

Original Article

Study of 2550 donor-recipient demographic characteristics associated with kidney transplantation in Isfahan Province, Iran

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Abstract. Due to a significant improvement in quality and quantity of life in most patients with end stage renal disease, kidney transplantation proved to be the best form of cost-effective treatment. The aim of this study was to analyze donor-recipient (n=2550) demographic characteristics associated with kidney transplantation in Isfahan Province/Iran. Demographic and clinical data were recorded in d-base and analyzed using SPSS for windows. A total of (recipient vs donor), 468 vs 63 females and 949 vs 1070 males were identified. The mean age of recipient vs donor was 42.5 ± 15.4 (range 2–87) vs 29.8 ± 6.1 (range 1–75) years ($p < 0.05$). Age in 93% of donor was ranged between 20 to 40 years and in the 92% of recipients age was ranged between 20 to 70 years. With a significant $p < 0.006$, the mean age of kidney transplanted recipients was higher in males than in females. The mean hospital stay was 20.6 days (range 1 to 180 days). In conclusion there was a significant difference between recipient and donor related to mean age and gender. An increase in the number of transplanted kidney recipients from 2008 to 2016, recommended the benefit of further study toward the impact of time to create the vascular anastomoses, graft survival and evidence-based pharmacotherapy strategy in Isfahan, Iran.

Keywords: Demographic, kidney, recipients, donors

Introduction

Kidney transplantation is a well-established management for patients with mainly end-stage kidney diseases. Cautious management is necessary in order to prevent graft rejection [1-3]. The success in transplantation connected to numerous known and unknown factors. Related to acceptance of organs, donor age mentioned as one of these factors, as matching related to age has been studied in kidney transplantation [4]. Augmented amounts of TNF-Alpha and IL6 are related with inflammation and cardiovascular disease between patients with death and graft functioning [5]. To expand the living donor pool, eligibility of donors related to anomalies is another factor that should be consider before transplantation [6]. Poor health literacy is also associated with inferior outcomes in kidney transplant recipients [7]. Another high potential factor related to graft loss is surgical complication such as vascular, urologic and any others [8]. The poorer graft existence for feminine recipients of male donor kidneys is alleviated by male donors with a larger BMI [9]. An investigation from the Collaborative Transplant Study [10] shown that female recipients of male donor kidneys had the poorest graft survival after the first year and up to ten years post- transplant [11]. Regarding to donor race and consequence in kidney transplantation, African American

donor race was connected with augmented cardiovascular death and graft loss [12]. As the number of patients on the waitlist remains to grow in Isfahan Province, clarifications to increase the donor pool are continuing. Therefore, as a preliminary stage toward determining this problem, we examined demographic characteristics of donor/recipients in two large representative sample associated with kidney transplantation in Isfahan Province.

Materials and Methods

Ethical approval

This retrospective study was approved by the Institutional Review Board (No. 296013). The study was conducted to the Isfahan Kidney Transplantation Research Center (IKTRC). Donor-recipients data associated to Kidney transplantation from 2008 to 2016 were obtained from two Isfahan tertiary hospitals of Alzahra and Khorshid.

Data analysis

Composed coded data were connected using the de-identified patients' name and surname. In the next step, the code for each patient, father's name, age, gender, date of admission, date of transplant and date of discharge were

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TABLE 1
DONOR-RECIPIENTS DEMOGRAPHIC CHARACTERISTICS
ASSOCIATED WITH KIDNEY TRANSPLANTATION

	Total	Females	Males
Recipient	1417	468	949
Age (years) Mean±SD	42±15.4	40.3±15.3	43.5±15.3
Donor	1133	63	1070
Age (years) Mean±SD	29.8±6.1	30.2±1.3	29.8±0.2

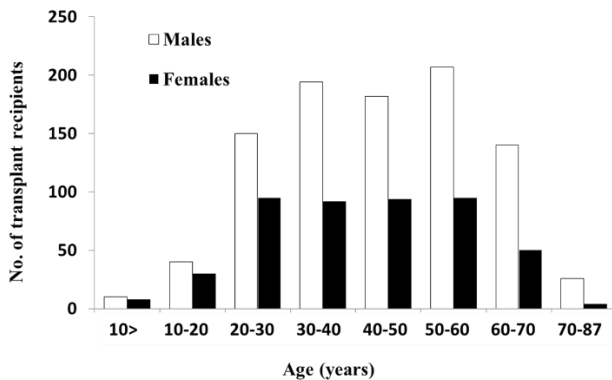


Figure 1 Distribution of age in recipients of kidney transplantation.

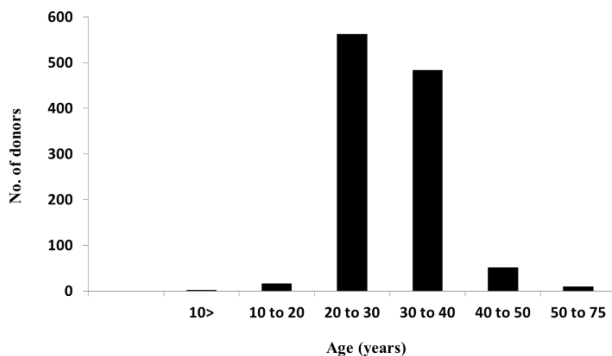


Figure 2 Distribution of age in donor associated to kidney transplantation.

recorded in Excel.

Statistical analysis

Microsoft Excel was used to arrange raw data before being inputted into the Statistical Package for Social Science (SPSS® version 20; IBM Corp., Armonk NY, USA) for analysis. Age, as a continuous variable, was expressed as mean ± standard deviation (SD). The normality distribution of age was tested using the Kolmogorov–Smirnov test. Variables such as gender, hospital stay were expressed by frequency and percentage.

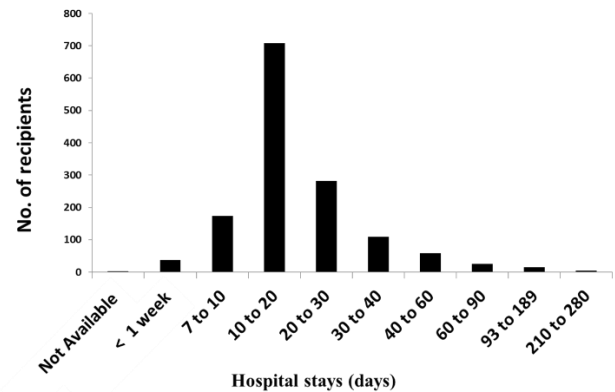


Figure 3 Duration of hospital stays in recipients of kidney expressed as days after transplant surgery.

Normality distribution test of the patient population was studied in comparisons associated with the age of males and females. In order to examine the differences between age and gender the *t*-test and chi-squared test were used [13].

Results

Donor-recipient demographic characteristics related to kidney transplantation was shown in Table 1. There were 1133 and 1417 recorded cases of donors and recipients, in which 94% and 67% was associated with males correspondingly. Normality distribution of recipient age was tested by Kolmogorov–Smirnov. With a minimum of 2 and a maximum of 87, the mean age ± standard deviation was 42.5 ± 15.4 years old. The mean age of kidney transplanted recipients was higher in males than in females (*t*-test; *p* < 0.006). Figure 1 shows that 92% of male received kidney at the age between 20 to 70 years old of life and 80% of females received kidney at the age between 20 to 60 years old of life.

Figure 2, shows that in donor with a minimum of 1 and a maximum of 75 year, the mean age were 29.8 ± 0.2 year where in 93%, ranged between 20 to 40 years. Figure 3 shows that the mean hospital Stay ± standard deviation was 20.6 ± 20.6 days (ranged from 1 to 280 days) in recipients of kidney after transplant surgery. Out of total population 3% of kidney transplanted recipients stayed less than a week in hospital. In the 12% the duration of hospital stay was less than 10 days and 70 % stayed in hospital from 10 to 30 days after kidney transplant surgery. In the 14% hospital stay ranged from 30 to 90 days after transplant surgery. The rest stayed for a range of 93 to 280 days after transplant surgery in hospital.

Discussion

Kidney transplantation remains the gold standard treatment for end-stage renal disease, with existing donor kidneys providing the greatest consequences in terms of allograft survival [1-14]. According to published article by Bendorf et al., there are more than 1.7 million that suffers from end-stage kidney disease globally and for many of those, kidney transplantation could provide the best chance of evading from dialysis. They confirmed that, United

Nations Human Development Index, religion, education, age, healthcare expenditure, presumed consent legislation and existence of a nationally managed organ donation program were associated with higher deceased kidney transplantation rates. In contrast, the only factors associated with living kidney transplantation rates were a highly significant negative association with presumed consent and variable associations with different religions.¹⁵ In this study related to recipients, out of total population 67% were a male that is in agreement with a recent published article that confirmed 39% of females' population among 453162 kidney recipients [16].

In this study the mean age of kidney recipients was 42.5 years that is in agreement with study of 48950 kidney transplant recipients in which in their study the mean age of subjects was approximately 41 years [17]. Another study related to 453162 adult kidney transplantation candidates, confirmed the mean age of 50.9 years [16].

In agreement with previous publication that mentioned kidneys from older donors led to significantly lower graft survival than kidneys from younger donors [18], in this study in 93% the age of donor was between 20 to 40 years. Takemoto, et al [18], also confirmed that the 1-year first cadaver donor graft survival rates were 80% for recipients receiving kidneys from 16-year-old donors, 70% from 50-year olds and 57% from 65-year-old donors. This means that 1-year graft survival decreased 10% by donor age 50 and 23% by donor age 65. In our study 5% of donor age ranged between 40 to 50 years and in 1% ranged between 50 to 75 years.

Related to recipients' hospital stay, in this study 15% of kidney transplanted recipients stayed for less than 10 days in hospital. Previous publication conformed that donors with shorter stays in intensive care units resulted in longer graft survival. Duration of perfusion of donor kidney and length of intensive care unit stay of donor were associated with longer perfusion time and shorter time in intensive care unit.

As previous publication confirmed [19-22] that length of hospital stay is a major variable related to cost, in our study 70 % stayed in hospital from 10 to 30 days after kidney transplant surgery.

There was a significant difference between recipient and donor mean age and gender as this might need further study toward the possibility of a consistent decrease in immunologic failures associated to recipient-kidney graft-survival. Further studies related to pre transplant recipient weight, preservation time, pre-transplant respiratory or peripheral vascular disease seem to be advantageous in Isfahan Province.

Conclusion

The result of this study confirmed that the most kidney transplanted recipients were males (67%). In recipients vs donor the mean age was 42.5 vs 29.8 years old. In the 93% the age of donor was between 20 to 40 years old. Related to hospital stay, 15% of recipients stayed for less than 10 days and 70% stayed for 10 to 30 days.

Finally, the outcome of this research recommends toward scheduling for improved transplant outcome by

determined strategies associated with "local based indication-problem" in the field of organ transplantation.

Conflict of interest

The authors declare no conflicts of interest.

Acknowledgement

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