Survival of patients with end-stage renal disease in Iran

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Abstract
End-stage renal disease (ESRD) is a common and life threatening disease in the world and the prevalence of ESRD is increasing which can be attributed to increased prevalence of diabetes mellitus and hypertension as the most common causes of ESRD. Although long term survival and life expectancy of patients with ESRD has significantly improved since the introduction of hemodialysis (HD), however the outcome of ESRD patients is still relatively poor and catastrophic, especially among diabetic patients. Many studies about outcome of patients on maintenance dialysis have been done in developed countries, but the data from Iran is few and aim of this review article is to evaluate the survival of these patients.

Keywords: End-stage renal disease, Survival, Diabetes mellitus, Hypertension

Introduction
End-stage renal disease (ESRD) is a common and life threatening disease with significant complication. The prevalence of ESRD is increasing and it will place an enormous financial burden for healthcare systems in developed and developing countries (1-9). For example according to the report of US Renal Data System (USRDS), the number of ESRD patients in the United States has significantly increased from approximately 10,000 patients in 1973 to 527,283 in 2008 (6). The exact reasons for the rising prevalence of ESRD are unknown, but it can be attributed to increased prevalence of diabetes mellitus and hypertension as the most common causes of ESRD (10).

Materials and Methods
Directory of Open Access Journals (DOAJ), Google Scholar, PubMed, EBS-Co, Scopus, Embase, and Web of Science with keywords relevant to; end stage renal disease, diabetes mellitus, hypertension, hemodialysis, renal data system, survival and health-care systems were searched.

Life expectancy of patients with ESRD
Although life expectancy of patients with ESRD has significantly improved since the introduction of hemodialysis (HD) in the early 1950s, however patient survival remains an important issue among these patients (10-13). Many studies on the long-term survival of patients on maintenance dialysis have been done in developed countries, but the data from Iran is few and aim of this review article is to evaluate the survival of patients on maintenance dialysis in Iran (14-17).

In the first study, Beladi Mousavi et al evaluated long-term survival of 185 ESRD patients on maintenance HD in Khuzestan province, Iran. According to the results of this study, 1-, 3- and 5-year survival of ESRD patients was 89.2, 69.2% and 46.8%, respectively without significant difference between male and female, blood groups and various insurance organizations. In addition, 1-year survival of diabetic and non-diabetic patients was also similar with no significant difference between them. However, 3-year survival of ESRD patients with diabetes was poor and significantly lower than non-diabetic ESRD patients (52.2% versus 73.8%) and no one of diabetic ESRD patients had 5-year survival in the study of Beladi Mousavi et al (0% versus 56.9%) (15).

In the multicenter study, Beladi-Mousavi et al (16) assessed long-term survival
of 1312, ESRD individuals in the Khuzestan province, southwest of Iran. According to the results of the study 1-, 3-, 5-, 7- and 10-year survival of diabetic and non-diabetic ESRD patients on maintenance HD in Iran were 70% versus 82%, 26.9% versus 50.7%, 9% versus 28.6%, 3.3% versus 13.6% and 0.6% versus 4.5%, respectively and similar to the results of above study the survival of diabetic patients was also significantly lower than non-diabetic patients (17).

Factors contributed to the poor outcome in ESRD
Many factors may contribute to poor outcomes of ESRD patients on HD in Iran compared with some other countries. In summary, these include shorter dialysis time compared to some other countries, inadequate dialysis, low socioeconomic status of ESRD patients, no close follow-up care and no adherence to diet (15-17).

According to the results of many studies, there is a significant inverse relationship between average time of dialysis per week and outcome of ESRD patients (19-21). For example, in a report from Tassin, France, the 5, 10, and 15-year survival of ESRD patients on HD is 87%, 75%, and 55%, respectively, which is much better than that of almost all other countries including Iran and also developed countries like the United States (21). It seems that the better outcome of ESRD patients in Tassin is due to longer dialysis time in this center. The average time of dialysis per week in Tassin, France reaches to 24 hours per week whereas this time in Iran is 9 to 12 hours per week which is much lower than the former report (2,3,21).

It is also suggested that the higher mortality rate in the United States is at least in part to short dialysis time and inadequate dialysis (19,20,22). Studies in Germany have also documented the relationship between shorter dialysis time and poorer outcome of ESRD patients (19,20).

According to some studies, the mortality rate is significantly higher among ESRD patients who are dialyzed fewer than 3.5 hours three times per week compared to patients who are dialyzed four or more hours three times per week (19).

Adequacy of dialysis is a very important factor and it is well established that inadequate dialysis is a contributor to lower overall survival of ESRD patients (21). This has important implications since increasing HD time leads to increase in adequacy of dialysis and therefore improve survival of ESRD patients (21). Charra and colleagues also reported that 98% of their patients who were dialyzed very intensively in Tassin, France had normal blood pressure without antihypertensive drugs (21).

Easy availability of kidney transplantation for healthier and younger ESRD patients is another factor which may contribute to poor outcomes of ESRD patients on HD in Iran compared with some other countries. Thus healthier and younger ESRD patients are transplanted and older patients with lower health status and comorbid disease are remained on HD and therefore contribute to overall poor outcome of HD patients (23).

In the other hand, HD is free for ESRD patients in Iran which have a positive impact on the overall survival of ESRD patients (22). In addition other social support by the some organizations and affordable costs of medical therapy are the another advantages that might have a positive effect on the outcome of patients with ESRD (23-25).

Conclusion
The prevalence of ESRD is increasing and it will place a huge financial burden for health-care systems. Although life expectancy of patients with ESRD has significantly improved, however patient survival remains an important issue among these patients.

According to the reports from Iran, the outcome of ESRD patients is relatively poor, especially among diabetic patients; one, three, five, seven and ten-year survival of diabetic and non-diabetic ESRD patients on maintenance HD in Iran are approximately 70% versus 80%, 27% versus 51%, 9% versus 29%, 3% versus 14% and 0.6% versus 4.5%, respectively. However, the survival of ESRD patients in the other countries including developed countries like United States is also catastrophic.

Many factors may contribute to poor outcomes of ESRD patients on HD which some of them include shorter dialysis time, inadequate dialysis, low socioeconomic status of ESRD patients, no close follow-up care and no adherence to diet. Easy availability of kidney transplantation for healthier and younger ESRD patients is another factor. Thus healthier ESRD patients are transplanted and older patients with comorbid disease are remained on HD and contribute to overall poor outcome of HD patients.

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All the authors wrote the paper equally.

Conflicts of interest
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