



The Cost of Kidney Transplantation in Iran

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ABSTRACT

Background. Kidney transplantation has gained widespread popularity by improving the outcome of end-stage renal disease (ESRD) patients. However, this is a highly complicated and expensive procedure that puts much pressure on the health system in developing countries. We report the costs in Iran model of kidney transplantation.

Materials and Methods. We reviewed the regulations for kidney transplantation using Dialysis and Transplant Patients Association (DATPA) information, 2005. All data regarding the cost of transplantation procedure, immunosuppression, and the money given to donors were included. The cost of transplantation procedure was categorized into personnel, drugs, paraclinics, hospital bed, and other expenses. To achieve more comprehensive results, all costs were converted into US dollars (1 USD = 9000 Rials).

Results. The total cost of kidney transplantation procedure was \$9224. Of this, 65.8% (\$6076) was related to the immunosuppression therapy in the first year, 22.2% (\$2048) to the transplantation procedure, and 12% (\$1100) to organ procurement. The details of donor nephrectomy were as follows: personnel, \$183; accommodations, \$107; drugs, \$39; paraclinics, \$23; and other, \$22. These values for kidney recipient were personnel, \$331; drugs, \$367; paraclinics, \$278; accommodations, \$475; and other, \$222.

Conclusion. Compared with other countries, the kidney transplantation cost is low in Iran. The health system also pays for all the expenses. These, along with full medical insurance coverage of kidney recipients, make kidney transplantation available for every patient, regardless of the socioeconomic status due to its low cost. It is expected that a higher number of transplantation candidates with a low socioeconomic status will select transplantation.

KIDNEY TRANSPLANTATION is the preferred method of kidney replacement therapy (KRT). Many studies have shown its superiority to other KRTs, like hemodialysis and peritoneal dialysis, in terms of lower short- and long-term costs, better patient and graft survival, better quality of life, less morbidity, and better compliance with therapy.¹

Due to these advantages, many physicians now recommend it as the first line of treatment for KRT. Because of a lack of kidney resources for transplantation from cadavers in almost all countries, there are huge waiting lists for receiving a kidney. The number of patients on waiting lists exceeds 50,000 patients and this number is growing every day.¹ Many patients die while waiting for a transplant. Findings about the superiority of preemptive kidney transplantation and good outcome of kidney transplantation in

the elderly have added to this number and have increased the pressure on healthcare systems in recent years.²

Due to similar problems in Iran, the authorities decided to establish a model based on controlled living unrelated donor (LURD) nephrectomy.³ This model, which is now well-known as the "Iranian Model" for kidney transplanta-

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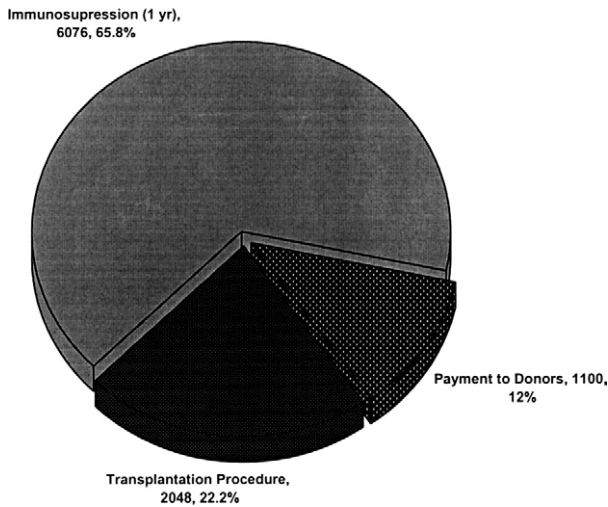


Fig 1. Total costs of kidney transplantation.

tion, has received a lot of attention among transplantation scientists worldwide. The efficacy of this model is evident by eradicating the waiting list, allowing people of every socio-economic status to receive a kidney and the prevention of an organ black market and organ trafficking, along with comparable patient and graft outcome to the international standards.⁴

Despite the popularity of this model and findings of other studies in different countries about the cost effectiveness of kidney transplantation, there is no published report on the costs of kidney transplantation in Iran. We report here the costs of kidney transplantation in Iran based on data from a reliable organization.

MATERIALS AND METHODS

Because living donors are main source of organ for kidney transplantations in (99.2% compared with 0.8% for cadavers),³ we report here the costs of kidney transplantation from living donors. In the Iranian model, all hospital expenses for a kidney transplantation procedure are paid by the government. There is no private practice for kidney transplantation in Iran and all transplantation teams belong to university hospitals.

We gathered data regarding the costs of kidney transplantation from Dialysis and Transplant Patients Association (DATPA), a government controlled nonprofit organization responsible for registering all the transplantation activities in the country and is working under close observation of the Iranian Society of Organ Transplantation. Expenses are related to the transplantation procedure based on open nephrectomy (with an average 5 days of hospitalization in donors) and the first kidney transplantation (with a total of 30 days of hospitalization, including 2 days in intensive care) for kidney recipient plus 1 year of immunosuppression and the money that is given to the donors. Expenses for the transplant procedure and their categorization in our study were as follows: nursing, visits by nephrologists and the costs related to transplant surgeons and the anesthesia to form personnel costs; accommodation and operation room costs to form accommodation; the costs of laboratory and imaging studies to form para clinics; and equipments and other costs to form other and the costs related to the drugs.

The cost of immunosuppression therapy was calculated based on the routine triple therapy protocol with cyclosporine (Sandimmune, Novartis, Basel, Switzerland), mycophenolate mofetil (CellCept, Roche Mannheim, Germany) and prednisolone for a period of 1 year. Payments to donors includes the award that is given to the donors by the government. To be internationally comparable, we converted all the costs to US dollars (1 USD = 9000 Iranian Rials).

RESULTS

The total cost of kidney transplantation was \$9224 65.8% (\$6076) of which was related to the immunosuppression therapy in the first year, 22.2% (\$2048) to the transplant procedure, and 12% (\$1100) to payments to donors (Fig 1).

The details of total cost of transplantation procedure are as follows: accommodation, \$582 (28%); personnel, \$514 (25%); drugs, \$406 (20%); paraclinics, \$301 (15%); and other, \$245 (12%). The costs of kidney transplantation procedure in recipients includes accommodations costs, \$475 (28%); drugs, \$367 (22%); personnel, \$331 (20%); paraclinics, \$278 (17%); and other costs, \$222 (13%; Fig 2). Donor nephrectomy costs, related to the mentioned categories were personnel cost, \$183 (49%); accommodations, \$107 (29%); drugs, \$39 (10%); paraclinics, \$23 (6%), and other, \$22 (6%).

DISCUSSION

The total cost of kidney transplantation procedure in our study was \$9235. The reports on the total costs of kidney transplantation from other countries are very diverse and vary greatly from one center to another. It is reported to be from \$65,569 in Germany,⁵ \$65,000 in China,⁶ \$44,201 to

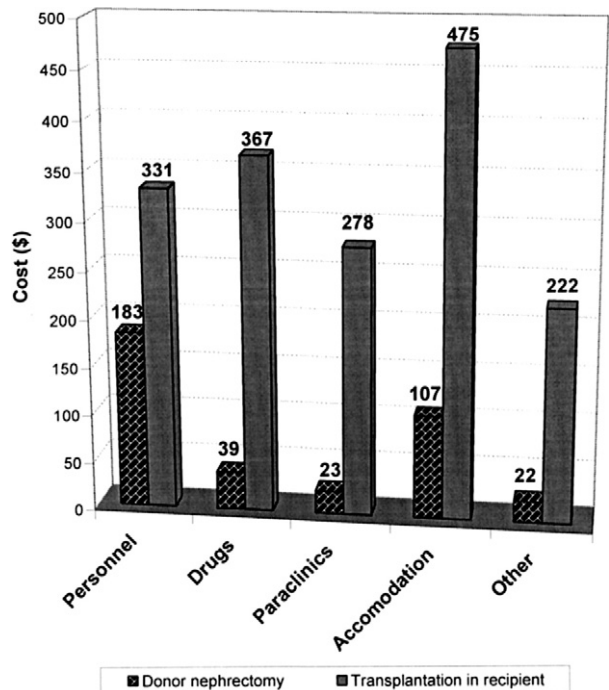


Fig 2. Details of transplantation costs.

\$64,000 in the United States,^{1,7} and \$40,000 in Mexico⁸ to \$8000 in India.² As the data show, the cost of kidney transplantation in Iran is very low and is comparable to the countries with very low cost of kidney transplantation, like India. As the data show, the majority of this cost (>65%) is related to immunosuppressive therapy. This is the proportion that is out of the health care system's control and is influenced by the international cost of drugs. However, the burden of such a cost is not imposed on patients and the health care system pays for almost all the drug cost. Furthermore, all kidney recipients receive full medical insurance coverage from government-based insurance companies as a rule. Therefore, follow-ups and immunosuppressive drugs are available at a low price and thus, the low rate of costs for kidney transplantation continues even after transplantation.

Several facts could explain such a low price. In Iran, all the hospitals that perform transplantation are university based and are funded by the government. Another fact is the relatively low personnel costs. Short- and long-time patient and graft survival rates are comparable to international standards.⁴ These facts could explain why the kidney transplantation rate is increased in the country and why Iran is the most active country in the field of kidney transplantation in the MESOT region. These are also some factors that may entice foreigners to undergo kidney transplantation in Iran. Based on the current regulations, candidates from foreign countries are allowed to undergo transplantation if the donor and the recipient are of the same nationality. The price of kidney transplantation for such patients is near the mentioned costs. These facilities have led to a number of such transplantations being performed on foreigners in the past and this trend is increasing.⁹

The policy of Iran in the case of kidney transplantation has yielded major benefits for the health care system. There is no doubt that kidney transplantation has definite cost effectiveness over other KRTs.¹ There is now growing enthusiasm for establishing a LURD program, like the Iranian model, in many countries like the United States, where this kind of practice is explicitly prohibited by law.¹⁰ Much of this enthusiasm comes from members of transplant communities and a number of economists and bioethicists. They believe that with thousands of patients still on waiting lists, many of whom die waiting for a transplant, and with regard to the costs of other KRTs, paying a donor as much as \$90,000 for each kidney would be cost effective, in addition to its life-saving results.¹

Kidney transplantation, like all treatments of ESRD, is costly. Therefore, it would be wise to think of modalities to reduce the rate of ESRD in the community. Prevention and early referral of cases with hypertension, diabetes mellitus, and glomerulonephritis, which account for >53% of all causes of ESRD,¹¹ could prevent or decrease the rate of morbidities. New techniques like laparoscopic donor nephrectomy seem to be costly in developing countries; however, some studies have shown that by use of some modifications and adjustments, it could be more cost effective, especially when the number of days that the patient takes off from work and the fewer complications are taken into account.¹²

In conclusion, we found that the Iranian model of kidney transplantation has low costs compared with other countries. This low cost and the overall good outcomes are attractive to foreigners to undergo kidney transplantation in Iran. In addition, other countries may use Iran's experience to enhance their kidney transplantation programs.

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