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EDITORIAL

Hemodialysis in an underserved area (Hama, Syria): A base for a situation analysis project

INTRODUCTION

The challenges that face patients with end stage renal disease in underserved areas are enormous. Here are just two examples that practicing nephrologists will struggle with on a daily bases.

Case 1

A 55-year-old woman with a history of uncontrolled diabetes and hypertension secondary to noncompliance. The patient presented in 1997 with altered mental status secondary to hypoglycemic episode. She was found with end-stage renal disease (ESRD) and critically elevated potassium. The patient was transferred on emergency basis to the university hospital (3 h away). However, she refused to be initiated on hemodialysis or peritoneal dialysis. Subsequently, the patient was treated conservatively and she passed away in about 2 months.

Case 2

A 63-year-old woman presented with a history of ESRD secondary to diabetes and hypertension. The patient had to travel back and forth to the university center for her maintenance dialysis. She passed away in few months after initiating hemodialysis.

These 2 cases are examples of the challenges that face renal patients on maintenance therapy, especially hemodialysis in many underserved areas, such as Hama, Syria.

In the absence of enough data (if any available), a "situation analysis research" is required to evaluate the specific needs of this locality.

This article will explore the bases of a situation analysis research of renal replacement therapy (RRT) in a medically underserved area, Hama, Syria.

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METHODS

Medline was searched in English language published literature without restricting dates using the key words renal replacement therapy, hemodialysis, developing countries, and Syria.

RESULTS

No data were found about RRT for the studied location. However, RRT in the developing counties share many challenges. Chronic renal failure is a devastating medical, social, and economic problem for patients and their families. Reliable data on the true incidence and prevalence of ESRD are often lacking because no national registries exist. Delayed diagnosis and failure to institute measures to slow the progression of renal failure have resulted in a predominantly young ESRD population, with a median age of 44 years. The prevalence of hepatitis B and C and HIV is unknown in this specific locality. There is also no data about the availability of other RRT modalities. More resources must be mobilized to care for these patients; early detection of renal disease must be facilitated, and measures to delay ESRD must be implemented.[1-12]

DISCUSSION

While the challenges facing RRT are not unique to any specific developing country, the extent of these challenges varies. Full understanding of these challenges at a specific locality, such as my home town Hama, Syria, will require a "site visit" and "situation analysis."

This literature review showed that the following issues are frequently encountered in developing countries.

Issue #1: The lack of data

Although ESRD has become a major health problem, data about ESRD are not available in many underserved countries. Published data, especially about the incidence, prevalence, and outcome of treated ESRD, are quite limited in many underserved countries.[1] National registry for ESRD has not been established yet in many countries.[2] 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.[1]

Because there is no published data found about RRT in Hama, site visits to the hemodialysis units is needed to collect a basic estimation of the incidence and the prevalence of RRT in this city. Also contacting the local health organizations might be useful too.

Issue #2: Is it underdiagnosing, underreporting, or a truly low prevalence?

In general the reported prevalence and incidence of RRT are lower in developing countries than in the developed world. Compared with the prevalence in countries, such as United States [1147 per million population (pmp)], Japan (1465 pmp), Canada (610 pmp), and Germany (546 pmp),[3] the reported prevalence of RRT from many developing countries is much lower (in Yemen and Kuwait: 64 and 72 patients pmp, respectively).[1] Since this finding is not likely due to a lower prevalence of renal failure, an inaccurate registry of patients on dialysis cannot be excluded.[4]

In the view of lack of any specific data about RRT in Hama, collecting data and analyzing the situation will be the first step.

Issue #3: Poverty and the health care structure of RRT

Access to dialysis is significantly different between developed and developing nations. Close to 80% of the world dialysis population is treated in Europe, North America, and Japan, representing 12% of the world's population.[5,6] The remaining dialysis patients are treated in the developing world. This disparity is likely due to the high cost and complexity of RRT. Dialysis is so costly that is out of reach for low-income countries, which are struggling to provide preventive and therapeutic measures for communicable diseases and other basic needs.[5,6]

In many developing countries, the number of programs is insufficient to cover the growing demand for dialysis and transplantation leaving many patients behind without adequate RRT. For example, in countries such as Peru and Paraguay, only one fourth of patients with renal failure have access to dialysis.[3]

Political and economic stability often play a major role in providing systematic health services, such as RRT. For example, the economic changes in Eastern Europe have led to the involvement of private capital in the healthcare system. Currently, up to 50% of patients are dialyzed in private (nonpublic) dialysis units in some eastern European countries. In many countries of this region, privatization of dialysis units provided the opportunity to obtain new investment and to introduce modern techniques. Because of inadequate public resources, such progress would otherwise have been impossible.[3]

Furthermore, unlike Western nations, the concept of health insurance is in a primitive stage in many developing countries.[7] Most patients on RRT in these countries are funded by their employers or by charity organizations.

In a study from a private-sector hospital in south India, 30% arranged finances by selling property, 20% raised loans, and 4% were able to take care of their treatment costs by pooling family resources.[7]

The types of RRT vary widely in developed countries, in the middle east hemodialysis is by far the prevalent type and is preferred by most patients,[1] whereas in South America 56% of RRT is hemodialysis, 23% on peritoneal dialysis, and 21% has a functioning kidney graft.[4] In Central and Eastern Europe the proportion of patients on peritoneal dialysis is relatively low with an average of 8% (varies from 1% in Macedonia to 41% in Estonia).[3]

The research questions are as follows:

- How RRT is structured at this specific locality?
- How is RRT funded (private versus governmental versus charity support)?
- Types and distribution of RRT among the different modalities (hemodialysis/peritoneal dialysis/transplantation)?
- How is poverty affecting the access of RRT in this community?
- What are the available resources (material and man power available)?
- These questions are to be answered by collecting data from RRT sites in the city.

Issue # 4: The cost of RRT

It is not only that majority of developing countries suffer from poverty, but also the costs of RRT are very overwhelming. These costs include the costs of drugs, treatment instruments, medical procedures, transportation, absence from work, diet, staff salary, equipment and building support services, nonmedical supplies, depreciation of installations and equipments, depreciation of reverse osmosis (RO) and building rent.

According to a recent analysis of the costs of RRT in Iran, the estimated cost of each hemodialysis session is about US$ 74 by which an annual cost of US$11,549 could be estimated for each patient. These costs of dialysis are somewhat comparable to other developing countries, but significantly less than the cost in developed countries.[8]

In India and Pakistan the annual cost of hemodialysis ranges from US$ 2300 per year for twice weekly hemodialysis to US$ 3500 per year for 3 times weekly hemodialysis. The annual cost of 6000 IU of erythropoietin given every week is US$ 1700. Most patients are given hemodialysis twice a week. Only 20% of patients are dialyzed 3 times a week. All dialysis units reuse dialyzers after manual cleaning, and 50% of units still use acetate buffer in hemodialysis. The dialysis prescription is empirical, with *Kt/V* of 1 in the majority. Erythropoietin is used in adequate dosage by only 30%–40% of patients.[7]

The number of patients using continuous ambulatory peritoneal dialysis (CAPD) in India has recently grown substantially compared with the number in Pakistan, where CAPD use is relatively new. India has an estimated 4000 patients on CAPD; more than two thirds of these patients are on three 2-L exchanges per day with twin bags. Financial constraints prevent wider acceptability of CAPD; the annual cost is US$ 4500 per year for 3 exchanges per day. Thus, the cost of CAPD is approximately 2 times higher than hemodialysis on the subcontinent.[7]

The research question here will be "what are the costs of RRT in Hama and how are they distributed (CAPD versus hemodialysis or transplant)?"

Issue # 5: Causes of ESRD

Etiology of ESRD in the developing countries also differs from that seen in the developed world. As opposed to the situation in Europe and the United States, where diabetic nephropathy constitutes close to 50% of patients on ESRD programs, the predominant causes of ESRD in Africa are essential hypertension and chronic glomerulonephritis (CGN).[9,10] A rise in the percentage contribution of diabetes has, however, been noted in various centers, which is consistent with the increase in urbanization and improvement in the living standards in these countries.

In India and Pakistan CGN is the leading cause of ESRD in patients who underwent hemodialysis (39.9%), followed by diabetes mellitus (17.5%) and obstructive infective kidney diseases (13.5%). Also diabetes mellitus has been the cause of significantly increasing ESRD.[7]

Hypertension and diabetes are likely to be the predominant causes of ESRD in Hama. However, this is to be verified in the proposed research study.

Issue # 6: ESRD starting at an early age

The average age of ESRD patients in many developing countries is much younger than that in the developed world, where nephrology is gradually becoming a geriatric practice. The average age is about 40 years in Africa and 44 in India as compared with 52–63 years in developed countries.[7,9,10] Consistent findings also have been seen in some developing countries of the Eastern Europe.[3]

ESRD affect patients when they are young so it has a major impact on their lifes and their families too. These patients are often the sole breadwinners of their families. Delay in detection and failure to institute strategies that delay progression of renal failure contribute to ESRD at a younger age.

What is the average age of patients starting RRT in Hama is to be answered by this proposed research project.

Issue # 7: Late referrals

Late referral is a common problem facing RRT in developing countries. Patients generally present late in the course of their disease; in some developing countries 73% of patients first see a nephrologist when they require dialysis or less than 4 months before they develop ESRD.[9-10] Diagnosis prior to presentation is often inaccurate without the recognition of renal failure by the referring unit.[9,10]

Screening for kidney disease in high-risk populations, for example, patients with hypertension and diabetes mellitus and a family history of kidney disease, should be instituted as the first step in kidney disease prevention in developing countries.

Late referral is probably evident in the researched community, but what can be done about it is a different research question.

Issue # 8: Lack of sufficient number of nephrologists and RRT centers and the problem of centralized care

These are commonly encountered problems in the developing countries. For example, in the subregion of Africa no more than 2 or 3 nephrologists are serving populations that run into millions.[9,10] Invariably these nephrologists are located in the urban areas, which leave large portions of the population unattended.[9-11]

India has also <600 practicing nephrologists and 400 dialysis centers (0.4 per million populations). A large number of dialysis units are small, minimal care facilities with <5 dialysis stations. Patients have to travel far from their homes to hospitals where specialized care is available.[7]

These problems are clearly evident in the 2 clinical cases reported above. While situations in Hama have improved since 1990s, the situations of RRT are probably still suboptimal. Up to date, there are only a few dialysis machines and they are only peripherally supervised.

This issue of lack of sufficient number of nephrologists and RRT centers and the problem of centralized care are other research questions to be addressed in this proposed project.

Issue #9: The high incidence of hepatitis B and C

The prevalence of hepatitis B virus (HBV) infection in patients on renal replacement has been reduced in the developed countries, but information from developing nations is currently scarce and high prevalence rates are suspected. In a dialysis center in Mexico, which included 368 patients, the prevalence of HBsAg was 7.1% and for Hepatitis C (HCV) was 8.4%. Two patients (0.5%) were co-infected.[12] The risk of hepatitis B at this center is about 35 times higher the risk in general population (0.2%).[12]

The incidence of hepatitis B and C at the RRT centers in Hama, along with applied preventive programs are to be reviewed in this proposed project.

Issue#10: The incidence of HIV

To further compound the dismal picture in some developed countries in Africa, HIV is in a rising scourge. In South Africa, 19.9% of the adult population is seropositive for HIV, and HIV is responsible for 30% of deaths. That HIV is increasingly recognized at presentation either as a cause or coexisting in patients with ESRD is not unexpected. Unfortunately, several centers still routinely exclude such patients from their RRT programs.[9-11]

The incidence of HIV cases in RRT centers in Hama is probably very low, but that exact incidence and methods of testing and secondary prevention are to be evaluated in this proposed research study.

Issue #11: Looking for alternatives for hemodialysis

Reviewing the availability of other modality of RRT, including peritoneal dialysis and renal transplantation, and the availability of preventive programs are other questions of this proposed research.

Issue #12: Outcome

The fate of ESRD patients is dismal in several underserved countries; in sub-Saharan Africa most (65.7%) do not receive any form of RRT or stop treatment because of lack of resources.[9-11] Of those referred to a center known for its prolific transplant activity, only 12.8% underwent renal transplantation, 16.3% received maintenance hemodialysis for varying periods of time, and 5% received CAPD.[9-11]

Data about the outcome at the RRT in Hama is to be collected in this proposed research.

Limitations of this research proposal

Search method was performed in English, whereas the main language of the studied community is Arabic. This might limit the likelihood of finding data. But keeping in mind that there is no available search engine in Arabic language (to the extent of my knowledge), it is unlikely to find more published data about this topic in Arabic. However, supplementary information might be available from regional congresses and symposia, websites of specialized nephrology centers, and direct communications.

CONCLUSION

The true extent of the problem of ESRD in many underserved areas, including the city of Hama, is not known. Facilities for the provision of RRT are grossly inadequate and not accessible to a large part of the population. RRT is expensive, and no organized reimbursement system exists. Information about renal transplantation and peritoneal dialysis are not available either.

In the view of lack of sufficient literature about RRT in this city, data might be extrapolated from other communities with similar problems, but a specific research is still needed to analyze the situation at this given locality.

The challenges remain enormous, but renal care for all, although a difficult task, could be achieved through a concerted effort between nephrologists, governments, patients, charitable organizations, and industry.

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