

Family History in Patients with End-Stage Renal Disease on Hemodialysis in Tripoli, Libya

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Abstract

Background: End-Stage Renal Disease (ESRD) is a global health problem due to increasing its burden worldwide. High-risk groups include family members of patients with ESRD. **Objectives:** To determine the prevalence of ESRD among dialysis patients' families. At Al-Shat kidney dialysis Center, Tripoli, Libya. So can conclude that the ESRD patient is an index case for a high- risk population. **Methods:** All patients' data were collected through direct interview with the patients for 15- 20 minutes and by reviewing patients' charts. Patients who decline consent to participate and those with mental or speech disability were excluded, and patients on peritoneal dialysis. The study carried at Al-Shat kidney dialysis centre, Tripoli, Libya. In January 2019. **Results:** 261 patients were interviewed, mean age 51.8 years (± 15), nearly half (48.7%) of them, between 45 to 65 years and 31.8% younger than 45 years. 56.3% were men, and 43.7% were women. The leading causes of ESRD in these patients were DM, HTN, congenital abnormalities (APCKD/VUR) and GN (35.2%, 22.2%, 10%, 8%). Positive family history of ESRD was reported by 26.8% of these patients. From them, 47% (33/70) were between 45 to 65 years of age. 58.6% were male (41/70). 34.3% have diabetic, 20% have HTN, 13% have congenital abnormalities, and 7% GN. **Conclusions:** Positive family history of ESRD was high in dialysis patients. These patients can be used as an index case to identify high- risk population.

Keywords: ESRD End-Stage Renal Disease, DM Diabetes Mellitus, HTN Hypertension, APCKD Adult Polycystic Kidney Disease. VUR Vasico-Ureteric Reflux.

INTRODUCTION

End-stage renal disease (ESRD) prevalence is increasing globally, reaching epidemic proportions due to the increased prevalence of type 2 diabetes mellitus and ageing populations.^[1-4] It is currently higher than 2000 per million population (pmp) in Japan, about 1500 pmp in the US, and about 800 pmp in the European Union. In developing countries, the

figures vary from less than 100 pmp in sub-Saharan Africa and India to about 400 pmp in Latin America,

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more than 600 pmp in Saudi Arabia.^[5] Furthermore, 624 pmp in Libya.^[1,6] It is an irreversible chronic disease with considerable co-morbidity and mortality.^[1,6,7] Maintenance dialysis therapy is the commonest mode of renal replacement therapy (RRT) and constitutes a heavy financial burden on healthcare systems worldwide.^[1,5,6] Globally, the number of patients receiving RRT is estimated at more than 1.4 million and the annual incident rate growing to 8%.^[2] Family history of end-stage renal disease is a significant risk factor for subsequent renal disease. These families have an increased prevalence of hypertension, diabetes mellitus, proteinuria, and systemic lupus erythematosus contributing to the aggregation of ESRD in these families.^[4,8-10] Several US reports reveal a three- to nine-fold higher risk of developing ESRD in the individual with relatives with ESRD.^[9]

As early intervention during chronic kidney disease may delay or prevent chronic kidney disease progression to ESRD, it may be reasonable to suggest periodic screening of close relatives of patients with ESRD to detect previously undiagnosed kidney disease high-risk population. However, this approach has not been established.^[8,11] In Libya, there are no screening programs for ESRD and its risk factors, in addition to a lack of awareness regarding this disease in the community making its prevalence in progress. I conduct this study to raise awareness about the important high-risk population of this disease.

PATIENTS AND METHODS

Design and settings

A cross-sectional study was conducted in the Al-shat kidney dialysis center, a government hospital in Tripoli, Libya, throughout January 2019. Data was collected using a designed questionnaire, direct interviewing technique with ESRD patients, in addition to using medical records. Patients who refuse to participate and those with mental or speech disability were excluded. As well; that on peritoneal dialysis.

Survey questionnaire

After conducting an extensive literature review on the major risk factors of ESRD, data were collected

via a complementary questionnaire that consisted of four parts. The first part of the questionnaire included the objectives and the importance of the study. The second part included demographic characters, duration of hemodialysis. The third part was devised to collect information about the patient's family history (diabetes, hypertension, ESRD). The fourth part of the questionnaire was about the patient's medical history, including ESRD etiology (diabetes, hypertension, congenital anomalies, renal stone, analgesic drug usage, or other drugs, including contrast agents and other causes).

Data collection

Face-to-face interviews using a structured questionnaire were conducted on the patients at Al-Shat kidney dialysis center, Tripoli, Libya. The questionnaire collected comprehensive data on a wide range of issues related to the risk factors of ESRD. 261 patients, who were known for ESRD on regular hemodialysis in Al-shat kidney dialysis center, were interviewed. 3 to 4 visits per week have been done to the center; each visit direct interview was performed for 10 to 15 patients, which took about 15-20 mins for each patient.

Statistical analysis

All data collected from patients enrolled in the study were analyzed using Statistical Packages for Social Science (SPSS) version 25. Data analyzed as absolute and relative frequencies (number & %) or mean \pm standard deviation. The family history was considered positive if an ESRD patient (index case) reported having either a first-degree (parent, sibling, or child) or second-degree (grandparent, aunt, uncle, grandchild) relative with ESRD.

RESULTS

Study population

The study sample (n = 261 patients) consisted of 56.3% males and 43.7% females. The mean age of the patients was 51.8 (\pm 14.95) years. Nearly half (48.7%) of them between 45– 65 years, and 31.8% younger than 45yrs. The mean duration of dialysis was 5.42 (\pm 4.73) years. Hemodialysis duration was <5 yrs in 56.3%, between 5-10 years in 31.0% and >10 years in 12.6% of the patients.

Patients' medical history

Among all studied patients, diabetes mellitus and hypertension represented the main causes of ESRD; 35.2% of ESRD patients had DM. 22.2% had hypertension, 10% had a congenital abnormality, 8% had glomerulonephritis, and 1.9% had a renal stone. Of higher importance is that about 20.7% of the patients were on regular hemodialysis with unknown etiology [Table 1]. For those who gave a family history of ESRD (70 patients/26.8%), the males constitute 58.6% (41/70) while females 41.4%(29/70). The mean age was 49.04 yrs (± 16.13 yrs). 47% (33/70) between 45 to 65 years of age, 37% (26/70) younger than 45 years, and 16%(11/70) older than 65 years. The mean hemodialysis duration was 5.74 years(± 5.03). Hemodialysis duration was <5 yrs in 52.9%, between 5—10 years in 31.4% and >10 years in 15.7%. The causes of ESRD in these patients were: DM (34.3%), HTN (20%), congenital abnormalities (APCKD/VUR)(13%), GN (7%), and unknown cause (24.3%). Table 1

Medical history of family members

The prevalence of ESRD among families of the studied patients was 26.8%. While the family

history of DM and HTN were 68.2% and 58.6%, respectively in these families Table 2. There was significant association between the presence of family history of ESRD and the age at the start of dialysis. Positive family history of ESRD is associated with younger age of starting dialysis.

DISCUSSION

The presented study showed that the prevalence of ESRD increased with aging, particularly after 50 years; 59% were aged more than 50 years. As well, this study demonstrated that the prevalence of ESRD was higher in men than in women. The males represent 56.3% and the females 43.7%. The mean (SD) age of the patients was 51.8 (± 15) years. The current results agree with Ghonemy *et al.*^[2], who reported that ESRD prevalence increases with ageing, particularly after 50 years. As well, ESRD was higher in males (62.2%), and the mean (SD) age 52.03 (± 14.67) years in his study was similar to the present study. Also, the results were in concordance with Barry I. Freedman *et al.*^[8], who reported an increase in ESRD incidence with ageing; 79% were aged 45 or older.

Table 1: Characteristics of the studied patients as a whole and by family history of renal disease

Medical conditions	Positive family history of ESRD	Negative family history of ESRD	All patients
Sex			
Male	41 (59%)	106 (55.5%)	147 (56.3%)
Female	29 (41%)	85 (44.5%)	114 (43.7%)
Age			
Mean age (years)	49.04 \pm 16.12	52.85 \pm 14.4	51.8 \pm 14.95
Age groups			
<45 years	26 (37%)	57 (29.8%)	83 (31.8%)
45-65 years	33 (47%)	94 (49.2%)	127 (48.7%)
>65 years	11 (16%)	33 (20.9%)	51 (19.5%)
Smoking habit	13 (18.6%)	18 (9.4%)	31 (12.0%)
Duration of hemodialysis			
Mean duration (years)	5.7 (± 5.03)	5.3 (± 4.6)	5.4 (± 4.73)
<5	37 (52.9%)	110 (57.6%)	147 (56.3%)
5-10	22 (31.4%)	59 (30.9%)	81 (31.0%)
>10	11 (15.7%)	22 (11.5%)	33 (12.6%)
Causes of ESRD			
Diabetes mellitus	24 (34.3%)	68 (35.6%)	92 (35.2%)
Hypertension	14 (20%)	44 (23%)	58 (22.2%)
Glomerulonephritis	5 (7.1%)	16 (8.4%)	21 (8%)
Congenital	9 (12.9%)	17 (8.9%)	26 (10%)
Renal stone	1 (1.4%)	4 (2.1%)	5 (1.9%)
Drugs	0 (0%)	5 (2.6%)	5 (1.9%)
Unknown	17 (24.3%)	37 (19.4%)	54 (20.7%)

Results are shown as absolute and relative frequencies [count (percentage)]. ESRD: End-stage renal disease

Table 2: Medical history of family members of the ESRD patients

Medical conditions	Positive family history of ESRD		Negative family history of ESRD		All patients studied	
	Frequency (%)	Count	Count	Percent	Count	Percent
Diabetes mellitus						
Yes	46 (65.7%)		132 (69.1%)		178 (68.2%)	
No	24 (34.3%)		59 (30.9%)		83 (31.8%)	
Hypertension						
Yes	45 (64.3%)		108 (56.5%)		153 (58.6%)	
No	25 (35.7%)		83 (43.5%)		108 (41.4%)	
APCKD						
Yes	5 (7.1%)		1 (0.5%)		6 (2.3%)	
No	65 (92.9%)		190 (99.5%)		255 (97.7%)	
Renal stone						
Yes	4 (5.7%)		10 (5.2%)		14 (5.4%)	
No	66 (94.3%)		181 (94.8%)		247 (94.6%)	

Results are shown as absolute and relative frequencies [count (percentage)]. APCKD: Adult polycystic kidney disease

Goleg *et al.*^[1] reported that the median age of Libyan patients with ESRD was 49 years which is lower than that reported by the present study (53 years); as well, it is higher than that reported from Pakistan.^[7] This reflects improved health care; however, we are still far away from developed countries as the mean age in the United States was 61.1 years.^[12] Moreover, the median age in the United Kingdom was 65.9 years.^[13] In Japan, the mean age of the entire dialysis population was 66.9 years.^[14] Such differences between the current study and other studies on age and gender could be due to genetic or social differences between the Libyan and other community.

Patients who have a regular habit of smoking comprised 12% of the study patients; the percentage of male smokers was 11%, while that of female smokers was 0.76%. These results were higher than that reported by Ghonemy *et al.*^[2] Also, he reported no female smoker. This change may be attributed to the community's changes due to immigrants from different nations, wear, country instability, poverty and lack of social support. However, there was no significant correlation between smoking and the incidence of ESRD. A study conducted in the USA determined that smoking is not a significant risk factor for ESRD.^[15] However, other studies conducted in nine centers in Germany, Italy and Austria, showed that in men with inflammatory or non-inflammatory renal disease, cigarette smoking significantly increases ESRD.^[16] In the present study, the data regarding the

cause of ESRD was comparable to international data. The commonest cause of ESRD in the study group was diabetes mellitus 35.2%. Worldwide, diabetes mellitus accounts for 50% of ESRD causes.^[17] Indeed DM is a major cause of ESRD in the Arab world, affecting 41.7% of these patients in Saudi Arabia^[18], 46.8% in Lebanon^[19], and 21.2% in Kuwait.^[20] In contrary to this, Yemen has DM as the least encountered cause of ESRD.^[21] Thus DM in Libya, like elsewhere in the developing and developed world, is a major public health problem that requires greater attention in terms of prevention and interventions. Hypertension was the second leading cause of ESRD in the present study, occurring in 22.2% of patients. It is comparable with its prevalence in Saudi Arabia, where it affects more than 25% of the adult population.^[22] As well, hypertension represents a major cause of ESRD in other regional countries such as Egypt^[23], Turkey^[24] and Iran.^[25] In the US, hypertension represents 28% of the causes of ESRD cases.^[26] Chronic glomerulonephritis accounts for 8% of the ESRD causes in the present study, which is high compared with other countries. In Sudan, GN reported a cause of ESRD in 5.5% of the patients^[27], in Egypt in 3.7%^[2], and in the US in 3%. Nevertheless, lower than that reported in Pakistan, which was 11.2%.^[7] In the present study, unknown causes compile 20.7% of all causes of ESRD. The unknown etiology of ESRD was estimated to be 17.7% in Egypt^[2], 14% in Qatar^[28], 19.9% in Saudi Arabia^[29], and 14.4% in Iran^[30]. When comparing the present study result with that of developed countries like the USA, unknown causes represent 3.7%^[12], a greater difference mirroring

the poor health care system in developing countries. A family history of ESRD was reported by 26.8% in the present study. This finding strongly supports earlier reports of familial aggregation of ESRD, such as that reported by Freedman *et al.* (22.8%).^[8,31] This study is relevant for many reasons. First, if 26.8% of the patients have additional family members at risk for ESRD, this result may help recognize these individuals, so they may be targeted by interventions that delay or prevent renal failure. For example. A family history of ESRD is a reliable predictor of whether diabetic patients will develop future kidney failure.^[32,33] Therefore, increased screening among high-risk family members and early use of Angiotensin-Converting enzyme inhibitors at the onset of microalbuminuria may prevent subsequent overt proteinuria and deterioration in renal function.^[34,35] Second, a potentially cost-effective method for facing the increasing prevalence of ESRD might be to make available to a relative of ESRD patients annual blood pressure screening, urinalysis, serum creatinine determination and counselling regarding avoidance of nephrotoxic drugs. This study's results are more general because these findings rely on the ability of patients to identify a positive family history correctly. In this study, hemodialysis's mean duration was 65.04 (± 56.8) months, which is more than that reported in Pakistan 29.08 \pm 22.25 months.^[7]

CONCLUSIONS

Family History studies suggest that ESRD patients' relatives are at increased risk for kidney disease and future ESRD. Based on this observation, it is reasonable to suggest that treatment center-based educational and chronic kidney disease screening programs directed to families of ESRD patients be considered to improve the detection, treatment and control of chronic kidney disease.

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Author's contribution

Solo author responsible for conception and conduct of the study and drafting and revision of the manuscript and approval of its revised version.

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Conflicts of interest

There are no conflicts of interest.

Compliance with ethical principles

The study was deemed not to expose the participants to any harm by the scientific committee of the Department. No formal ethical approval was sought. However, participants provided an informed verbal consent and all data were collected and analyzed anonymously.

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