

INCIDENCE, PREVALENCE, AND TREATMENT OF END-STAGE RENAL DISEASE IN THE MIDDLE EAST

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Introduction: This article reviews the status of end-stage renal disease in the Middle East, with emphasis on its incidence, prevalence, and treatment.

Methods: Data were obtained from English-language published literature through a Medline search over the past 40 years. Supplementary information was gathered from regional congresses and symposia, websites of specialized nephrology centers, and direct communications.

Results: Of the 14 Middle East countries, attention was focused on 10 countries with similar renal care systems: 7 Arabian Peninsula countries and 3 eastern Mediterranean countries. Collectively, they have a population of 72.5 million. Incidence of ESRD ranged between 64 and 212 patients per million population (pmp) with an average of 93 patients pmp. The lowest prevalence was 320, the highest was 462, and the average was 352 patients pmp. Hemodialysis is the preferred dialysis modality and is freely available in all countries for citizens. Non-citizen residents' access to hemodialysis is markedly restricted. Peritoneal dialysis is available on a limited scale. Renal transplantation is available in all countries with variable program activities. Most of the transplants are from living, related donors. Active deceased donor transplant programs exist in four countries. The results from countries with active programs are excellent, with 5-year patient and graft survival of >90%.

Conclusions: This review provides information on the incidence, prevalence and treatment modalities of ESRD in 10 Middle East countries. (*Ethn Dis.* 2006;16[suppl 2]:S2-2-S2-4)

Key Words: End Stage Renal Disease (ESRD), Incidence, Prevalence, Hemodialysis, Peritoneal Dialysis, Renal Transplantation, Middle East (ME)

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INTRODUCTION

The classical geographic term “the Middle East” (ME) encompasses 14 countries: 7 eastern Mediterranean (Iran, Iraq, Israel, Jordan, Lebanon, Syria, and Turkey) and 7 Arabian Peninsula countries (Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, United Arab Emirates [UAE], and Yemen). Because Turkey is closely linked to Europe and because Israel, Iraq, and Iran have distinct but variable renal care systems, this manuscript reviews the incidence, prevalence, treatment, and cost of end-stage renal disease (ESRD) in the remaining 10 countries.

METHODS

An extensive Medline search was conducted for English-language publications, over the past 40 years, for data on the incidence, prevalence, and treatment of ESRD in the ME. Treatment included hemodialysis (HD), peritoneal dialysis (PD), and renal transplantation. Supplementary information was obtained from abstracts of proceedings of regional symposia and conferences. Additional information was gathered through direct personal communications when necessary.

RESULTS

The population of the 10 countries varies widely, from densely populated countries like Yemen (20 million), Syria (18 million), and Saudi Arabia (16 million) to countries with populations in

the middle range like Jordan (5.5 million) and Lebanon (3.8 million) to scarcely populated countries like Qatar and Bahrain, which have populations of less than three quarters of a million (Table 1). The total population of the 10 countries is 72.5 million. In Kuwait, Qatar, and UAE, the composition of the population varies widely because of a high proportion, 43%, 75% and 82%, respectively, of expatriates from many nations.

Diabetes mellitus is the most frequently reported cause of ESRD in almost all countries, accounting for 20%–40% of the cases, followed by hypertension (11%–30%) and glomerulonephritis (11%–24%).^{1–6}

The incidence of ESRD ranged from 64 patients per million population (pmp) in Yemen⁶ to 212 pmp in Qatar,⁷ with an average of 93 patients pmp. Accordingly, we expected to find 6750 patients with new ESRD in the 10 ME countries annually (Table 2).

The lowest prevalence is in Kuwait, with 80 patients pmp,⁴ and the highest is in Saudi Arabia and Yemen, with 462 and 320 patients pmp, respectively.^{2,6} The average prevalence is 352 patients pmp, for an overall prevalence of 25,500 patients in the region (Table 3).

Dialysis and renal transplantation are available in all countries. Hemodialysis (HD) is the preferred type of dialysis by most patients. In the 6 Gulf states and Yemen, HD is available free of charge for citizens, and in the eastern Mediterranean countries, it is available for most citizens.^{1,3} For non-citizen residents and expatriate workers, HD is provided at an average cost of US \$100 per session. On a limited basis, some non-citizens may be

Table 1. Populations of 10 Middle East countries

Country	Population (millions)
Yemen	20
Syria	18
Saudi Arabia	16
Jordan	5.5
Lebanon	3.8
Oman	3.0
United Arab Emirates	2.5
Kuwait	2.3
Bahrain	0.7
Qatar	0.7
Total	72.5

dialyzed free of charge with approval from higher authorities.

PD is available on a limited basis. The patients are mostly non-citizens who have no access to HD; many of them are dialyzed free of charge. Also, some citizens who have exhausted all vascular access sites receive PD. PD is mostly continuous ambulatory peritoneal dialysis, but other types of PD, such as with automated cyclers, are available on a smaller scale.

Renal transplantation started in Jordan as early as 1972 and was gradually introduced in other countries, with variable activity in the programs. Well-established and steadily running programs exist in Saudi Arabia, Kuwait, Jordan, and Lebanon. In Qatar, Oman, and Syria, renal transplantation is done infrequently and sporadically. Limited programs exist in the remaining three countries: Yemen, UAE and Bahrain.⁸⁻¹²

Table 2. Incidence of end-stage renal disease (ESRD) in Middle East countries

Country	ESRD Incidence (per million population)
Qatar	212
Saudi Arabia	120
Lebanon	120
Kuwait	72
Yemen	64
Average	93
Total annual incidence	6750

Table 3. Prevalence of end-stage renal disease (ESRD) in Middle East countries

Country	ESRD Prevalence (per million population)
Qatar	262
Saudi Arabia	462
Lebanon	243
Kuwait	80
Yemen	320
Average	352
Total annual prevalence	25,500

Transplantation is mostly from living related donors. In most countries, living, unrelated donor transplantation is strictly prohibited, but in a few countries it is practiced on a limited scale. No clear guidelines or regulations exist to control it, and decisions are made on an individual basis. Cadaveric renal transplantation is regularly done in only a few countries; Saudi Arabia has the largest program. Kuwait, Lebanon, and Jordan also have regular cadaveric programs.^{10,13,14} The average cost for transplant in the first year is US \$15,000. Published data on outcomes from Saudi Arabia and Kuwait show excellent results: 3810 renal transplants were done in 13 centers in Saudi Arabia between 1979 and 2002, giving a rate of 11 transplants pmp per year. Patient survival at 1, 3, and 5 years was 98.4%, 96.7%, and 96.7%, respectively. The 1- and 5-year survival for living related donor was 96.9% and 92.2%, respectively and for cadaver transplantation was 96.2% and 87.2%, respectively.⁸ In Kuwait, 631 renal transplants were done between 1983 and 1998, for a rate of 18 transplants pmp per year. Graft survival at 1, 5, 10, and 14 years was 97%, 91%, 80%, and 83%, respectively.¹⁰

DISCUSSION

ESRD constitutes an important health problem in the ME. Although

the 10 countries reviewed in this article are a relatively homogeneous group, differences still exist according to a number of factors, especially variation in financial resources. In the six Gulf countries, the population composition exerts its effect on the pattern of renal disease with the expatriates coming from different ethnic groups and environmental and social backgrounds. This disparity is especially noted where expatriates make up half or more of the country population.

Apart from a few countries in the region, published data, especially on the incidence, prevalence, and outcome of treated ESRD, are quite limited. Most of the data on incidence have not been obtained by organized surveys and epidemiologic studies but rather by indirect methods and from limited retrospective studies. The data on prevalence are more accurate because of better-developed registry systems. The reported incidence of ESRD is low in Yemen and Kuwait: 64 and 72 patients pmp;^{4,6} in other countries, the incidence matches that seen in most other parts of the world, from 120 to 212 patients pmp.^{2,7}

Similar to the experience in most developed countries, the leading reported cause of ESRD is diabetes mellitus. In the indigenous population in Arabian Peninsula countries, the prevalence of diabetes mellitus is high, with an average of ≈17%. This finding is possibly due to the high prevalence of obesity and low-activity lifestyle.

Dialysis is available in all countries. It is free of charge for the countries' citizens. Access to dialysis for expatriates in the Arabian Peninsula countries depends on many factors, including duration of stay in the country, profession, potential opportunity for renal transplantation, and available dialysis vacancies. HD is by far the prevalent type and is preferred by most patients.

Before the establishment of regular renal transplantation programs, residents of the Arabian Peninsula countries

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traveled predominantly to Asian countries for the procedure. Those transplants were done mostly in low-quality centers and with mostly living, unrelated donors. The poor ethics and commercialism of this practice have been criticized in the medical literature.⁹ Renal transplantation programs vary widely; in Saudi Arabia, Kuwait, Jordan, and Lebanon, well-established programs exist with both living related and deceased donors. Saudi Arabia and Kuwait are leading in the number of transplants done yearly and in well-established centers for organ transplantation. The reported outcomes compare favorably with those of high quality centers.

More emphasis needs to be made in the region on performing well-planned, prospective, and accurate epidemiologic studies to attain accurate and reliable information.

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AUTHOR CONTRIBUTIONS

Design concept of study: Abboud
Acquisition of data: Abboud
Data analysis interpretation: Abboud
Manuscript draft: Abboud
Acquisition of funding: Abboud
Administrative, technical, or material assistance: Abboud
Supervision: Abboud