

Causes of end-stage renal disease (ESRD) in patients on hemodialysis in Al-Gharbiyah Governorate in Egypt

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Abstract: Chronic kidney disease (CKD) is an increasing global burden regarding social, epidemiological and economic aspects. The burden is greater in the developing countries because of limited resources and poverty. In Egypt the problem is increasing and it represents one of the major health problems. One of the first steps of prevention of CKD and hence of ESRD is identification of the causes of this problem. The present study is an epidemiological study which carried out through questionnaire. Aiming to find out the causes of ESRD in Algharbiyah Governorate in Egypt. All governmental haemodialysis units in Al-Gharbiyah Governorate and private hemodialysis centers were included in the study. 980 patients with ESRD on hemodialysis were included. A modified form of Egyptian society of nephrology Questionnaire was used. The mean age of patients was 52.27±12.91 years. Percentage of patients from rural areas and that from urban areas was (61.9% vs 39.1). All patients were under Hemodialysis 3 times per week, hypertension accounted for 31.8% of all causes of ESRD, diabetic nephropathy 22.9%. and Unknown cause 11.9, chronic pyelonephritis was responsible for 0.6% of ESRD cases, chronic glomerulonephritis represented 1.4% of all cases. While shistosomiasis was responsible for 0.9% of treated ESRD and Polycystic kidney disease accounted for 3.7% of all causes of ESRD. **In conclusion:** hypertensive nephropathy was the most common cause of ESRD in Al-Gharbiyah Governorate followed by diabetic nephropathy. [Abd El Raouf, Y. M and Alghazal, G. **Causes of end-stage renal disease (ESRD) in patients on hemodialysis in Al-Gharbiyah Governorate in Egypt.** *Life Sci J* 2015;12(8):45-55]. (ISSN:1097-8135). <http://www.lifesciencesite.com>. 8

Key words: Endstage renal disease, Diabetic nephropathy, Hypertension, Glomerulonephritis.

1. Introduction

CKD is either kidney damage or a decreased glomerular filtration rate (GFR) of less than 60 mL/min/1.73 m² for 3 or more months. Whatever the underlying etiology, once the loss of nephrons and reduction of functional renal mass reaches a certain point; the remaining nephrons begin a process of irreversible sclerosis that leads to a progressive decline in the GFR (**KDIGO Guideline, 2013**).

Professional guidelines classify the severity of CKD in five stages, with stage 1 being the mildest and usually causing few symptoms and stage 5 being a severe illness with poor life expectancy if untreated. Stage 5 CKD is often called end stage renal disease (**National Kidney Foundation, 2002**).

ESRD is the point of irreversible renal function deterioration beyond which life can no longer be sustained without treatment. Importantly, appropriate pre-ESRD care ensures that the patients are in the best overall condition when they start dialysis (**Abboud and Henrich, 2010**).

Chronic renal failure (CRF) is a debilitating condition responsible for high morbidity and mortality and is a financial burden on government and society because of its costs and the complexity of its treatment (**Agarwal et al., 2005**).

Costs for dialysis and renal transplantation are still unaffordable for most patients with ESRD. Since the cost burden has significantly increased,

nephrology services should be changed from curative medicine to preventive medicine (**Soliman et al., 2012**).

ESRD is associated with increased psychological distress and diminished quality of life (QoL) (**Kimmel and Peterson, 2005**). The high prevalence of CKD has related morbidity with increased prevalence of anemia, acidosis and renal bone disease. Other possible associated comorbidities with CKD are heart failure, periodic hypoglycemia and obstructive sleep apnea (**Gullion et al., 2006**).

ESRD has significantly increased in developed and developing countries, diabetes mellitus is still the leading cause of ESRD in developed countries, also in these countries hypertension is an important cause (**Kdoqi, 2007**).

Polycystic kidney disease is another well-known cause of CKD (**Alam and Perron, 2010**). Chronic pyelonephritis, chronic glomerulonephritis and interstitial nephritis are currently the principal causes of CKD in developing countries reflecting the high prevalence of bacterial, viral and parasitic infection (**Barsoum, 2002**).

Overuse of common drugs such as aspirin, ibuprofen, and acetaminophen (paracetamol) can also cause chronic kidney damage (**Mihatsch et al. (2006)**).

Unfortunately, no clear statistical data are available in Al-Gharbiyah Governorate regarding the causes of ESRD. Therefore, the present work will be directed to find out the most common Causes of

ESRD in Al-Gharbiyah Governorate in trial to deal with these causes.

2. Patients and Methods

This study was conducted in governmental dialysis units and private hemodialysis centers in Al-Gharbiyah Governorate on 980 patients through a modified form of Egyptian society of nephrology Questionnaire. The questionnaire was filled by us depending on data obtained from physicians responsible for dialysis units, obtained from files and patients. A consent was taken from patients to use their data in a confidential manner.

Inclusion criteria

All governmental haemodialysis units in Al-Gharbiyah Governorate and private haemodialysis centers were included in the study. The Questionnaire used in this study is included in appendix 1.

Exclusion criteria

Patients refused to give consent and non motivated responsible physicians were excluded from the study.

3. Results:

As shown in tables 1 & 2; we can see a comparison between all studied patients (980) as regard age, sex and weight, it shows no statistically significant difference in all ($p > 0.05$). There is statistically significant difference in residency of patients as being those from rural areas (60.9%) more than those from urban areas (39.1%) ($p = 0.0001$), regarding occupation more patients with ESRD on hemodialysis are jobless (64.1%) ($p = 0.0001$), less in highly educated (11.9%) ($p = 0.0001$), only 4.3% had +ve family history and regarding habits there are more in those without special habits (82.4%), (16.9%) are smoking and (0.6%) alcoholic (0.043). Also; baseline diseases at time of starting dialysis showed no LVF in (99.4%) of patients ($p = 0.001$), COPD was absent in (97.9%) of patients ($p = 0.004$), and hepatitis C viral infection was absent in (55%) of patients ($p = 0.0001$).

As seen in table (3), there is significant difference in causes of ESRD detected among the studied patients among different dialysis units regarding: reflux nephropathy and chronic pyelonephritis, obstructive uropathy, gouty nephropathy, complication of pregnancy (eclampsia or pre-eclampsia), renal affection secondary to collagen disease and ESRD of unknown etiology, and the most common causes are hypertension (31.9%, and there was no significant difference among all dialysis units regarding this cause with P value=0.135), diabetic nephropathy (22.9%, and there was no significant difference among all dialysis units regarding this cause with P value=0.617), unknown cause (11.6%, and there was significant difference among all dialysis units regarding this cause with P value=0.0001) and obstructive uropathy (10.7%, and there was no

significant difference among all dialysis units regarding this cause with P value=0.707). Figure (1)

In table (4) we can find the causes of ESRD among the studied patients in Tanta (capital of the governorate) governmental dialysis units in Al-Gharbiyah Governorate being the most common causes are hypertension (35.3%, and there was significant difference among all dialysis units regarding this cause with P value=0.025), diabetic nephropathy (19.7, with P value=0.022 among all dialysis units), obstructive uropathy (11.2% and P value among studied units was 0.742) and unknown causes (11.2% with P value=0.1 among all dialysis units). The causes of ESRD varied from a dialysis unit to another in Tanta city (total number=249). In Moubarra unit, diabetic nephropathy represents (39.4%) of the causes, hypertensive nephropathy (12.2%) and analgesic nephropathy (12.1%). In Mougamaa unit, hypertensive nephropathy represents (39.5%) of the causes, diabetic nephropathy (14%) and unknown cause (14%). In Minshawy unit, hypertensive nephropathy (28.6%), diabetic nephropathy (17.6%) and unknown cause (15.4%). In Tanta University unit, hypertensive nephropathy (46.3%), diabetic nephropathy (17.1%), obstructive uropathy (11%) and unknown cause (9.8%). Figure (2)

As shown in table (5), the most common causes of ESRD among the studied patients in El-Mahalla El-Kobra (second big city in the governorate) dialysis units ($n=220$) are as follows: diabetic nephropathy (24.5% with P value= 0.0001 among the studied dialysis units in El- Mahalla), hypertension (24.1% with P value= 0.027 among the studied dialysis units in El- Mahalla), unknown cause (12.7% and P value among studied units was 0.109) and obstructive uropathy (10% with P value= 0.048 among studied units). Figure (3)

Table (6) shows the duration of hemodialysis of the studied patients in governmental dialysis units in Al-Gharbiyah Governorate with mean duration of (4.25 ± 3.70). The longest duration is in El Mahalla El Koubra units (6.38 ± 4.12) and the shortest is in Zafeta unit (2.96 ± 3.22), and the difference among studied units in the governorate was significant with $P = 0.001$.

As it is clear from table (7), the health problems diagnosed among the studied patients in dialysis units are significantly different in all (ischemic heart disease $P = 0.004$, peripheral vascular disease $P = 0.0001$, hepatitis C virus $P = 0.0001$ and renal osteodystrophy $P = 0.0001$) except in malignancy ($P > 0.05$).

We can see in table (8) that there is no significant difference in causes of ESRD in relation to area of residence as there is no significant difference between urban and rural areas ($P > 0.05$).

Table (1): Demographic data of the studied patients: *Significant (P<0.05)

Variables	The studied patients in dialysis units (n=980)																			χ ² P	
	Governmental units (n=842)																		Private unit (MK unit) (n=138)		Total (n=980)
	Tanta units (n=249)		El-Mahalla El-Koubra units (n=220)		Bassioun unit (n=36)		El-Santa unit (n=51)		Zefta unit (n=38)		Kafr Zayat Unit (n=117)		Kotour unit (n=51)		Samanoud unit (n=80)						
n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%		
*Age (years):																					
Range	14-91		14-80		26-72		20-77		12-67		20-83		23-78		20-75		20-80		12-91		
Mean±SD	53.16±14.02		51.64±12.62		51.42±10.13		52.25±11.73		47.16±12.41		52.52±12.72		51.86±13.25		52.79±12.29		52.94±12.86		52.27±12.91		
F value	1.053																				
P	0.394																				
*Sex:																					
Males	149	59.8	118	53.6	21	58.3	31	60.8	25	65.8	74	63.2	29	56.9	56	70.0	92	66.7	595	60.7	
Females	100	40.2	102	46.4	15	41.7	20	39.2	13	34.2	43	36.8	22	43.1	24	30.0	46	33.3	385	39.3	
*Residence:																					
Urban	112	45.0	117	53.2	18	50.0	20	39.2	11	28.9	41	35.0	7	13.7	4	5.0	53	38.4	383	39.1	
Rural	137	55.0	103	46.8	18	50.0	31	60.8	27	71.1	76	65.0	44	86.3	76	95.0	85	61.6	597	60.9	
*Occupation:																					
Worker	20	8.0	4	1.8	1	2.8	10	19.6	1	2.6	1	0.9	1	2.0	4	5.0	7	5.1	49	5.0	
Employer	82	32.9	45	20.5	9	25.0	5	9.8	10	26.3	19	16.2	5	9.8	23	28.8	57	41.3	255	26.0	
Farmer	8	3.2	4	1.8	2	5.6	5	9.8	1	2.6	9	7.7	4	7.8	7	8.8	8	5.8	48	4.9	
No work	139	55.8	167	75.9	24	66.7	31	60.8	26	68.4	88	75.2	41	80.4	46	57.5	66	47.8	628	64.1	
*Education:																					
Not educated	102	41.0	46	20.9	16	44.4	31	60.8	15	39.5	25	21.4	20	39.2	38	47.5	51	37.0	344	35.1	
Basic educ.	26	10.4	45	20.5	7	19.4	6	11.8	6	15.8	32	27.4	11	21.6	14	17.5	6	4.3	153	15.6	
Secondary	77	30.9	108	49.1	10	27.8	14	25.5	14	36.8	54	46.2	19	37.3	24	30.0	51	37.0	370	37.8	
High educ.	44	17.7	21	9.5	3	8.3	3	2.0	3	7.9	6	5.1	1	2.0	4	5.0	30	21.7	113	11.5	
*Habits:																					
-ve	189	75.9	187	85.0	32	88.9	39	76.5	34	89.5	94	80.3	41	80.4	68	85.0	124	89.9	808	82.4	
Smoking	58	23.3	32	14.5	4	11.1	12	23.5	4	10.5	20	17.1	10	19.6	12	15.0	14	10.1	166	16.9	
Alcohol	2	0.8	1	0.5	0	0	0	0	0	0	3	2.6	0	0	0	0	0	0	6	0.6	
*Family history:																					
-ve	236	94.8	207	94.1	32	88.9	50	98.0	36	94.7	115	98.3	50	98.0	77	96.2	135	97.8	938	95.7	
+ve	13	5.2	13	5.9	4	11.1	1	2.0	2	5.3	2	1.7	1	2.0	3	3.8	3	2.2	42	4.3	

Table (2): Body weight and history in disease of the studied patients (n=980).

Variables	The studied patients in dialysis units (n=980)																			χ ² P	
	Governmental units (n=842)																		Private unit (MK unit) (n=138)		Total (n=980)
	Tanta units (n=249)		El-Mahalla El-Koubra units (n=220)		Bassioun unit (n=36)		El-Santa unit (n=51)		Zefta unit (n=38)		Kafr Zayat Unit (n=117)		Kotour unit (n=51)		Samanoud unit (n=80)						
n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%		
*Body weight (kg):																					
Range	38-134		35-168		55-104		58-127		25-103		45-150		33-125		43-104		45-140		25-168		
Mean±SD	73.41±13.36		72.66±17.75		78.97±14.54		79.27±14.89		66.59±14.10		74.13±16.40		69.47±13.84		70.24±12.92		73.28±13.69		73.09±15.16		
F value	3.505																				
P	0.001*																				
*HCV:																					
No	129	51.8	78	35.5	7	19.4	22	43.1	11	28.9	45	38.5	15	29.4	33	41.3	101	73.2	441	45.0	
Yes	120	48.2	142	64.5	29	80.6	29	56.9	27	71.1	72	61.5	36	70.6	47	58.8	37	26.8	539	55.0	
*COPD:																					
No	248	99.6	210	95.5	33	91.7	50	98.0	38	100	117	100	49	96.1	80	100	134	97.1	959	97.9	
Yes	1	0.4	10	4.5	3	8.3	1	2.0	0	0	0	0	2	3.9	0	0	4	2.9	21	2.1	
*LVF:																					
No	244	98.0	220	100	35	97.2	51	100	38	100	117	100	51	100	80	100	138	100	974	90.4	
Yes	5	2.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0.5	
Not apparent	0	0	0	0	1	2.8	0	0	0	0	0	0	0	0	0	0	0	0	1	0.1	

*Significant (P<0.05)

NB. EF was recorded among two patients in Tanta Units

HCV=Hepatitis C virus infection, COPD=Chronic obstructive pulmonary disease, LVF=Left ventricular failure

Table (3): Etiological diseases of ESRD detected among the studied patients (n=980).

Variables	The studied patients in dialysis units (n=980)																		χ^2	P		
	Governmental units (n=842)																					
	Tanta units (n=249)		El-Mahalla El-Koubra units (n=220)		Bassioun unit (n=36)		El-Santa unit (n=51)		Zefta unit (n=38)		Kafr EL-Zayat Unit (n=117)		Kotour unit (n=51)		Samanoud unit (n=80)		Private unit (MK unit) (n=138)				Total (n=980)	
n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	
Reflux nephropathy and chronic pyelonephritis	12	4.8	18	8.2	0	0	2	3.9	6	15.8	13	11.1	1	2.0	4	5.0	9	6.5	65	6.6	16.416	0.037
*Chronic glomerulonephritis	3	1.2	6	2.7	0	0	1	2.0	0	0	2	1.7	0	0	0	0	2	1.4	14	1.4	5.863	0.663
*Diabetic nephropathy	49	19.7	54	24.5	7	19.4	9	17.6	9	23.7	35	29.9	12	23.5	19	23.8	30	21.7	224	22.9	6.272	0.617
*Hypertensive dis. of kidney	88	35.3	53	24.1	10	27.8	19	37.3	8	21.1	40	34.2	16	31.4	28	35.0	50	36.2	312	31.8	12.392	0.135
*Obstructive uropathy due to schistosomiasis	2	0.8	4	1.8	1	2.8	0	0	0	0	1	0.9	0	0	0	0	1	0.7	9	0.9	5.463	0.707
Obstructive uropathy	28	11.2	22	10.0	3	8.3	3	5.9	5	13.2	9	7.7	4	7.8	19	23.8	12	8.7	105	10.7	18.241	0.019
Gouty nephropathy	1	0.4	0	0	2	5.6	1	2.0	0	0	1	0.9	0	0	0	0	0	0	5	0.5	23.202	0.003
Complication of pregnancy (eclampsia or pre-eclampsia)	2	0.8	3	1.4	6	16.7	0	0	2	5.3	1	0.9	0	0	0	0	5	3.6	19	1.9	51.735	0.0001
*Polycystic kidney	8	3.2	12	5.5	0	0	1	2.0	1	2.6	4	3.4	2	3.9	5	6.3	3	2.2	36	3.7	6.442	0.598
*Other hereditary dis.	3	1.2	7	3.2	1	2.8	0	0	0	0	2	1.7	3	5.9	0	0	1	0.7	17	1.7	12.299	0.138
*Lupus nephritis	7	2.8	1	0.5	0	0	1	2.0	0	0	2	1.7	0	0	1	1.3	0	0	12	1.2	9.979	0.267
Renal affection secondary to collagen dis.	1	0.4	0	0	2	5.6	1	2.0	0	0	0	0	0	0	0	0	1	0.7	5	0.5	22.945	0.003
*Analgesic nephropathy	13	5.2	8	3.6	0	0	1	2.0	0	0	3	2.6	1	2.0	0	0	2	1.4	28	2.9	11.340	0.183
*Renal amyloidosis	1	0.4	1	0.5	0	0	0	0	0	0	2	1.7	1	2.0	0	0	1	0.7	6	0.6	5.402	0.714
*Other cause	3	1.2	3	1.4	0	0	0	0	0	0	2	1.7	0	0	0	0	1	0.7	9	0.9	3.938	0.863
Renal failure of unknown etiology	28	11.2	28	12.7	4	11.1	12	23.5	7	18.4	0	0	11	21.6	4	5.0	20	14.5	114	11.6	33.850	0.0001

*Significant (P<0.05)

Table (4): Causes of ESRD detected among the studied patients in Tanta governmental dialysis units (n=249).

Variables	The studied patients in Tanta governmental dialysis units (n=249)										χ^2	P
	Moubarrha unit (n=33)		Mougamaa unit (n=43)		Minshawy unit (n=91)		Tanta university unit (n=82)		Total (n=249)			
	n	%	n	%	n	%	n	%	n	%		
*Reflux nephropathy and chronic pyelonephritis	2	6.1	2	4.7	6	6.6	2	2.4	12	4.8	1.751	0.626
*Chronic glomerulonephritis	0	0	1	2.3	1	1.1	1	1.2	3	1.2	0.865	0.834
Diabetic nephropathy	13	39.4	6	14.0	16	17.6	14	17.1	49	19.7	9.612	0.022
Hypertensive dis. of kidney	7	21.2	17	39.5	26	28.6	38	46.3	88	35.3	9.381	0.025
*Obstructive uropathy due to schistosomiasis	0	0	1	2.3	1	1.1	0	0	2	0.8	2.282	0.516
*Obstructive uropathy	2	6.1	5	11.6	12	13.2	9	11.0	28	11.2	1.245	0.742
*Gouty nephropathy	0	0	0	0	1	1.1	0	0	1	0.4	1.743	0.627
*Complication of pregnancy (eclampsia or pre-eclampsia)	0	0	0	0	1	1.1	1	1.2	2	0.8	0.894	0.827
*Polycystic kidney	3	9.1	2	4.7	0	0	3	3.7	8	3.2	7.026	0.071
*Other hereditary dis.	0	0	1	2.3	0	0	2	2.4	3	1.2	3.015	0.389
*Lupus nephritis	1	3.0	0	0	3	3.3	3	3.7	7	2.8	1.544	0.672
*Renal affection secondary to collagen dis.	0	0	0	0	1	1.1	0	0	1	0.4	1.743	0.627
Analgesic nephropathy	4	12.1	2	4.7	7	7.7	0	0	13	5.2	8.844	0.031
*Renal amyloidosis	1	3.0	0	0	0	0	0	0	1	0.4	6.572	0.087
*Other cause	0	0	0	0	2	2.2	1	1.2	3	1.2	1.681	0.641
*Renal failure of unknown etiology	0	0	6	14.0	14	15.4	8	9.8	28	11.2	6.242	0.100

*Significant (P<0.05)

Table (5): Causes of ESRD detected among the studied patients in El-Mahalla dialysis units

Variables	The studied patients in El-Mahalla dialysis units (n=220)						χ^2	P
	Moubarrha unit (n=59)		General hospital unit (n=161)		Total (n=220)			
	n	%	n	%	n	%		
•Reflux nephropathy and chronic pyelonephritis	0	0	18	11.2	18	8.2	7.184	0.007*
•Chronic glomerulonephritis	0	0	6	3.7	6	2.7	2.260	0.133
•Diabetic nephropathy	39	66.1	15	9.3	54	24.5	75.174	0.0001*
•Hypertensive dis. of kidney	8	13.6	45	28.0	53	24.1	4.890	0.027*
•Obstructive uropathy due to schistosomiasis	4	6.8	0	0	4	1.8	11.117	0.001*
•Obstructive uropathy	2	3.4	20	12.4	22	10.0	3.914	0.048*
•Complication of pregnancy (eclampsia or pre-eclampsia)	0	0	3	1.9	3	1.4	1.115	0.291
•Polycystic kidney	1	1.7	11	6.8	12	5.5	2.210	0.137
•Other hereditary dis.	0	0	7	4.3	7	3.2	2.650	0.104
•Lupus nephritis	0	0	1	0.6	1	0.5	0.368	0.544
•Analgesic nephropathy	0	0	8	5.0	8	3.6	3.042	0.081
•Renal amyloidosis	1	1.7	0	0	1	0.5	2.741	0.098
•Other cause	0	0	3	1.9	3	1.4	1.115	0.291
•Renal failure of unknown etiology	4	6.8	24	14.9	28	12.7	2.568	0.109

*Significant (P<0.05)

Table (6):Duration of hemodialysis of the studied patients in governmental dialysis units in Al Gharbiya province

Variables	The studied patients in dialysis units (n=980)								Private unit (MK unit) (n=138)	Total (n=980)
	Governmental units (n=842)									
	Tanta units (n=249)	El-Mahalla El-Koubra units (n=220)	Bassioun unit (n=36)	El-Santa unit (n=51)	Zefta unit (n=38)	Kafr EL-Zayat Unit (n=117)	Kotour unit (n=51)	Samanoud unit (n=80)		
•Duration of hemodialysis (years):										
Range	2 w.-18 y.	2 w.-20 y.	4 m.-15 y.	4 m.-9 y.	2 w.-15 y.	2 w.-16 y.	2 w.-20 y.	2 w.-20 y.	2 w.-16 y.	2 w.-20 y.
Mean±SD	4.00±3.45	6.38±4.12	4.04±3.81	4.13±2.16	2.96±3.22	3.78±3.42	3.94±4.31	3.43±3.01	3.33±2.87	4.25±3.70
χ^2 value	140.031									
P	0.001*									

*Significant (P<0.05)

Table (7): Show the health problems diagnosed among the studied patients in dialysis units

Variables	The studied patients in dialysis units (n=980)																		χ^2	P					
	Governmental units (n=842)																								
	Tanta units (n=249)		El-Mahalla El-Koubra units (n=220)		Bassioun unit (n=36)		El-Santa unit (n=51)		Zefta unit (n=38)		Kafr EL-Zayat Unit (n=117)		Kotour unit (n=51)		Samanoud unit (n=80)		Private unit (MK unit) (n=138)				Total (n=980)				
n	%	N	%	n	%	N	%	n	%	N	%	n	%	n	%	n	%	n	%	n	%				
•Ischemic heart disease	35	14.1	23	10.5	6	16.7	7	13.7	5	13.2	5	4.3	1	2.0	1	1.3	2	1.8	6	8	12	12.6	22.31	0.004*	
•Peripheral vascular disease	16	6.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	17	1.7	43.51	0.0001*
•Malignancy	2	0.8	2	0.9	0	0	0	0	1	2.6	2	1.7	1	2.0	1	1.3	0	0	0	0	0	9	0.9	4.858	0.773
•HCV	11	47.0	14	65.0	27	75.0	2	56.0	2	71.0	7	60.0	3	66.0	4	61.0	4	29.0	9	3	53	55.0	70.21	0.0001*	
•Renal osteodystrophy	7	8.4	26	11.8	5	13.9	1	2.0	2	5.3	0	0	1	2.0	1	1.3	0	0	0	0	57	5.8	43.44	0.0001*	

*Significant (P<0.05)

Table (8): show that there are no significant difference in causes of ESRD detected among the studied patients in relation to their residence (n=980).

Variables	Residence of the studied patients in dialysis units (n=980)				χ^2	P
	Urban (n=383)		Rural (n=597)			
	N	%	n	%		
▪Reflux nephropathy & pyelonephritis	24	6.3	41	6.9	0.136	0.712
▪Chronic glomerulonephritis	7	1.8	7	1.2	0.711	0.399
▪Diabetic nephropathy	98	25.6	126	21.1	2.658	0.103
▪Hyperensive dis. of kidney	123	32.1	189	31.7	0.022	0.881
▪Obstructive uropathy due to schistosomiasis	2	0.5	7	1.2	1.084	0.298
▪Obstructive uropathy	34	8.9	71	11.9	2.218	0.136
▪Gouty nephropathy	1	0.3	4	0.7	0.769	0.381
▪Complication of pregnancy (eclampsia or pre-eclampsia)	8	2.1	11	1.8	0.074	0.785
▪Polycystic kidney	17	4.4	19	3.2	1.040	0.308
▪Other hereditary dis.	6	1.6	11	1.8	0.104	0.747
▪Lupus nephritis	5	1.3	7	1.2	0.034	0.853
▪Renal affection secondary to collagen dis.	2	0.5	3	0.5	0.002	0.966
▪Analgesic nephropathy	11	2.9	17	2.8	0.001	0.982
▪Renal amyloidosis	3	0.8	3	0.5	0.302	0.582
▪Other cause	3	0.8	6	1.0	0.126	0.723
▪Renal failure of unknown etiology	39	10.2	75	12.6	1.286	0.257

*Significant ($P < 0.05$)

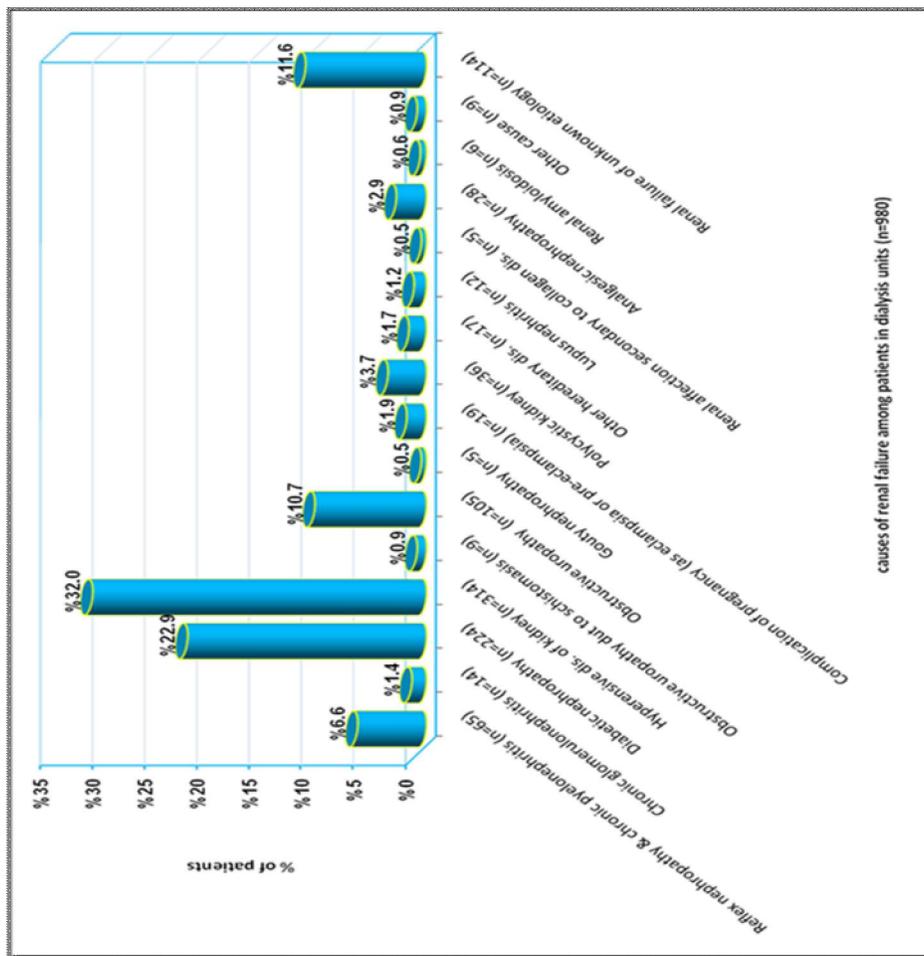


Figure (1): Causes of ESRD among the studied patients (n=980).

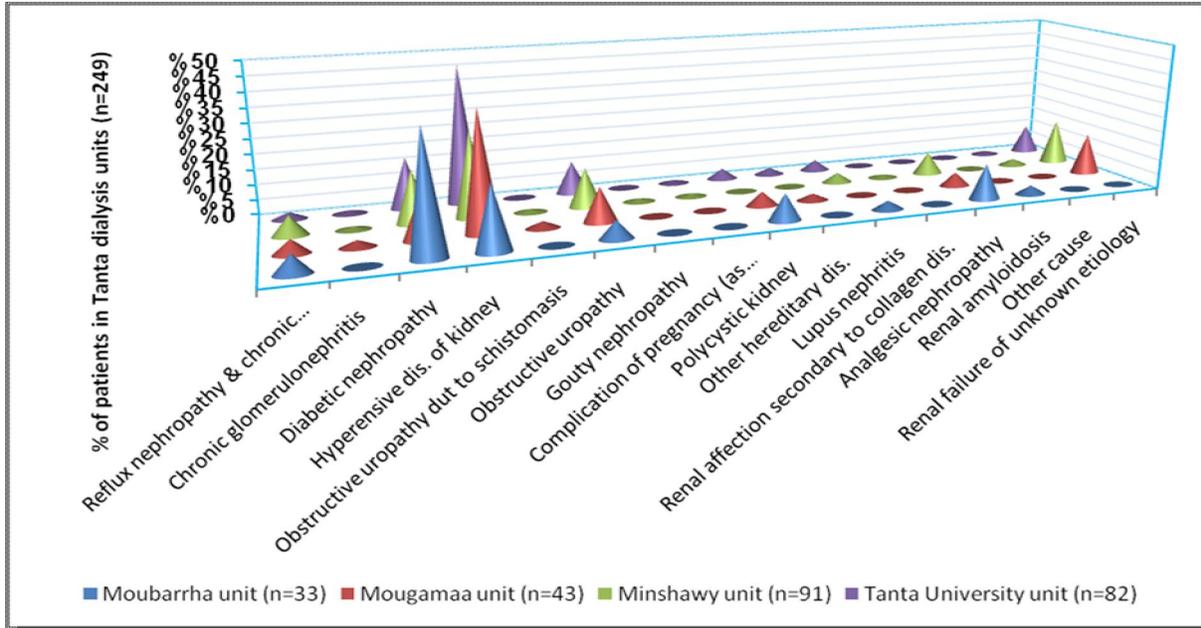


Figure (2): shows the causes of ESRD among Tanta governmental dialysis units as in Moubarrha unit diabetic nephropathy (39.4%), hypertensive nephropathy (12.2%) and analgesic nephropathy (12.1%). In Mougamaa unit, hypertensive nephropathy (39.5%), diabetic nephropathy (14%) and unknown cause (14%). In Minshawy unit, hypertensive nephropathy (28.6%), diabetic nephropathy (17.6%) and unknown cause (15.4%). In Tanta University unit hypertensive nephropathy (46.3%), diabetic nephropathy (17.1%), obstructive uropathy (11%) and unknown cause (9.8%). (n=249).

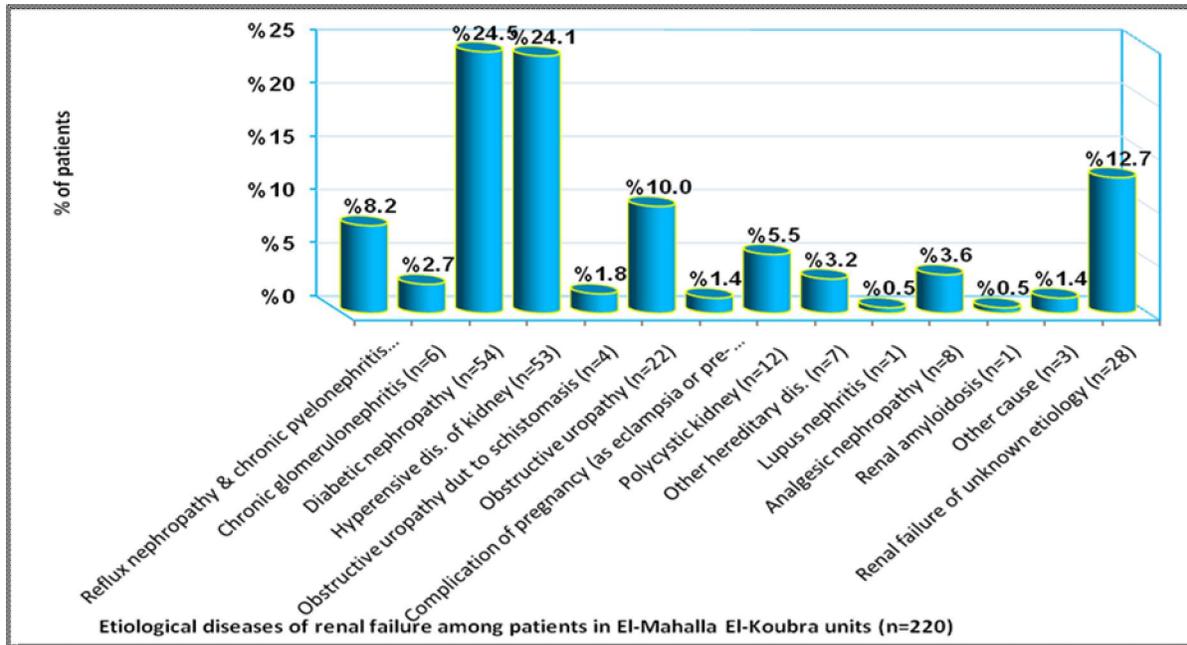


Figure (3): Shows the causes of ESRD among the studied patients in El-Mahalla El-Kobra dialysis units (n=220): diabetic nephropathy (24.5%), hypertension (24.1%), unknown (12.7%) and obstructive uropathy (10%) (n=220).

4. Discussion

Chronic renal disease is a public health problem with epidemiological, social, and economic

implications. In developed countries there is electronic data registry which allows easy statistical analysis and determination of the size of the problem for future

plans. In developing countries there is no data registry and only few data were available about epidemiology of dialysis patients.

The results of the present study showed that the prevalence of treated ESRD in males was almost twice that of females (60.7% vs 39.3%). This male predominance among the ESRD population, almost a global phenomenon, is poorly explained, with males constituting 56% according to **US (United States) Renal Data System (USRDS), 2012** in the US, 60% in the **UK (United Kingdom) Renal Registry, 2010** and 54.5% in the KSA (Kingdom of Saudi Arabia) (**Al-Sayari and Shaheen, 2011**).

In the present study the mean age was 52.27 ± 12.91 years. **Afifi, 2008**, reported that mean age in Egypt increased from 45.6 years in 1996 to 49.8 years in 2008. Increasing mean age of ESRD patients reflects the improvement of health care however we still away from developed countries as mean age in United State was 61.1 years according to **USRDS, 2012** and median age in United Kingdom (UK) was 65.9 years according to **Steenkamp et al., 2011**.

Most of the patients come from rural areas than from urban areas (61.9% vs. 39.1% respectively). All were dialyzed three times per week with average (4 hours) as a duration of each dialysis session, among the 980 patients, 11.5% were highly educated, 35.1% not educated, and basic and secondary education represented 15.5%, 37.8% of total number of patients respectively. There is high incidence of ESRD in low educated and low incidence in highly educated patients. This can be explained with good sanitation and proper health care in the highly educated group of patients. The main duration of dialysis was 4.25 ± 3.70 in years. The longest main duration of dialysis is 6.38 ± 4.12 in El-Mahalla El-Koubra general hospital unit, this indicates good care of patients leading to good survival rate.

Etiology of treated ESRD in the current study was hypertension in about 31.8% of the causes of treated ESRD in the area of Al-Gharbiyah Governorate. In Sudan, **El-Amin et al., 2010** reported that hypertension was responsible for about 26% of the causes of treated ESRD. Similarly, hypertension was the cause of treated ESRD in 28% of ESRD cases in the US according to **USRDS, 2012**. In Iran, **Malekmakan et al., 2009**, found that, the most common cause of treated ESRD among HD patients was hypertension (30.5%), but this is likely an overestimate as the diagnosis of hypertensive nephrosclerosis is difficult to ascertain even in patients with long-standing hypertension. Such patients may have had secondary hypertension due to undiagnosed kidney disease.

Naicker, 2009 stated that hypertension was the cause of kidney failure in 21% of patients on renal replacement therapy (RRT) in the South African

registry. Hypertension is responsible for 20% of the causes of treated ESRD in El-Minia Governorate in Egypt, and in El- Menofia governorate, Egypt, the main known cause of ESRD was hypertension (34.8 %) followed by diabetes (16.6 %). (**El-Minshawy, 2011**). A similarly wide variation is noted in the reported rates of hypertension as the primary cause of ESRD patients in the US and UK (28% and 5.8%, respectively), this according to **UK Renal Registry, 2010 and USRDS, 2012**.

The variation in the reported rates of hypertensive nephrosclerosis likely results from the different definitions of these conditions rather than a true variation of prevalence. Among the reasons for this difference are the delay in detecting renal disease and the failure to institute controlling and preventive measures in patients with progressive renal failure, both of which result in faster deterioration of renal function and progression to ESRD, and because of that chronic renal failure patients are referred late to nephrologists.

Diabetic nephropathy was responsible for 22.9% of causes of ESRD in the current study, while **Naicker, 2009**, found that the prevalence of diabetic nephropathy is estimated to be 14-16% in South Africa, 23.8% in Zambia, 9% in Sudan, and 6.1% in Ethiopia. In Egypt, **Afifi, 2008**, reported that the prevalence of diabetic nephropathy among ESRD patients is 14.5%. The reasons for this increase is the prevalence of diabetic nephropathy (DN) in the population, is mainly due to improvement in survival of patients with type 2 diabetes. However, in China, **Yao et al., 2009**, found that the incidence of diabetic nephropathy increased from 9.9% in 2000 to 17.2% in 2005. In France, **Couchoud et al., 2009**, reported that during the year 2007, 39% of patients with ESRD on HD were diabetics. Also, **Pérez-Oliva, 2009**, reported that the main cause of ESRD in Cuba in 2006 was diabetes mellitus. **Udayaraj et al., 2009**, stated that in England, diabetes mellitus was seen in 28.9% of patients on RRT while **Malekmakan et al., 2009**, reported that diabetes mellitus constitutes 30.1% of the causes of chronic renal failure in Iranian HD patients. In Qatar, diabetic nephropathy was the commonest cause of ESRD (48%) (**Shigidi et al., 2009**), and 44% in the US according to **USRDS, 2012**.

Afifi, 2008, found that in Egypt the prevalence of DN as a cause of ESRD was increased from 8.9 % in 1997 to 13.5 % in 2008 and still accounting for the 2nd cause of ESRD as hypertension is the main cause with 36.6% , while in Kuwait it was 25% constituting 2nd cause after glomerulonephritis which accounts 32 % (**El-Reshaid et al., 2005**), and in Saudi Arabia DN accounts for 25.2 % as 2nd cause following hypertension with 30.4 % as reported by **Shaheen and Al-Khader, 2005**.

In the present study the unknown cause of ESRD accounts for 11.9% of all causes of ESRD. It was estimated to be 27 % in Minia governorate, 18.1 % in Cairo governorate (**Elminshawy, 2011**), and all over Egypt it was estimated to be 15.2 % (**Afifi, 2008**). In Sudan, **El-Amin et al., 2010**, found that more than 40% of the surveyed patients had no identified cause for their renal impairment. Uncertain etiology of ESRD was estimated to be 14.4 % in Iran by **Malekmakan et al., 2009**, 14% in Qatar by **Shigidi et al., 2009**, and reported to be 19.9 % in Saudi Arabia by **Shaheen Shaheen and Al-Khader, 2005**. And the unknown etiology of ESRD in the US is only 5% according to **USRDS, 2012**.

This difference may be attributed to environmental factors. The demonstrated great difference reflects the poor health care system in developing countries.

Elminshawy, 2011, reported that in some Egyptian governorates like Cairo the main cause of ESRD was hypertension with 29.7% followed by DN with 12.5 %, in Canal governorates hypertension was the main cause of ESRD with 27.3 % followed by DN with 10.7%, and in Minia governorate the main cause was also hypertension with 20 % followed by DN 8%.

Chronic glomerulonephritis (GN) was 1.4% in our study. In Sudan, **El-Amin et al., 2010**, reported that GN was the reported cause of treated ESRD in 5.5% of the patients, 3.9% in the US (**USRDS, 2012**) while in Kuwait it for accounts 32 % of causes of ESRD according to **El-Reshaid et al., 2005**. In El-Minia Governorate it accounts for 11% of causes of ESRD, 15.8% in Cairo Governorat, and 2.5% in Canal Governorates (**Elminshawy, 2011**).

In present study, schistosomiasis was responsible for about 0.9% of the etiology of ESRD treated with HD. In Egypt; schistosomiasis responsible for 1.5-6.6% of the treated ESRD (**Afify, 2008**).

In the current study, obstructive uropathy is responsible for 10.7% of ESRD on HD. From a research work in Arab world, **FAISSAL and Al-Khader, 2005**, found that, in many Arab countries, obstructive uropathy constitutes a major cause (40%) of ESRD. The two most common underlying causes of obstructive uropathy are renal calculi and schistosomiasis, in El-Minia Governorate obstructive uropathy is blamed for 12% of cases of ESRD (**El Minshawy, 2011**). This may be due to hot weather and loss of water due to excessive sweating and concentrated urine.

Chronic pyelonephritis accounts for 5% of ESRD in El-Minia Governorate (**Elminshawy 2011**), but in our study it accounts 6.6% and in US it accounts 0.8% (**USRDS, 2012**) which reflects the high prevalence of bacterial, viral and parasitic infections such as schistosomiasis in our locality.

In the US, according to the **USRDS data, 2012**, analgesic nephropathy was seen in only 0.2% of patients while it was 2.9% in the current study; this reflects awareness of the people themselves in the US about the risk of excessive intake of analgesics. Another important cause is the widespread use of herbal medicines, in our locality, whose benefits and/or toxicity profiles have not been verified. These are compounded by the major problem of buying virtually any drug from the pharmacy without a doctor's prescription. Although bylaws exist against this practice, they are not enforced properly.

In the current study, polycystic kidney accounted for 3.7% of causes of ESRD, congenital kidney diseases occur in 3.3 per 1000 births (80% of which are due to hydronephrosis) (**FAISSAL and Al-Khader, 2005**). Polycystic kidney disease can be prevented through genetic counseling and premarital screening.

Hypertension more prevalent in urban areas (32.1%) than rural areas (31.7%), ESRD due to diabetic nephropathy was higher in urban (25.6%) than in rural areas (21.1%), while obstructive uropathy caused by schistosomiasis and renal stones was higher in rural (11.9%) than in urban areas (8.9%). The causes of ESRD showed no significant differences between rural and urban areas due to urbanization and migration.

In this study the prevalence of hepatitis C was found to be 55 % among patients with ESRD on HD. The high prevalence of hepatitis C is due to high rate of blood transfusion in dialysis units and it was estimated to be 52% in Egypt (**Afify, 2008**), 54.4 % in Syria which was reported by **Moukeh et al., 2009**, 21 % in Jordan as documented by **Batieha et al., 2007**, 18.9 % in Saudi Arabia (**Hussein et al., 2007**), and 31.4 % - 51 % in Turkey (**Kaya, 2008**). The high incidence of HCV can be associated with glomerulonephritis, only 2.6% of patients undergone to renal biopsy in our study, that is why (GN) may be the underlying cause of ESRD in cases of unknown cause.

In evaluation of our result, we didn't find a proper registry system if any. Also, we could not find clear detected data in registry; which is poor in different dialysis units; regarding the care which is given to ESRD patients on HD. No results of biopsies done for patients were found. Also, we could not find registry of laboratory results in most of dialysis units except in Tanta university hospital unit, Al Mogamaa hospital unit and El-Mahalla El-Kobra units, and no echo-cardiographic examination was recorded for any of the patients.

In conclusion

in Al-Gharbiyah Governorate, the most common cause of ESRD is hypertensive renal disease followed by diabetic nephropathy then unknown cause was the 3rd cause of ESRD. Most of hemodialysis units in Al-

Gharbiyah Governorate don't have a proper registry which could be an interfering factor accounting for the high rate of ESRD of unknown cause. We recommend to initiate a registry system in the units of hemodialysis in Al-Gharbiyah Governorate. This will help proper follow up of patients, proper research works and proper preventive programs of ESRD. Also, we recommend proper campaign activities for detection and treatment of diabetes mellitus and hypertension in the community which may be of value in early detection of hypertensive and diabetic patients, which are usually diagnosed late after complications are there.

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Appendix 1

Modified Form Of Egyptian Society Of Nephrology Dialysis patient Questionnaire2009

Center\Hospital:	Obtained by:		
Name Of Patient :	Age:	SEX:	
Occupation:			
Area of residence:			
Family history of ESRDS:	If+ve ,The cause is:		
Educational level:			
Habits:			
BMI :			
HCV:	COPD:	LVF:	EF:

Etiology of Renal Failure

Reflux nephropathy& chronic pyelonephritis:
Chronic glomerulonephrities:
Diabetic nephropathy:
Hypertensive disease of the kidney:
Obstructive uropathy due to schistosomiasis:
Renal affection with schistosomal liver fibrosis:
Obstructive uropathy (other than schistosomiasis):
Gouty nephropathy:
Complication of pregnancy:
Polycystic kidney of disease:
Other hereditary disease:
Lupus nephritis:
Renal affection secondary to other collagen diseases:
Analgesic nephropathy:
Renal amyloidosis:
Other cause not mentioned in the list:
Renal failure of unknown etiology:
Result of renal biopsy if done at any stage of the disease:

8/12/2015