The Regulated Market for Kidneys in Iran

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Abstract. We study the kidney market in Iran. The most effective treatment for end-stage renal disease is a kidney transplant. While the supply of cadaveric kidneys is limited, the debate has been focused on the effects of the existence of a free market for human organs. Economists as well as medical and legal researchers are divided over the issue. Iran has a unique kidney market which has been in place for over 20 years, frequently reporting surprising success in reducing the waiting list for kidneys. This paper demonstrates how the Iranian system works.

Keywords: Kidney Market.

1 Introduction

The most effective treatment for End-Stage Renal Disease (ESRD) is a kidney transplant (Renal Replacement Therapy: RRT). The only alternative treatment is dialysis and RRT is the only way for the patient to live without needing dialysis on a regular basis. Some researchers predict that the number of patient with ESRD reached 2 million worldwide by 2010 (Nwankwo et al., 2005). In the US, it is predicted that more than 40% of patients may die while on the waiting list (Matas, 2006). Xue et al. (2001) predict that more than 95,000 patients were on the waiting list for a kidney transplant by 2010; the figure was more than 65,000 in 2007.

There are two sources for a kidney transplant, cadaveric kidneys and kidneys from the live donors. Cadaveric kidneys can be harvested either from a brain-dead patient (whose heart is still beating) or cardiacally dead patient; the latter is considered to have a lower quality. Since a normal person can live on just one kidney, she can decide to donate one of her kidneys. The incentive to donate a kidney can be altruistic or obtaining money by selling a kidney.

In order to match a kidney from a donor with a potential recipient, their ABO and RdH blood types as well as tissues should be compatible. The ABO matching should follow the same rules that should be considered for blood transfusion, although some

* The author would like to convey thanks to Kidney Foundation especially Mr. Ghasemi and Mrs. Shaban-Kareh for providing access to the foundation data base. Dr. Alireza Heidary from the Organ Procurement Centre at the Iranian Ministry of Health also was very helpful in order to improve author's understanding of the Iranian kidney donation system.

P. Coles et al. (Eds.): AMMA 2011, LNICST 80, pp. 62–75, 2012.

programs are experimenting with ABO-incompatible transplantation (Gloor and Stegall, 2007). Regarding the tissue matching, a higher proportion of tissues matched between the donor and recipient will increase the probability of a successful transplantation.

It is well documented that RRT is cost effective as compared to dialysis. For example the UK national health system (NHS) data reveals that the annual average cost of dialysis is £30,800 while the cost of kidney transplantation is £17,000 following by a £5,000 annual cost of drugs which translates to the average net benefit of £241,000 for kidney transplantation over a period of 10 (UK Transplant, 2007).

In order to compare the cost of two alternatives for Iran (all data for 2008); the annual cost of hemodialysis for a patient is about Rials 47.0m. The cost of a transplant operation is about Rials 2.4m following by estimated Rials 40.0m annual expenditure on drugs. That means from the cost of point of view the transplant is preferred and the average benefit over a 10 year period is Rials 67.6m.

It is worth mentioning, the above calculations (both for UK and Iran) are only the direct benefit of the transplantation by reducing the treatment costs. Three other factors may also be considered in the cost-benefit analysis i) opportunity cost of the time spent to get dialysis treatment, ii) improved quality of life after receiving the transplant, and iii) risk of death during the surgery for donor which is reported to be between 0.03% and 0.06%. (Becker and Elias, 2007 and Matas et al, 2003).

It is also well known that kidneys from the live sources have a better quality as compared to the kidneys harvested from cadavers. NKUDIC (2007) contains statistics from US transplants which shows that the kidneys from live donors are more effective. While the 10 year graft survival probability for live kidneys is 54.7%, the same figure for a cadaveric kidney is only 39.2%. One issue that should be addressed here is the possibility that these data is affected by selection bias. In reality, patients are not randomly matched to kidneys. Terminally ill patients are more likely to receive a cadaveric kidney which becomes available with lower degree of compatibility. On the other hand, patients on better conditions can wait a bit longer to receive a more compatible live donation. Then the cadaveric kidneys may show a lower graft survival not only because of its own condition but also because of the condition of recipients.

Harvesting kidneys has been a major concern for health systems all around the world in the last few decades. In order to increase the kidneys available from cadavers, two different systems adopted. The most popular one is the opt-in system where people, who wish to donate their organs after their death, sign up to the scheme. The alternative system is the opt-out system which is practised in some European countries, including Spain and Austria. In this system, the donor's consent is presumed and a person needs to opt out the scheme if she does not want to donate her organs after death. One legitimate argument against this system is that presumed consent means that the state is considered the owner of the body of deceased person. Some consider this to be a problematic assumption (Becker and Elias, 2007). (For an economic comparison of the two systems see Abadie and Gay (2006)).

If the donor is a close relative or emotionally related to the recipient, live donation is legal in most of the countries around the world. The sale of organs is forbidden in

all countries except in Iran, which has a regulated system for selling kidneys. However, there is evidence of the abuse of the system in many other countries. There are reports that patients from wealthy countries travel to poorer countries in order to buy a kidney (Boseley, 2006) which in some cases removed from donor's body without their knowledge (Patel, 1996).

In Iran a regulated system for kidney donation with monetary compensation was introduced in 1980s. Under this regime the donor receives a monetary compensation from the recipient and enjoys additional monetary and non-monetary bonuses from the government. The system has been criticised harshly (i.e. Harmon and Delmonico, 2006 and Zargooshi, 2001) as well as receiving some warm support (i.e. Daar, 2006 and Mahdavi-Mazdeh et al., 2008) both inside Iran and internationally. Ghods and Savaj (2006) show that in 2006, 1858 kidney transplantation took place in Iran. 13% and 12% of these transplants were harvested from cadaveric and emotionally related live sources respectively and the other 75% was from unrelated live donations (Pondrom, 2008).

There has been no discussion on how the Iranian system works by economists, while there were a lot of discussion in medical journals (for some of the most recent ones look at Ghods and Savaj (2006), Griffin (2007), and Mahdavi-Mazdeh et al. (2008)), the lack of publication in economics journals leads to misleading quotes in other researches. For example Becker and Elias (2007) mention that Iranian government opposes the cadaveric donation on religious grounds which in not true. On contrary, based on data from IRODaT (2009) the Iranian government tries hard to replace the live donation with harvesting kidneys from cadavers and the number of other cadaveric organ donations is also growing fast (Pondrom, 2008).

In this paper, we try to establish clearly how the Iranian regulated system works and find facts using the data collected from one procurement centre in Tehran. Our finding shows the average waiting time in Iranian system is around 5 months which shows a significant difference compared to average waiting time in other countries.

Following we start with a brief review on the economics literature of organ donation in section 2. In section 3 and 4, we demonstrate Iran's case and present the data collected from one of the procurement centres. Section 5 concludes and offers some policy implications.

2 Literature Review

Economists have made contribution to the organ donation literature in two fields, the kidney market and issues associated with that and also designing a mechanism to resolve the allocation and compatibility issues.

2.1 Kidney Market

Discussion on buying and selling organs or parts of human body (including blood) can be done on four grounds: medical, moral, legal, and economic grounds. Top medical experts do not agree on whether the organ market can be implemented or

should be banned. Some of the most recent arguments for and against the idea can be found respectively in Reese et al. (2006) and Danovitch and Leichtman (2006).

From the medical point of view, the evidence as presented in introduction shows that live donation is efficient and cost effective. Furthermore, if it is safe to be performed on an emotionally related donor, there should be no medical concern for a kidney market on the medical grounds. Roth (2007) explains how the ethical and moral belief of majority of a society may affect the market as repugnance. Defining a property framework for the human body is one of the fresh lines of research in medical ethics. (i.e. Quigley, 2007).

The early discussion on the economics of a market for human body parts goes back to 1970 when Titmuss argued that buying and selling blood has an adverse effect on the quality of the blood (Titmuss, 1997). Titmuss compares the data from the British system (where paying for the blood was illegal) with the American system (where blood donors got paid) and argues that the latter had a lower quality of denoted blood. Titmuss points out that a monetary compensation system tends to decrease the supply (crowding effect) and acquire unhealthier blood.

Becker (2006) argues that even if Titmuss was right about the quality of the blood, the American system provides more blood per capita than British system, which means that the crowding out effect is not present. In case of kidneys, one can argue that medical developments can determine the well-being of the donor and recipient. On the other hand, since kidney transplant is a more complicated and costly procedure comparing to blood transfusion, the initial test for the donor in order to assess the quality of the kidney, as well as the donor's safety and welfare, would be more justifiable. Mellström and Johannesson (2008) ran a field experiment on the blood transfusion system in Sweden and conclude that the crowding out effect is observed only on some part of population (women) which will be eliminated if the monetary payment made to charity rather than the individual.

Cohen (1989), Epstein (1993), and Kaserman and Barnett (2002) discuss the monetary compensation for cadaveric organ donations but Becker and Elias (2007) are the first to calculate a price for live kidneys. They calculate a price of a kidney based on three components i) risk of death as a result of donation, ii) time lost during recovery, and iii) risk of reduced quality of life. They suggest a price of $15,200 for a kidney. They also point out that if the market for cadaveric kidneys established alongside the live kidney market, most kidneys will come from cadavers and live kidney prices works as a benchmark for the market equilibrium price for cadaveric kidneys.

2.2 Kidney Exchange Mechanisms

One of the main restrictions for emotionally related organ donations is the compatibility issue, where the donor's kidney cannot be transplanted for their intended recipient but it might be compatible with another patient who also has a non-compatible donor.

Roth et al. (2004) introduce a kidney exchange mechanism which efficiently and incentive compatibly, can increase the number of transplants. Modified versions of their

model, in order to limit the number of simultaneous operations needed, with constraint on the maximum number of donor-patient pairs to two or three, has been developed in later papers (Roth et al., 2005; Roth et al., 2007; and Saidman et al., 2006).

3 Iran's Case[1]

In 1980s, dialysis equipments were scarce in Iran because of economic sanctions and lack of funds for imports (Nobakht and Ghahramani, 2006). As a result, nephrologists were encouraged to perform kidney transplants. At the beginning, the process relied on few cadaveric kidneys available, along with emotionally related donors. But the large number of patients on the waiting list, forced the authorities to establish a regulated market for living unrelated donations. Efforts of charities, established and managed by dialysis patients and their close relatives, helped to develop the market. It is notable that over a period of 10 year (1996-2006) the rate of cadaveric and live donation increased by 35.1% and 8.1% annually. Cadaveric transplants accounted for 1.6% of total number of transplantation in 1996, this figure reached 13.1% in 2006 (IRODaT, 2009).

There are several bodies involved in kidney procurement for patients in need of a kidney transplant in Iran, the main two players are:

Kidney Foundation of Iran (or *Dialysis and Transplant Patients Association (DATPA)*) is a charity founded by some of kidney patients and their relatives about 20 years ago. With 138 branches around the country, they help kidney patients with medical, financial, and other problems. In about 10 centres they have kidney donation offices. Their main and busiest office is located in Tehran.

Management Centre for Transplantation and Special Diseases which is part of the Ministry of Health and Medical Education and is responsible for cadaver transplant. This centre has different nationwide waiting lists for patients in need of various organs for transplantation and is the main (and only) centre involved in procurement of organs from cadavers. When cadaveric organs of a deceased patient become available, the centre allocates the organs (including kidneys) to transplant centres around the country considering different factors including distance and waiting time.

In summer 2007, there were around 1000 patients on their waiting list for kidney transplant. In 2005, from 1854 kidney donation, 243 cases were from cadavers. Religious and traditional views are a major barrier for cadaveric donations, however, in recent years the numbers of cadaveric transplants is increasing. An opt-in system is designed and some individuals, especially young educated Iranians, have shown interest in signing to the scheme. But in practice the relatives of the dead person have veto power and they can overrule the original decision made by the person herself, as it is the case in many other countries (Abadie and Gay, 2006).

The Kidney Foundation keeps waiting lists for kidney patients with different blood types in each of its procurement offices. There are eight different lists for different blood types (see Table 1). To be on the waiting list, a kidney patient should be referred

[1] The latter part of this section is based on our interviews with the Iranian kidney foundation staff, other sources and some published papers.

to foundation by his doctor. Since the foundation does not run initial tests on patients, some patients may enter the list when they are not medically ready for a transplant. This may cause unintended delays in the matching process. A patient is given priority in the waiting list, if he either is medically in an emergency situation or is a disabled soldier.

There is no centralised waiting list and each centre has its own waiting list. Patients are asked by foundation to book in their nearest centre but some patients enter several waiting lists (including the cadaveric waiting list) in order to minimise their waiting time. However, the centres coordinate with each other in case of imbalances (especially for emergency cases) of demand and supply within a particular blood type.

Medical staff including the members of the transplantation team have no role in identifying potential donors. When a donor (should age between 22 and 35) turns up to donate her kidney, she needs to provide certain documents; including a formal consent from either her spouse or her father (in case of un-married donors)[2]. After the initial official paperwork, she will be referred to a clinic for the initial medical tests. These tests determine whether the potential donor has any kidney problem as well as blood type and whether her kidney has two renal arteries[3]. If the transplantation team suspected any possible harm to the donor either now or in the future, the donation will be cancelled. The costs of these tests, which are not high, have to be paid by the donor herself. Since the cost of these tests (estimated around Rials 50k) is not significantly high, comparing to the monetary compensation, it does not seem to have an adverse effect on donors' decision.

After the donor passes the initial tests, the administrators contact the first patient in the same waiting list as the donor's blood type. In this stage the staff also match the physical build of the donor and the patient or at least make sure that they are not extremely different. Matches cross different blood types are rare.

If the patient who is on the top of the waiting list is not ready for the transplant, the next patient will be called, and so on, until a ready patient will be found. Then a meeting between the two parties is arranged (they are provided with a private area within the foundation building if they want to reach a private agreement) and they will be sent for tissue tests. If the tissue test gives the favourable result (According to administrators of the foundation less than 10% of the tests have a positive cross-match which effectively rules out transplantation.), a contract between the patient and the donor will be signed and they will be provided with a list of the transplant centres and doctors who perform surgery. When the patient and the donor are referred to transplant centre, a cheque from the patient will be kept at the centre to be paid to the donor after the transplant takes place. The guide price has been 25m Rials (≈ $2660) until March 2007 for 3 years and then raised to 30m Rials (≈ $3190).[4] This decision has been made because the foundation was worried of a decreasing trend in number of donors. In some cases, the recipient will agree to make an additional payment to the

[2] In Absence of next of kin, to make sure the donor is aware of her action and its consequences, she will be referred to a chartered psychologist at the coroner's office for a psychic test.

[3] Most patients are not happy to have a kidney transplant from this type, since it reduces the chance of successful transplant.

[4] The exchange rate for 20 Feb 2008: $1 ≡ Rials 9410.

donor outside the system; it is not certain how common this practice is, but according to the foundation staff the amount of this payment is not usually big and is thought to be about 5m to 10m Rials (≈ $530 to $1060). The recipient also pays for the cost of tests, two operations, after surgery cares, and other associated costs. Insurance companies cover the medical costs of the transplant and the operations are also performed free of charge in the state-owned hospitals.

In addition, the government pays a monetary gift to the donor (currently, Rials 10m), as well as automatic provision of one year free health insurance[5], and the opportunity to attend the annual appreciation event dedicated to donors. The Charity Foundation for Special Diseases also provides the donors with a free annual medical test and high level of support, in case that the donor develops kidney problems in the future, regardless of whether this is due to the transplant or not.

Emotionally related donors also enjoy these monetary and non-monetary bonuses as well as exemption of paying hospital costs, and it gives them a good incentive to register at the foundation offices. The minimum payment of Rials 45m is around 2 years of minimum wage and equivalent to around 6 times of average monthly cost of living for a family of four in urban areas reported by the Iranian Central Bank.

The minimum current payment (45m Rials) by using PPP exchange rate is equivalent to $14,000 which is interestingly close to Becker and Elias (2007) suggestion for the market value of a kidney at $15,200 for the US. In 1980s when the sale of kidney was legal in India, donors were paid $1,603. After making this illegal in 1990s the average payment dropped to $975 (Goyal et al., 2002). Based on this paper and other researches, Becker and Elias (2007) estimate that the equivalent cost of a kidney in Indian market to US dollar in 2005 is in region of $17,078 to $17,665.

Advertising for kidney donors is banned but informal advertisement is observed and some patients manage to find donors using informal channels in order to avoid the waiting list. The foundation handle these cases with due care and such cases need to be reviewed by the foundation managing director.

In order to prevent international kidney trade, the donor and recipient are required to have the same nationality. That means an Afghan patient, who is referred to the foundation, should wait until an Afghan donor with appropriate characteristics turns up. Another issue can be Iranian nationals residing abroad and travel to Iran to buy a kidney, which is allowed under current legislation. Ghods and Savaj (2006) present the data that shows the scale of transplant tourism is very small in Iran.

By the foundation's procedure to keep 8 different waiting lists, if one assumes that the blood type distribution is the same between patients and potential donors then the waiting time would be fairly similar for all waiting lists, furthermore there will be no significant social benefit in matching between blood groups.

One of the concerns about employing the Iranian system would be the possible welfare effect on the minorities because of the different pattern of the blood type distribution in their blood types. One line of fresh research in Iranian system would be

[5] Nobakht and Ghahramani (2006) claim that the donors are provided with a free life-long insurance which is in contrary with our findings, after interviews with the foundation staff.

to investigate the proportion of different ethnic and race minorities in the pool of kidney donors and recipients.

There are two major papers which address the donors' satisfaction issue. Zargooshi (2001) surveys 300 of kidney donors. They donated between 6 to 132 months prior to being interviewed. He finds that the majority of donors either did not receive or did not attend follow-up visits and many of them regretted their original decision. On contrary, Malakoutian et al. (2007) report a 91% satisfaction between living kidney donors. However, the latter survey interviewed the donors at the point of discharge from hospital.

4 Data

Our data contains 598 transplantations recorded in Tehran office of the Kidney Foundation between April 2006 and December 2008. Of these, 549 were live kidney donations of which 539 were traded kidney and 10 emotionally related donations. The remaining 49 transplantations took place with a cadaveric donation. In theory, the waiting lists for live and cadaveric kidneys run independently; and the coverage of our data from cadaveric transplant is not complete. As a result, our data shows a 8.2% share for the cadaveric transplantations, which is lower than around 13% based on official sources. It is clear that our finding can not be a good image of what is happening in terms of emotionally related donations, because of the small number of this type of donations in our sample. Table 1 shows the ABO and RhD blood types distribution of recipients.

Table 1. The ABO and RhD blood types distribution of recipients

	Blood Type									
	O+	A+	B+	AB+	O-	A-	B-	AB-	**Total**	
Traded	150	165	110	38	27	34	10	5	**539**	90.1%
Non-Traded	3	2	2	1	0	1	1	0	**10**	1.7%
Cadaver	15	15	11	2	1	3	2	0	**49**	8.2%
Total	**168**	**182**	**123**	**41**	**28**	**38**	**13**	**5**	**598**	

In Order to check whether the traded kidneys are biased in favour of AB blood type and are disadvantageous for O type, Table 2 demonstrates the ABO blood type distribution of recipients. Although the share of AB recipients is higher in traded cases but there is no significant difference for the share of O recipients in traded and cadaveric cases.

Table 2. The ABO blood type distribution of recipients

	Blood Type				
	O	A	B	AB	**Total**
Traded	32.8%	36.9%	22.3%	8.0%	**100%**
Non – Traded	30.0%	30.0%	30.0%	10.0%	**100%**
Cadaver	32.7%	36.7%	26.5%	4.1%	**100%**
Total	**32.8%**	**36.8%**	**22.7%**	**7.7%**	**100%**

Another concern could be discriminating against women in receiving kidneys. Traditionally in Iran, men are considered the breadwinner of the family. Despite the recent changes in the sex pattern of labour force, it is still biased in favour of male workers. Since in this view, the economic value of a man is considered to be higher, one consequence in our argument can be a higher likelihood for a male patient receiving a kidney from traded sector. Our data shows 64.9% and 67.3% of male recipient for traded and cadaver kidneys respectively which do not support such a negative effect on female patients.

On the other hand, the donors are mostly men (446 in 539 cases of traded kidneys). This can be because of the two facts. Firstly, the ages between 22 and 35; when the donation is accepted; is the fertility age; and women are less likely to be considered as potential donors. Secondly, since men are considered as the family breadwinner, it is likely that they sell their kidneys to overcome financial difficulties. Female donors count for around 18% of traded kidneys in our data; it is in contrary with the Indian case where 71% of the sold kidneys were from female donors (Goyal et al. 2002).

Table 3 demonstrates age distribution of recipients and donors of traded kidneys. It shows that 10.9% of the recipients are under the age of 20. The high number of transplants needed for relatively young patients (42.9% under the age of 40 and 65.3% under the age of 50), shows the economic and social value of these transplants. Although the foundation's policy is to limit the donors' age to 35, 10.4% of the donors are older than 35.

Table 3. Age distribution of recipients and donors

Age	Recipients		Donors	
5 – 19	59	10.9%		
20 – 24	36	6.7%	148	27.5%
25 – 29	50	9.3%	216	40.1%
30 – 34	42	7.8%	119	22.1%
35 – 39	44	8.2%	51	9.5%
40 – 44	59	10.9%	5	0.9%
45 – 59	185	34.4%		
60 – 74	63	11.7%		
75 – 79	1	0.2%		
Total	**539**	**100.0%**	**539**	**100.0%**

The joint blood type distribution of recipients and donors can be seen in Table 4. On average 94.8% of kidneys are matched to an exact blood type. In total 28 cases out of 539 are matches between different blood types. The reason behind this can be emergency cases, matches found by patients themselves out of the formal system, and especial cases (like children recipients when the size of kidney plays an important rule).

Table 4. Joint ABO and RdH frequency of transplants for recipients and donors

		Donor								**Total**	
		O+	A+	B+	AB+	O-	A-	B-	AB-		
Recipient	O+	149				1				**150**	27.8%
	A+	2	163							**165**	30.6%
	B+	4		104				2		**110**	20.4%
	AB+		1	1	36					**38**	7.1%
	O-	7				20				**27**	5.0%
	A-	1	4			3	26			**34**	6.3%
	B-							10		**10**	1.9%
	AB-				2				3	**5**	0.9%
Total		**163**	**168**	**105**	**38**	**24**	**26**	**12**	**3**	**539**	100.0%
		30.2%	31.2%	19.5%	7.1%	4.5%	4.8%	2.2%	0.6%	100.0%	
Own type		91.4%	97.0%	99.0%	94.7%	83.3%	100.0%	83.3%	100.0%	94.8%	

The average waiting time for patients who receive a live kidney is 149 days (Table 5). By waiting time, we mean the time gap between signing into the waiting list and the operation date. This includes the time needed for the tests and preparation before the transplant when a match initially introduced.

Assuming a similar distribution in donors and recipients population over the blood types, waiting time is expected to be the same for all waiting lists. However, the waiting time for a given waiting list is going to be affected by the following: i) Not enough donors from that blood type turn up comparing to other blood types; it can be serious when one blood type is rare; like AB- for the Iranian population; ii) When kidneys from a blood group is offered to other blood groups. In our data, type O+ recipient is likely to be slightly affected by this, as the average waiting time for them is 171 days and 8.6% of this type of kidney is allocated to other blood groups. iii) When a patient enters before he is medically ready for the transplant; we cannot check for this in our data. And iv) When a mismatch arises in testing procedure which means a 2-4 weeks is added to waiting time of the next recipient of this kidney. However, we can assume the last two have a similar effect on all waiting lists.

Table 5. Average waiting time for recipients based on the blood type of both parties

		Donor								
		O+	A+	B+	AB+	O-	A-	B-	AB-	**Average**
Recipient	O+	169				461				**171**
	A+	110	138							**137**
	B+	85		138				214		**138**
	AB+		104	32	128					**125**
	O-	163				117				**129**
	A-	92	205			249	177			**184**
	B-							124		**124**
	AB-				218				144	**174**
Average		**165**	**139**	**137**	**133**	**148**	**177**	**139**	**144**	**149**

The guideline price increased by 20% on March 2007. But our data shows no significant change in the waiting time or the number of donation. It could because of two reasons; firstly this increase has almost no significant effect in real term because of inflation (The inflation rate for 2006-07 is 18.4%). Secondly, the price that actually paid in each case can be different from this benchmark by two parties' negotiation process and it can also make that increase less significant.

Considering all of the mentioned factors, having a waiting list of around 5 months in Iranian system comparing to more than 3 years for some other countries seems a significant achievement.

5 Summary and Conclusion

In this paper, our focus was not on the moral and ethical issues surrounding the discussions. The effect of the Iranian system on reducing the waiting time for patients is significant, which based on our data is around 5 months. One should be careful in advising to ban the sale, the alternative solution practiced in other developing countries, e.g. black market for organs, might have dramatic consequences. This may result lower standards on medical conditions, as well as leaving the donors who can be vulnerable without any official support.

Following, we list the possible policy considerations:

- Since the donors might be subject to exploitation because of their social status; it needs to be guaranteed that they make an informed decision and are aware of all risks attached to their decision.
- After donation networks needs to be strengthened in order to make sure the donors receive the best support possible.
- Considering the Iranian population structure, it is expected that the demand might rise for kidneys in coming years and decades. Then, more efforts need to be put on other sources of kidneys. Cadaveric kidneys can be utilised more effectively. Unlike some developed countries, Iran faces no social barrier in new frontiers in

medical research, e.g. cloning. Investing in this area may help to eliminate the demand for live donation in the future.

- A national waiting list can reduce the waiting time as well as improving pre- and post- surgery support for both donors and recipients.
- It can be shown by a simple two separated market when the supply can be transferred from one market to the other that allowing intra-trade may improve the welfare in one market and reduce it in the other. The Iranian model restricts the social welfare by not allowing trade between different markets; however, it might be justifiable with higher expected rate of success when both donor and recipient have the same blood type.

Future research can focus on two different lines; first, a behavioural experiment on whether people who decide to donate their kidney for money, have significantly different economic attitudes; second if one can get the data on actual money exchanged hands in the donation an analysis of demand and supply for kidneys can give us a better insight into this market.

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