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A survey of waiting lists for kidney transplantation in northeastern Iran

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Abstract

Introduction: End-stage renal disease (ESRD) continues to be a public health challenge. In ESRD patients, renal replacement therapy is essential. Kidney transplantation is considered as an effective therapeutic procedure for ESRD. On the advice of a qualified nephrologist, ESRD patients are registered on a waiting list, seeking organ transplantation.

Objectives: This study aimed to report the status of the waiting list for kidney transplantation in the northeastern Iran region, with data covering the time period until 2017.

Patients and Methods: The study was conducted at Montaserie hospital in Mashhad, Iran. We reviewed the clinical records of all ESRD patients referred to the hospital, retrospectively. Patients' data were completed using a data linkage method and analyzed using SPSS version 23.

Results: A total of 1956 patients were studied from the waiting list with a mean age of 44.7 ± 14.4 years (3-80 years). The described etiology reveals that the main causes of ESRD were unknown sources (44.1%), diabetes (18.4%) and hypertension (10.9%). Hemodialysis therapy was conducted for 91.1% of the patients. The maximum registered waiting time was 295 months and the minimum was one month, with an average of 63 months. The proportion of patients waiting for the first, second and third kidney transplantation was 86%, 13.2% and 0.7%, respectively.

Conclusion: This study highlights that in the population under study, the number of registered patients on the waiting list followed an increasing pattern, while the age of patients decreased. Unfortunately, in most case studies in Iran, the true etiology of nephrology diseases is still unknown. More effort to define the ESRD causes is necessary. The most likely reason for reported cases with unknown etiology is delays in referral problems.

Introduction

End-stage renal disease (ESRD) is the last stage (stage five) of chronic kidney disease (CKD), which is diagnosed when glomerular filtration rate (GFR) falls below 15 mL/min (1). In ESRD, the kidneys no longer function well enough to meet the needs of daily life. As a result, in ESRD patients, renal replacement therapy is necessary. ESRD continues to be a public health challenge. In the United States, there were 120 688 new cases of ESRD reported in 2014 (1.1% increase compared to 2013) (2) and approximately 600 000 individuals were diagnosed with ESRD until 2015 (3). Kidney transplantation is an effective therapeutic procedure for ESRD patients (4, 5). Patients, on the advice of a qualified nephrologist, are registered on a waiting list, and then referred to the transplantation center. On waiting list, patients are transplanted according to their waiting time (according to the first date of dialysis), by blood group.

Objectives

In this study, we report the status of the

Key point

In the present study, the status of waiting list in northeastern Iran can help nephrologists to make appropriate decisions about the organ seeking candidates. On the other hand, it is concluded that the status of waiting list is very useful to know the growing and stratifying candidates to decision about them.

waiting list in northeastern Iran until September 2017.

Patients and Methods
Study patients
This study was conducted at Montaserie hospital in Mashhad, Iran. This hospital is a specialty transplantation center, and provides renal services to the entire northeastern (Razavi, north, and south Khorasan province) Iran region. All patients with symptomatic CKD and ESRD in northeastern Iran are admitted either by the nephrologists, private hospitals or Montaserie hospital directly. Details of every individual admitted with ESRD were collected with a unique identifier number on a unified waiting list, thus preventing any duplication of records or redundancy of referrals. We reviewed the clinical records of all ESRD patients referred to this hospital until September 2017, retrospectively.

Ethical issues
The research followed the tenets of the Declaration of Helsinki. The Ethics Committee of Mashhad University of Medical Sciences approved this study. The institutional ethical committee at Mashhad University of Medical Sciences approved all study protocols(IR.SBMU.MSP. REC.1396.900). Accordingly, written informed consent was taken from all participants before any intervention. This study was extracted from thesis of PhD at this university (Thesis #950393).

Statistical analysis
Data was compiled and cleaned in Excel 2013. Then it was completed using a data linkage method and analyzed using SPSS version 23.

Results
A total of 1956 patients (1198 male, 758 females, 1.58:1 ratio) were studied from the waiting list. The most frequent blood group was O (33.3%), the least frequent was AB (7.2%) (Figure 1), and the mean population age was 44.7 ± 14.4 years (3–80 years). With regard to age distribution (Table 1), 43% of patients were in the 26-45 years range, which represents the dominant age group.

The main causes of ESRD were reported as unknown (44.1%), diabetes (18.4%) and hypertension (10.9%) (Table 2, Figure 2). The distribution of reported ESRD causes in the past 5 years is illustrated in chart 2. 41% of diabetic patients suffered from type 1 diabetes and 59% from type 2. Only two reported causes ("preeclampsia" and "lupus nephritis disease") were more prevalent in women than in men. The main causes of ESRD in patients aged fewer than 18 were unknown sources (31.8%), reflux nephropathy (15.3%), and finally FSGS (focal segmental glomerulosclerosis) (13.1%). Main causes of ESRD in other age groups are shown in Table 3.

In men, the main causes of ESRD were unknown (44.9%), diabetes (19.7%), and hypertension (9.6%) while
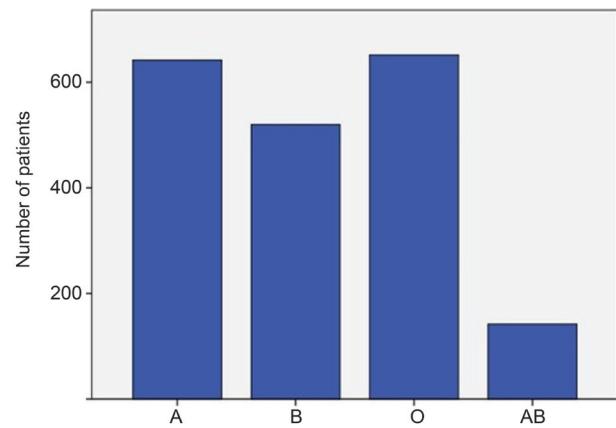

Figure 1. Distribution of patients on the waiting list by their blood group.
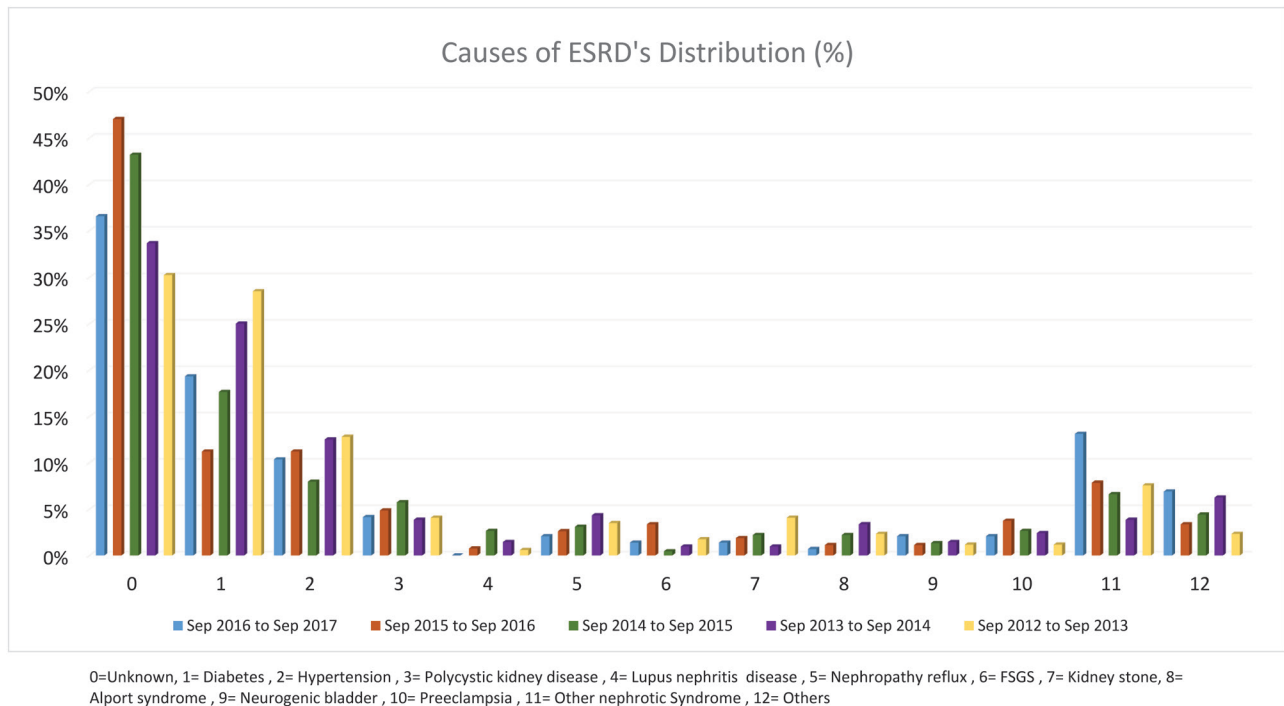
Table 1. Distribution of patients' age on the waiting list

Age group (y)	Total, n (%)	Male, n (%)	Female, n (%)
0-18	91 (4.6)	55 (2.8)	36 (1.8)
19-25	102 (5.2)	66 (3.3)	36 (1.8)
26-45	835 (42.6)	508 (26)	327 (16.7)
46-55	393 (20)	249 (12.7)	144 (7.3)
56-65	428 (21.8)	257 (13.1)	171 (8.7)
66+	107 (5.4)	63 (3.2)	44 (2.2)

Table 2. Reported etiology of ESRD

ESRD etiology	Total, n (%)	Male, n (%)	Female, n (%)
Unknown	861 (44.1)	541 (27.7)	320 (16.4)
Diabetes	359 (18.4)	237 (12.1)	122 (6.2)
Hypertension	214 (10.9)	116 (5.9)	98 (5)
Polycystic kidney disease	86 (4.4)	53 (2.7)	33 (1.7)
Lupus nephritis disease	28 (1.4)	6 (0.3)	22 (1.1)
Nephropathy reflux	63 (3.2)	38 (1.9)	25 (1.3)
FSGS	22 (1.1)	14 (0.7)	18 (0.4)
Kidney stone	47 (2.4)	36 (1.8)	11 (0.6)
Alport syndrome	34 (1.8)	21 (1.1)	13 (0.7)
Neurogenic bladder	31 (1.6)	27 (1.4)	14 (0.2)
Preeclampsia	41 (2)	0 (0)	41 (2)
Other nephrotic syndrome	102 (5.2)	69 (3.5)	33 (1.7)
Others	68 (3.5)	40 (2)	28 (1.4)
Total	1956 (100)	1198 (61.2)	758 (38.8)

FSGS, focal segmental glomerulosclerosis.

for women it was reported as unknown (42.2%), diabetes (16%), and hypertension (12.9%). Hemodialysis was the dominant preferred renal replacement therapeutic procedure for 91.1% of patients on the waiting list, while 5.5% underwent peritoneal dialysis (3.4% preemptive). The maximum registered waiting time for an individual patient was 295 months, the minimum was one month,

Causes of ESRD's Distribution (%)

0=Unknown, 1= Diabetes , 2= Hypertension , 3= Polycystic kidney disease , 4= Lupus nephritis disease , 5= Nephropathy reflux , 6= FSGS , 7= Kidney stone, 8= Alport syndrome , 9= Neurogenic bladder , 10= Preeclampsia , 11= Other nephrotic Syndrome , 12= Others

Figure 2. Distribution of causes of ESRD.

and the mean waiting time was 63 months.

Table 4 shows the distribution of waiting time, categorized by the length of waiting time in months. The category with the largest number of patients was the 37-72 months waiting period (34%). The number of registered patients on the waiting list has grown by 22.4% over the past 5 years. The proportion of patients waiting for the first, second and third kidney transplantation was 86%, 13.2% and 0.7%, respectively.

Discussion

Results of our analysis demonstrate a steady increase in the number of registered patients on the waiting list. Over the past 5 years, 1020 patients were added to the waiting list and 581 patients have undergone transplantation. The number of patients on our studied waiting list increased 8% over the last year alone. Comparatively, in the United States, a 3% increase in the number of registered patients on the waiting list has been reported over the last year (2016) (2). Usually, the demand for kidney transplantation

overwhelmingly exceeds actual performed transplantation procedures, which leads to an increase in the number of patients on the waiting lists (6). In this study, the waiting time category with the largest number of patients was 37-72 months (34% of patients fell into this category). The US statistics report that nearly 30% of patients were on the waiting list for 72 months or more in 2013 (7) and approximately 33% of European patients were on waiting lists for more than 60 months in 2017 (8). This figure varies across different European countries. For example, the figure falls at 29% in Austria, 27% in Belgium, and 57% in Germany (9).

The mean age of ESRD patients in our studied waiting list was 44.7 ± 14.4 years. The number of cases was most frequent among the 26-45year group (42.6%) in our study. Considering the trend, it can be inferred that the age of ESRD patients has decreased over the last 15 years and number of males was more than females obviously (1.58:1). Therefore, in the United States number of males was higher than females (1.2:1) (10).

Table 3. Etiology of ESRD categorized by age groups

Age group (y)	First cause (%)	Second cause (%)	Third cause (%)
0-18	Unknown (31.8%)	Nephropathy reflux (15.3%)	FSGS (13.1%)
19-25	Unknown (39.2%)	Nephropathy reflux (16.6%)	Neurogenic bladder (12.7%)
26-45	Unknown (58.8%)	Other nephrotic syndrome (7.6%)	Hypertension (7%)
46-55	Unknown (36.3%)	Diabetes (27.7%)	Hypertension (12.7%)
56-65	Diabetes (36.2%)	Unknown (27.5%)	Hypertension (18.2%)
66+	Diabetes (32.7%)	Unknown (28.9%)	Hypertension (24.2%)

Table 4. Distribution of patients' waiting time on the waiting list

Waiting time category (Months)	Total, n (%)	Male, n (%)	Female, n (%)
0-36	640 (32.7)	394 (20.1)	246 (12.5)
37-72	681 (34.8)	419 (21.4)	262 (13.4)
73-108	313 (16)	211 (10.7)	102 (5.2)
109-144	184 (9.4)	105 (5.4)	79 (4)
145-180	106 (5.4)	54 (2.8)	52 (2.6)
181+	15 (0.7)	15 (0.7)	0 (0)

In most of the studies conducted in Iran, unknown etiology is reported as of the most dominant causes of ESRD. More effort to study the ESRD etiology and identify the causes of the disease is deemed essential. A possible reason for the high reported rate of unknown causes may be due to delays in referral problems.

Diabetes and hypertension were found to be two of the most common causes of ESRD (29.3%). It seems that if patients with diabetes and hypertension are provided with a better healthcare, it will have an influential reductive effect on diagnosed cases of ESRD. Moreover, the percentage of diabetes and nephrotic syndrome (causes of ESRD) in comparison with similar rates in the last year has been increased and unknown and FSGS have been reduced.

Polycystic kidney disease (4.4%) was another cause of ESRD. The number of patients who get ESRD due to polycystic kidney disease and other causes is less.

In this study, 91.1% of the patients received hemodialysis for renal replacement therapy, 5.5% underwent peritoneal dialysis and 3.4% underwent preemptive kidney transplantation.

Conclusion
Unfortunately, the number of patients on the waiting list is rising. Additionally, unknown is the high percentage of ESRD causes. Hence, the specialists should effort to define the ESRD causes is needed and refer patients as soon as possible.

Limitation of the study
A lack of the registry in ESRD patients and the limited sources of funding only allowed a regional study spanning northeastern Iran. A more comprehensive study can have a broader coverage, investigating all reported ESRD cases in Iran.

Authors' contribution
MJ analyzed data, did background research, and revised the manuscript. HT analyzed data and drafted manuscript. MGHS did background research and revised the manuscript. EKH participated in data collection and drafted manuscript. SMM revised the manuscript. MT analyzed data and revised the manuscript. All authors read and signed the final manuscript.

Conflicts of interest
Authors declare no conflict of interests.

Ethical considerations
Ethical issues (including plagiarism, misconduct, data fabrication, falsification, double publication or submission, redundancy) have been completely observed by the authors.

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