ISSN: 2755-1059

Journal of Nephrology & Endocrinology Research

SCIENTIFIC Research and Community

Case Report

Open Access

Is Kidney Trading the Answer for Kidney Shortage? A Case Study Based on Iran's Experience

Claire Liu

St. John's School, Guam

ABSTRACT

Kidney transplantation has been demonstrated to be the treatment of choice for end stage renal disease. However, most patients still end up receiving dialysis rather than receiving transplantation for the kidney as the organ source is fairly limited in most countries. We therefore explore the case of Iran where kidney trading is considered legal. As of now, Iran is also the only country worldwide that allows monetary compensation for kidney donation, whereas there are rules to refrain its abuse. We also discuss the strength and weakness of Iran's kidney trading system and the applicability of the system to other countries to hopefully help reduce the kidney shortage in organ donation.

***Corresponding author**

Claire Liu, St. John's School, 911 North Marine Corps Dr, Tumon, 96913, Guam.

Received: January 31, 2025; **Accepted:** February 07, 2025; **Published:** February 13, 2025

Keywords: Kidney Trading, Kidney Transplantation, Kidney Shortage, Organ Transplantation, Organ Trading, Iran

Introduction

When most people hear the term "organ trade", they associate it with crime and likely oppose the legalization of organ sales. Life is widely regarded as priceless, and by extension, human organs are not something to be bought or sold. The impacts of organ removal for sale can also be significant. However, one exception exists: the kidney. A person can live just as long and well with one kidney as with two, making kidney trade a practical possibility. It is important to differentiate between organ trade and organ trafficking: the former refers to the legal sale of organs, while the latter involves illegal transactions. In most countries, organ sale is illegal and classified as trafficking. Iran is the only country where organ trade is permitted, though it is restricted to kidneys and operates under strict regulations. Iran's system was influenced by unique historical factors. Given today's global shortage of transplantable kidneys, Iran's experience offers an opportunity to evaluate whether its model has effectively addressed the kidney shortage, to assess its strengths and weaknesses, and to explore ethical concerns. Finally, we will consider whether improvements to the model could make it adaptable for other nations facing similar challenges.

Global Kidney Shortage

Chronic kidney disease affects 13.4% of the global population, and this number continues to rise with aging populations and increasing cases of hypertension and diabetes. As the disease progresses to end-stage renal disease (ESRD), patients require renal replacement therapy (RRT); without it, they usually die within 8–12 weeks. Globally, 5–7 million people have ESRD, but there are only two RRT options: dialysis and kidney transplantation. Dialysis must be done every two days for 3–4 hours, often causing weakness and pain, and must continue indefinitely. Kidney transplantation, although requiring lifelong immunosuppressants, offers ESRD patients a longer life, better quality of life, and fewer cardiovascular complications compared to dialysis [1]. It is also more cost-effective, even in countries with universal healthcare. Despite these advantages, kidney transplantation is limited by a severe shortage of transplantable kidneys. The kidney was the first organ successfully transplanted in 1953, due to simpler procedures, fewer complications, and lower risks of rejection and infection. Kidneys for transplantation come from cadaveric or living donors, with living donations divided into related and unrelated categories. Related donors have the highest success rates due to lower rejection risks, while unrelated living donors achieve better outcomes than cadaveric donations [2].

Additionally, since a person can live a normal life with one kidney and have similar longevity to someone with two, this increases the likelihood of living donations. However, at present, the majority of kidney donations still occur after death in most countries [3]. Living people donate kidneys mainly because their relatives have ESRD and they want to give them to the relatives or through the paired kidney exchange system that has just emerged in this century so that their relatives can get a matched kidney sooner [4]. Due to increasing deaths from drug overdoses, higher rates of voluntary organ donation from deceased individuals, and the growing use of paired kidney exchange systems, the United States has led OECD countries in total and per capita kidney transplants since 2019. Still, over 93,000 people remain on the kidney transplant waiting list, with average wait times of 3–5 years. The need to increase the supply of transplantable kidneys becomes an inevitable agenda.

The Unique Country

There is only one country in the world that has nearly eliminated its kidney transplant waitlist, where over 50% of ESRD patients have undergone kidney transplants, and where living unrelated kidney transplants outnumber deceased kidney transplants: Iran. Currently, Iran performs 2,500–2,700 kidney transplants annually. This success is attributed to its unique kidney trade system, unlike any other in the world.

Elsewhere, organ trade is prohibited, as the World Health Organization discourages organ sales to prevent the exploitation of vulnerable people and mitigate risks to donors. In 2008, the Declaration of Istanbul defined organ trafficking and transplant tourism, urging countries to ban both practices. Over 100 nations, including previously notorious ones like China, Turkey, the Philippines, and Pakistan, responded by tightening relevant laws [5]. Iran became the first Middle Eastern country to perform kidney transplants in 1967, but laws on deceased kidney donation were not passed until 2000. Meanwhile, Iran has the fifth-highest prevalence of kidney disease globally due to its diet and lifestyle, exceeding the world average by 2–5%. For years, Iran faced a shortage of transplantable kidneys, with most ESRD patients reliant on dialysis. The burden of a large dialysis population strained healthcare expenditures in a country plagued by decades of economic challenges, as the growing number of ESRD patients outpaced dialysis resources. In the early 1980s, Iran even attempted to send ESRD patients abroad for transplants. This situation changed in 1988 when Iran passed laws permitting unrelated living kidney donations, effectively legalizing kidney trade under a regulated framework. The law framed these transactions as "donations" with the kidney recipient (KR) providing a "gratitude" payment to the kidney provider (KP). Within a year, transplant numbers doubled, with 80% of kidneys coming from unrelated living donors. Between 1988 and 2000, living related donations continued, and deceased donations became legal after 2000, creating a three-track system: living related, deceased, and living unrelated donations. However, unrelated living donors rarely donate altruistically, as kidneys can be sold instead.

Description of Iran's Kidney Trade System

The system [6,7] involves monetary compensation but falls short of free-market trading, as kidney prices are regulated within a fixed range. The system is operated via the Dialysis and Transplant Patients Association (DTPA), composed of ESRD patients who volunteer under the supervision of the health authority. This third party organization is responsible for leading and overseeing the entire kidney trading process. ESRD patients needing transplants (KRs) register with the DTPA after obtaining a referral from their doctor, while individuals wishing to sell a kidney (KPs) also register. To become a qualified KP, the person must be between 18-40 years old, pass a series of physical and mental assessments as well as the medical tests, along with a notarized consent form oneself and the family. Only Iranian citizens are qualified for being KP and KR to prevent organ trafficking and transplant tourism.

The KP and KR cannot contact each other privately, but some people do so secretly. After registration is complete, the DTPA will match the KR and KP based on blood type and human leukocyte antigen (HLA). Those who register first are paired first.

The DTPA matches KPs and KRs based on blood type and HLA. Matches are made on a first-come, first-served basis, but matching is not routine, potentially increasing rejection rates compared to other countries. Once matched, the DTPA facilitates contact between the KR and KP for price negotiation. A national floor price for kidneys, currently $3,200 USD, is set to protect KPs from exploitation, with prices adjusted periodically. Regional rules may vary slightly, with some areas imposing ceiling prices or requiring price transparency. Final transaction prices generally range from $4,400–$5,000 USD. KPs receive additional government incentives, including $150 USD, free post-transplant medical follow-up for a year, and potential exemptions from military service. Charities sometimes assist KRs who cannot afford the cost, though funding is inconsistent. The geographic disparity in kidney prices leads KPs to register in areas with higher prices, while KRs prefer areas with lower prices, resulting in uneven distribution. In regions with price ceilings, KRs often make under-the-table payments to KPs. Some ESRD patients forgo registration entirely, knowing they cannot afford the costs, as Iran's 2022 per capita income was just $5,460 USD. DTPA staff, themselves ESRD patients, may prioritize their own matches and often resign post-transplantation. Once a price is agreed upon, KRs must pay KPs within a specific timeframe. Both are then referred to government-approved hospitals for transplantation, with surgical and post-operative costs covered by the government. Hospitals and doctors are prohibited from profiting from the kidney trade. However, complications occasionally arise. If a KP cannot undergo surgery immediately due to illness or other risks, the KR must wait until the KP recovers. Alternatively, the KR may terminate the agreement and find another KP, but the original KP keeps the payment. If the KP becomes unable to donate (e.g., due to injury), the KR can request a refund. If the KR dies before surgery, the KP must return the payment since the transaction was incomplete.

After Transplantation

Many KPs sell kidneys due to severe financial hardship or coercion from creditors. Post-surgery, they often skip follow-up care to avoid discrimination for selling their kidneys. This leads to poorer health outcomes compared to donors in other countries, although their long-term mortality rates are similar. Critics question the autonomy of KPs in making the decision to sell a kidney under financial duress, despite informed consent being required. There is also concern about the loss of dignity associated with selling one's organ, likened to the stigma surrounding selling one's body. KRs also face challenges. Iran's medical quality is not on par with developed nations, potentially shortening life expectancy after transplantation, though no data confirms this. Additionally, Iranian KRs are typically older and in worse health compared to organ recipients in other countries, where factors like age, comorbidities, and psychiatric history influence recipient selection. The physical condition of the KP may not be suitable for kidney transplantation. In Iran, financial status is often the sole determining factor for kidney procurement. Rash removal of a kidney may result in devastating medical consequences. Furthermore, the prognosis for both the KR and KP is poorer compared to transplantation done in the accredited hospitals due to substandard surgical capabilities and post-transplantation care in private hospitals. In addition, KRs in Iran's organ trade system are often older with poorer baseline physical conditions than the organ recipients in other countries as the latter is selected by a variety of factors including age, comorbidities, social and psychiatric history … etc that the healthier subjects are often prioritized, whereas the only determining factor for the KR to procure a kidney is his/her own financial status.

The Rampant Black Market of Private Trafficking

Despite Iran's long-standing kidney trade system, private kidney trafficking persists. Even though the Iranian government has strengthened relevant laws following the Declaration of Istanbul, the public often fails to distinguish between private trafficking and the DTPA system, with many believing private sales are legal. Iran's economic struggles have created a poverty-stricken class, many of whom are ineligible to register with the DTPA or seek higher prices on the black market, where kidneys can fetch up to $160,000 USD. Buyers who lack medical referrals, have unmatched HLA types, or want to avoid long wait times also turn to the black market. Foreigners further fuel private organ

trafficking, sometimes involving coercion or abduction for organ extraction. Transplants in unauthorized hospitals are marked by poorer surgical standards, higher rejection rates, and severe risks for both KR and KP. Last but not least, human trafficking may occur along with organ trafficking [8], which includes extracting one's kidney without his/her own consent and abducting locals or foreigners to Iran and retrieving their kidneys or other organs for sale.

The Outcomes from Iran's Model

No national epidemiological data exists for Iran's kidney trade. However, a study in Mashhad revealed a crowding-out effect on living kidney donation—most KPs now prefer selling kidneys, even to relatives, over donating [7]. The average kidney price equals two years of minimum wage. KPs are younger, predominantly male (85%), and less educated than KRs. Unemployed KRs comprise 47%, despite having slightly more education than KPs. For each additional year of education in KP, kidney prices rise by $26.2 USD, and prices increase $3.25 for each year of age difference between KP and KR. Another study found male ESRD patients receive kidneys via trade more often than women, who are likely to receive through donation [9]. Wait times for kidneys in Iran are short if KR can pay, though outcomes slightly lag behind other nations. Graft survival rates in the U.S. for unrelated living transplants range from 93.9%-97.8% (1 year) and 79.0%-86.5% (5years), compared to Iran's 92.48% (1 year) and 79.96% (5 years) [10,11]. Variations in graft survival reflect uneven medical resources. Nevertheless, there is wide variation in graft survival rates among different regions in Iran, which may represent an uneven distribution of medical resources throughout the country. The situation of KPs after transplantation also appears worrisome [12]. More than 83% of KPs chose to sell the kidney for financial reasons, but afterwards, more than half expressed regret, 39% preferred to beg, and 60% preferred to borrow from loan sharks rather than sell a kidney. 75% of KPs said that selling a kidney ultimately did not achieve their intended goal, yet left them in worse health than before. KPs often regret their decision, with 75% failing to meet financial goals and 83% citing poor post-transplant health [12].

Conclusion

Almost four decades have passed since the inauguration of Iran's kidney trade system, which now supports over half of the country's kidney transplants. While the model has successfully eliminated transplant waiting lists, concerns about the ethicality of the practice, the well-being of kidney providers (KPs), and the persistence of private kidney trafficking remain. Iran's approach offers valuable insights into solving the global kidney shortage, but its system is not without flaws. The vulnerabilities of the model, such as the prevalence of underground trafficking, inadequate post-transplant care, and disparities in medical resources, highlight the complexities of regulating such a market. Iran's model also underscores the risks to KPs, who often come from economically disadvantaged backgrounds and face regret and worsening health outcomes after surgery. Additionally, the system has created unintended consequences, such as the near disappearance of altruistic living donations. Still, the country's experience demonstrates that regulated kidney trade can address critical organ shortages if accompanied by strict oversight, equitable access, and medical safeguards. While Iran's model is not universally replicable, especially in countries where organ sale is illegal or socially unacceptable, it raises important questions about the ethics, practicality, and potential improvements of organ trade systems. In today's global shortage of transplantable kidneys, we believe that the experience and model of the Iran's organ trade can be used to examine whether it has effectively solved the kidney shortage problem and whether the system has been effective in achieving its goals, to explore the strengths and weaknesses of the system and whether there are ethical concerns and controversies for kidney trade, and finally to consider whether there is room for improvement in the Iran's model so that other countries may apply the system to solve the pressing issue of kidney shortage.

References

1. M Tonelli 1, N Wiebe, G Knoll, A Bello, S Browne, D Jadhav, et al. (2011) Systematic review: kidney transplantation compared with dialysis in clinically relevant outcomes. American journal of transplantation: official journal of the American Society of Transplantation and the American Society of Transplant Surgeons, 11: 2093-2109.
2. D D Koo 1, K I Welsh, A J McLaren, J A Roake, P J Morris, et al. (1999) Cadaver versus living donor kidneys: impact of donor factors on antigen induction before transplantation. Kidney international 56: 1551-1559.
3. Schreuder M. F (2018) Life with one kidney. Pediatric nephrology (Berlin, Germany) 33: 595-604.
4. Vivek B Kute, Himanshu V Patel, Pankaj R Shah, Pranjal R Modi, Veena R Shah, et al. (2017) Past, present and future of kidney paired donation transplantation in India. World journal of transplantation, 7: 134-143.
5. International Summit on Transplant Tourism and Organ Trafficking (2008) The Declaration of Istanbul on Organ Trafficking and Transplant Tourism. Clinical journal of the American Society of Nephrology: CJASN 3: 1227-1231.
6. Major R. W (2008) Paying kidney donors: time to follow Iran?. McGill journal of medicine: MJM: an international forum for the advancement of medical sciences by students 11: 67-69.
7. Moeindarbari T, Feizi M (2022) Kidneys for Sale: Empirical Evidence from Iran. Transplant international: official journal of the European Society for Organ Transplantation 35: 10178.
8. Potter J (2015) Does the Iranian model of kidney donation compensation work as an ethical global model?. Online Journal of Health Ethics 11.
9. Malekshahi A, MortezaNejad HF, Taromsari MR, et al. (2020) An evaluation of the current status of kidney transplant in terms of the type of receipt among Iranian patients. Ren Replace Ther 6: 66.
10. Emilio D Poggio, Joshua J Augustine, Susana Arrigain, Daniel C Brennan, Jesse D Schold (2021) Long-term kidney transplant graft survival—Making progress when most needed. Am J Transplant 21: 2824-2832.
11. Mousa Ghelichi-Ghojogh, Haleh Ghaem, Fateme Mohammadizadeh, Mouhebat Vali, Faisal Ahmed, et al. (2021) Graft and Patient Survival Rates in Kidney Transplantation, and Their Associated Factors: A Systematic Review and Meta-Analysis. Iranian journal of public health 50: 1555-1563.
12. Zargooshi J (2001) Iranian kidney donors: motivations and relations with recipients. The Journal of urology 165: 386-392.