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Thyroid Hormones and Lipid Profile Changes during Hemodialysis in CKD Cases of Libya

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Abstracts: *Chronic Kidney Disease **(CKD)** is a serious condition of loss of renal function progressively occurs usually within a course of several years. It is increasing rapidly worldwide at an annual growth rate of 8%. The prevalence of CKD is higher in developing countries than the developed countries are alarming and has become a major health issue.*
The aim of this study is to assess the level of thyroid hormones and lipid profiles of CKD of Pre-Haemodialysis and Post Haemodialysis patients at Al-khoms teaching hospital, Al-khoms, Libya.
Total of 71 (42 male and 29 female) cases of CKD with HD is included in the study. Blood samples are collected and centrifuged to take serum. Thyroid hormones and Lipid profiles were analysed from the serum of CKD patients during before and after HD using latest computerised equipment.
The Mean value of thyroid hormone (T3) level is increased than the normal value. T3 and T4 levels also show increased in Post HD patients than the Pre-HD. These increases in cases may be due to Hyperthyroidism. TSH level is decreased in Post HD cases. Triglyceride level is higher and Cholesterol level is more than the normal value. Mean value of Triglyceride, Cholesterol, HDL and LDL is more in Pre-HD cases. TG and Cholesterol amounts of male cases are higher than Females. T3, T4, TG, cholesterol levels are increased than the normal or show highest level reveals the patients involved in the study have CKD. Male cases have more levels of TG than the female. So a comprehensive health education campaign will ensure an appropriate and timely measure to halt or reduce the CKD among Libyan population.
Key Words: *Chronic kidney diseases, Thyroid hormones, cholesterol, Al-khoms, Libya.*

I. Introduction:

Chronic kidney disease (CKD) is defined as kidney disease that has been present for months to years. Chronic renal disease (CRD), chronic renal failure (CRF), and chronic renal insufficiency refer to the same condition. CKD is not a single disease. If anyone lose over 1/3 of their kidney function for over 3 months may leads to kidney failure, which requires dialysis or a kidney transplant to keep them alive. CKD leads to a build up of fluid and waste products in the body which affect most body systems and functions [(1)]. The prevalence of hyperthyroidism in CKD patients is the same as it is with the general population; thus CKD is not directly associated with hyperthyroidism. Oxidative stress also contributes to hypertension in hyperthyroidism, which contributes to CKD progression [(2)].

Thyroid dysfunction causes significant changes in kidney function. Both hypothyroidism and hyperthyroidism affect renal blood flow, GFR, tubular function, electrolytes homeostasis, electrolyte pump functions, and kidney structure [(3)]. Majority of patients with CKD are more likely to die from cardiovascular disease (CVD) rather than develop end stage kidney failure[(4)]. Lipid disorders are common among CKD patients and are recognized risk factors for CVD in CKD [(5)]. The focus of this study is to assess the level of thyroid hormones and lipid profiles of CKD of Pre-Haemodialysis and Post Haemodialysis patients at Al-khoms teaching hospital, Al-khoms, Libya.

II. Materials And Methods:

Total of 71 (42 male from the age of 13 to 77 years old and 29 female from the age of 16 to 68 years old) cases of CKD with HD is included in the study. The research work of collecting samples from the CKD patients, who undergo dialysis (Before and after) and analysis of the collected samples at the laboratory at Al-khoms Teaching Hospital, Al-khoms, Libya. The blood samples (5 – 10ml) were obtained from the HD patients (Before and after dialysis) (Dialysis Instrument, Dialog+, B.Braun, USA) using sterile syringe and Vacutainer tubes. Serum plasma was obtained by Centrifugation method using Centrifuge (Heraeus Model) at 300rpm for 10 minutes. Plasma was stored in -20^{0}C till analysis.

Thyroid Hormones: Level of T3, T4 and TSH were measured in the Serum plasma of both HD patients, before and after dialysis using an Automatic instrument (Viteos, EOQ, Johnson & Johnson, USA).

Lipid Profiles: Plasma total cholesterol (TC), Serum Triglycerides (TG), High density lipoprotein (HDL) and Low density lipoprotein (LDL) were analysed using Screen Master 2000, Eudutiun, Italy.

Statistical Analysis: Statistical analysis of the collected data were analysed by standard SPSS, IBM, Canada, statistical method. The mean for each parameter were found and applied the t-test to find the degree of freedom and significance to check the collected data.

III. Results And Discussions:

Chronic Kidney Disease (CKD) is a serious condition when the loss of renal function progressively occurs usually within a course of several years. It can be caused by the factors such as cardio-vascular disease, hypertension, diabetes, and obesity among others. If untreated, it can progress to the End-Stage Renal Disease (ESRD) and dialysis treatment or kidney transplant would be needed. Patients with CKD can experience poor quality of life, increased health care expenses, and increase the risk of death.

From the total 71 cases, male were 42 and the female cases were 29. The male and female ratio shows in the study was 1.44. More cases of CKD with Haemodialysis were observed mainly between 41 to 60 ages in both male and female (Table 1 and 2). In the same age group, the number of CKD with HD is more in male than female. This results shows that the quality of life in female is better than male. This result is in contradictory to the result of Barotfi (2005)[(6)] that an association between patients' gender and quality of life, male patients reported better quality of life along all studied dimensions than females. But the similar result is observed in studies focused on factors associated with quality of life of patients with chronic kidney disease have shown that elder patients on haemodialysis report worse quality of life than younger patients.

Table 1: Thyroid hormones (T3, T4 and TSH) level in CKD Patients during before and after HD.

1. a. Male:

S. No.	Age	T3 (Nr. 0.6-1.8ng/ml)		T4 (Nr. 4.8-12.0ng/ml)		TSH (Nr. 0.4-6.0miu/ml)	
		Before	After	Before	After	Before	After
1	13	4.9	2.9	14.4	10.2	1.2	1.3
2	23	0.9	3.0	5.5	12.5	4.3	1.7
3	27	3.5	4.7	5.4	13.2	3.9	2.1
4	27	3.4	5.8	10.6	12.5	1.1	1.2
5	28	0.4	3.2	4.7	9.0	0.3	0.2
6	30	2.5	5.3	10.1	11.1	0.3	0.2
7	33	1.7	4.7	10.7	9.5	2.0	1.9
8	36	2.7	4.5	5.5	7.2	2.1	1.5
9	36	3.2	4.4	5.1	12.3	9.5	6.1
10	38	2.3	5.9	4.3	8.9	1.5	0.6
11	39	2.2	3.8	5.1	10.2	1.2	1.1
12	42	5.4	5.9	11.5	10.5	1.4	2.1
13	45	2.8	2.3	4.3	10.7	1.4	1.2
14	45	2.9	3.2	4.8	10.1	1.9	1.3
15	46	2.4	4.5	5.2	12.0	1.6	3.4
16	46	5.5	6.2	8.4	10.1	1.7	1.1
17	48	2.5	5.7	4.8	12.0	6.1	2.2
18	48	2.4	5.9	5,05	10.1	6,02	0.4
19	48	4.8	1.8	8.1	13.2	1.1	0.9
20	50	2.7	4.9	4.7	10.5	1.8	0.2
21	50	2.9	4.1	10.7	11.1	2.5	1.2
22	50	2.5	5.1	4.4	10.1	0.4	0.4
23	50	2.8	4.7	5.0	17.9	0.7	0.3
24	50	3.2	4.5	5.5	12.2	3.9	1.9
25	50	2.7	3.7	5.5	12.1	4.3	1.2
26	50	0.8	2.8	4.3	9.2	0.6	0.6
27	50	2.7	4.5	4.8	11.1	4.6	1.9
28	50	2.6	4.3	9.4	9.9	1.4	1.2
29	50	2.9	4.1	10.4	12.1	1.0	1.0
30	51	5.4	5.9	9.2	8.3	3.6	0.4
31	52	5.7	4.2	13.1	10.7	1.5	1.3
32	53	5.7	5.8	8.6	10.1	2.2	1.9
33	55	4.7	5.1	7.8	9.1	0.5	0.3
34	58	11.4	3.9	11.1	9.1	1.3	1.2
35	59	0.9	5.0	8.5	9.1	3.5	2.1
36	60	2.8	3.1	11.2	12.5	0.6	0.4
37	62	3.4	3.9	9.9	9.9	1.2	1.1
38	63	2.9	4.1	8.6	13.5	1.6	2.2
39	63	2.8	3.1	9.1	11.1	4.5	2.3
40	70	2.4	6.5	4.5	10.2	0.2	1.2
41	77	3.1	5.1	10.1	13.2	3.6	0.6
42	77	5.4	2.9	8.6	6.5	1.9	1.1

1.b.Female:

S. No.	Age	T3 (Nr. 0.6-1.8ng/ml)		T4 (Nr. 4.8-12.0ng/ml)		TSH (Nr. 0.4-6.0miu/ml)	
		Before	After	Before	After	Before	After
43	**16**	**2.5**	**9.6**	**16.9**	**11.9**	**1.6**	**0.3**
44	**19**	**0.9**	**5.1**	**5.0**	**12.1**	**0.3**	**0.1**
45	**20**	**3.5**	**4.1**	**9.3**	**12.1**	**4.5**	**1.0**
46	**31**	**5.0**	**1.8**	**13.9**	**10.7**	**2.0**	**2.1**
47	**31**	**1.4**	**4.2**	**7.9**	**13.4**	**1.9**	**0.9**
48	**33**	**6.4**	**4.2**	**15.1**	**10.2**	**5.9**	**6.5**
49	**36**	**6.6**	**4.4**	**4.5**	**23.1**	**2.0**	**1.8**
50	**40**	**4.8**	**2.1**	**14.6**	**10.7**	**0.6**	**0.4**
51	**40**	**10.5**	**3.9**	**14.2**	**10.1**	**4.0**	**5.8**
52	**40**	**1.6**	**5.9**	**9.0**	**10.1**	**3.1**	**2.4**
53	**42**	**2.4**	**6.9**	**6.0**	**12.3**	**2.1**	**2.1**
54	**42**	**2.4**	**5.5**	**4.4**	**11.9**	**0.5**	**0.1**
55	**42**	**6.2**	**5.4**	**11.1**	**9.1**	**1.4**	**7.6**
56	**45**	**2.4**	**5.2**	**5.3**	**25.5**	**4.2**	**3.8**
57	**50**	**2.9**	**7.6**	**4.3**	**13.5**	**0.7**	**0,12**
58	**52**	**3.4**	**5.1**	**8.2**	**11.2**	**4.4**	**3.1**
59	**53**	**4.3**	**5.2**	**7.9**	**13.0**	**21.2**	**8.2**
60	**57**	**9.2**	**3.1**	**8.2**	**10.2**	**4.8**	**1.1**
61	**58**	**0.8**	**4.3**	**9.4**	**10.2**	**2.0**	**1.2**
62	**58**	**1.3**	**6.0**	**7.7**	**9.1**	**2.7**	**1.6**
63	**59**	**0.8**	**2.9**	**4.3**	**23.5**	**1.9**	**0.2**
64	**59**	**2.9**	**4.4**	**4.3**	**8.7**	**0.6**	**0.4**
65	**59**	**3.4**	**4.2**	**11.4**	**9.2**	**1.3**	**1.1**
66	**60**	**2.5**	**2.5**	**10.6**	**10.3**	**0.4**	**0.1**
67	**60**	**0.7**	**3.9**	**9.0**	**10.0**	**5.1**	**6.2**
68	**61**	**1.4**	**6.1**	**10.3**	**8.1**	**4.5**	**1.2**
69	**65**	**6.1**	**5.4**	**1.4**	**10.3**	**3.8**	**1.6**
70	**68**	**1.0**	**3.1**	**5.0**	**11.3**	**0.7**	**0.3**
71	**68**	**2.3**	**3.5**	**5.0**	**13.6**	**0.5**	**4.0**

Nr – Normal Value

1. Thyroid hormones (T3, T4 and TSH) level in CKD Patients during before and after HD:

Thyroid Hormones, T3 and T4 are increased after Haemodialysis in almost all the age of male and females (Table1a and 1b and Graph 1and 2) except the males aged 13 years old and females aged 21 – 40 years old. The level of T3 is higher than the normal level (0.6 – 1.8ng/ml) of CKD patients in Libya. This indicates that the patients were under study had Hyperthyroidism. Hyperthyroidism can result in accelerate CKD by several mechanisms. Firstly, hyperthyroidism results in intra-glomerular hypertension (increased filtration pressure) and consequent hyper filtration.

Table 2: Lipid profiles of CKD Patients during before and after HD.

2.a. Male:

S. No.	Age	Triglyceride (Nr. 60-165mg/dl)		Cholesterol (Nr. Upto220mg/dl)		HDL (Nr.30-70 mg/dl)		LDL (Nr. Upto 150mg/dl)	
		Before	After	Before	After	Before	After	Before	After
1	13	171.0	120.0	134.0	**120.0**	**30.0**	**20.0**	**40.0**	**30.0**
2	23	90.0	75.0	104.0	**75.0**	**33.0**	**28.0**	**44.0**	**34.0**
3	27	85.0	125.0	78.0	**125.0**	**42.0**	**31.0**	**55.0**	**30.0**
4	27	85.0	90.0	240.0	**90.0**	**25.0**	**21.0**	**40.0**	**30.0**
5	28	210.0	215.0	66.0	**215.0**	**33.0**	**29.0**	**51.0**	**39.0**
6	30	52.0	75.0	59.0	**75.0**	**30.0**	**26.0**	**49.0**	**39.0**
7	33	180.0	90.0	142.0	**90.0**	**41.0**	**31.0**	**30.0**	**20.0**
8	36	99.0	229.0	121.0	**229.0**	**50.0**	**40.0**	**60.0**	**50.0**
9	36	114.0	100.0	112.0	**100.0**	**50.0**	**40.0**	**44.0**	**34.0**
10	38	132.0	95.0	85.0	**95.0**	**43.0**	**32.0**	**70.0**	**55.0**
11	39	99.0	78.0	98.0	**78.0**	**37.0**	**27.0**	**40.0**	**30.0**
12	42	182.0	294.0	147.0	**294.0**	**50.0**	**25.0**	**60.0**	**22.0**
13	45	90.0	139.0	98.0	**139.0**	**35.0**	**29.0**	**78.0**	**50.0**
14	45	166.0	150.0	91.0	**150.0**	**51.0**	**41.0**	**41.0**	**31.0**
15	46	113.0	49.0	83.0	**49.0**	**49.0**	**39.0**	**39.0**	**24.0**
16	46	123.0	90.0	130.0	**90.0**	**60.0**	**50.0**	**63.0**	**50.0**
17	48	149.0	87.0	98.0	**87.0**	**44.0**	**32.0**	**54.0**	**44.0**
18	48	220.0	225.0	152.0	**225.0**	**28.0**	**36.0**	**26.0**	**24.0**
19	48	212.0	160.0	102.0	**160.0**	**29.0**	**22.0**	**39.0**	**28.0**
20	50	88.0	130.0	`107	**130.0**	**40.0**	**30.0**	**50.0**	**40.0**

21	50	290.0	274.0	126.0	**274.0**	**51.0**	**31.0**	**59.0**	**49.0**
22	50	118.0	160.0	89.0	**160.0**	**52.0**	**40.0**	**69.0**	**48.0**
23	50	122.0	225.0	111.0	**225.0**	**60.0**	**36.0**	**50.0**	**26.0**
24	50	208.0	147.0	63.0	**147.0**	**32.0**	**22.0**	**26.0**	**20.0**
25	50	191.0	522.0	123.0	**522.0**	**23.0**	**7.0**	**65.0**	**40.0**
26	50	107.0	183.0	105.0	**183.0**	**38.0**	**30.0**	**48.0**	**36.0**
27	50	85.0	130.0	78.0	**130.0**	**25.0**	**29.0**	**55.0**	**21.0**
28	50	146.0	110.0	155.0	**110.0**	**50.0**	**49.0**	**60.0**	**45.0**
29	50	133.0	120.0	155.0	**120.0**	**28.0**	**21.0**	**57.0**	**46.0**
30	51	225.0	150.0	140.0	**150.0**	**36.0**	**26.0**	**40.0**	**33.0**
31	52	143.0	141.0	83.0	**141.0**	**30.0**	**24.0**	**60.0**	**51.0**
32	53	120.0	100.0	224.0	**100.0**	**49.0**	**39.0**	**44.0**	**33.0**
33	55	90.0	100.0	142.0	**100.0**	**51.0**	**41.0**	**40.0**	**29.0**
34	58	150.0	121.0	145.0	**121.0**	**51.0**	**40.0**	**55.0**	**40.0**
35	59	477.0	310.0	131.0	**310.0**	**43.0**	**30.0**	**54.0**	**44.0**
36	60	378.0	200.0	215.0	**200.0**	**44.0**	**34.0**	**32.0**	**22.0**
37	62	78.0	96.0	97.0	**96.0**	**47.0**	**36.0**	**41.0**	**30.0**
38	63	211.0	150.0	91.0	**150.0**	**44.0**	**28.0**	**54.0**	**33.0**
39	63	78.0	60.0	140.0	**90.0**	**29.0**	**20.0**	**37.0**	**27.0**
40	70	69.0	51.0	75.0	**60.0**	**30.0**	**25.0**	**60.0**	40.0
41	77	327.0	200.0	99.0	**51.0**	**40.0**	**30.0**	**50.0**	40.0
42	77	142.0	110.0	121.0	**200.0**	**29.0**	**20.0**	**39.0**	28.0

2.b. Female:

S. No.	Age	Triglyceride (Nr. 60-165mg/dl)		Cholesterol (Nr. Upto220mg/dl)		HDL (Nr.30-70 mg/dl)		LDL (Nr. Upto 150mg/dl)	
		Before	After	Before	After	Before	After	Before	After
43	16	117.0	107.0	133.0	183.0	48.0	32.0	36.0	26.0
44	19	104.0	150.0	128.0	200.0	51.0	41.0	44.0	31.0
45	20	145.0	104.0	128.0	200.0	39.0	21.0	51.0	44.0
46	31	69.0	60.0	98.0	190.0	38.0	29.0	78.0	60.0
47	31	143.0	111.0	200.0	180.0	30.0	20.0	33.0	13.0
48	33	72.0	69.0	88.0	130.0	53.0	42.0	63.0	51.0
49	36	45.0	361.0	100.0	144.0	28.0	19.0	50.0	42.0
50	40	48.0	60.0	84.0	100.0	41.0	31.0	51.0	40.0
51	40	133.0	110.0	134.0	156.0	60.0	49.0	70.0	59.0
52	40	241.0	230.0	226.0	270.0	30.0	29.0	70.0	50.0
53	42	99.0	175.0	96.0	121.0	30.0	25.0	60.0	40.0
54	42	77.0	56.0	126.0	140.0	24.0	20.0	40.0	30.0
55	42	164.0	276.0	118.0	169.0	45.0	27.0	55.0	25.0
56	45	108.0	135.0	154.0	129.0	29.0	20.0	25.0	20.0
57	50	111.0	90.0	146.0	210.0	49.0	39.0	32.0	29.0
58	52	115.0	90.0	138.0	200.0	47.0	36.0	57.0	41.0
59	53	97.0	70.0	117.0	120.0	50.0	40.0	50.0	40.0
60	57	208.0	180.0	136.0	189.0	29.0	20.0	49.0	34.0
61	58	379.0	210.0	143.0	144.0	44.0	31.0	26.0	20.0
62	58	100.0	90.0	68.0	102.0	40.0	28.0	48.0	37.0
63	59	276.0	187.0	172.0	242.0	13.0	10.0	26.0	22.0
64	59	147.0	122.0	143.0	190.0	36.0	26.0	39.0	39.0
65	59	240.0	185.0	131.0	141.0	29.0	20.0	51.0	40.0
66	60	123.0	120.0	133.0	200.0	52.0	32.0	41.0	3.0
67	60	34.0	38.0	141.0	144.0	30.0	22.0	49.0	37.0
68	61	114.0	150.0	143.0	160.0	28.0	20.0	55.0	40.0
69	65	105.0	122.0	169.0	249.0	25.0	44.0	23.0	32.0
70	68	166.0	124.0	116.0	170.0	55.0	40.0	35.0	42.0
71	68	202.0	195.0	145.0	190.0	35.0	15.0	50.0	42.0

(Nr- Normal value)

Secondly, hyperthyroidism predisposes to proteinuria, which is known to cause direct renal injury. Thirdly, hyperthyroidism-induced increased mitochondrial energy metabolism along with down-regulation of superoxide dismutase contributes to the increased free radical generation and consequent renal injury. Oxidative stress also contributes to hypertension in hyperthyroidism, which contributes to CKD progression [(7)]. Silverberg et al., (1973) [(8)] study also showed the free Thyroxine fraction and vitamin A level in the blood of chronic HD patients were greater than the normal. Den Hollander et al., (2005) [(3)] expressed that both Hypothyroidism and Hyperthyroidism affect the kidney function and structure.

Table 3.a. Mean, Standard deviation and Standard Error:

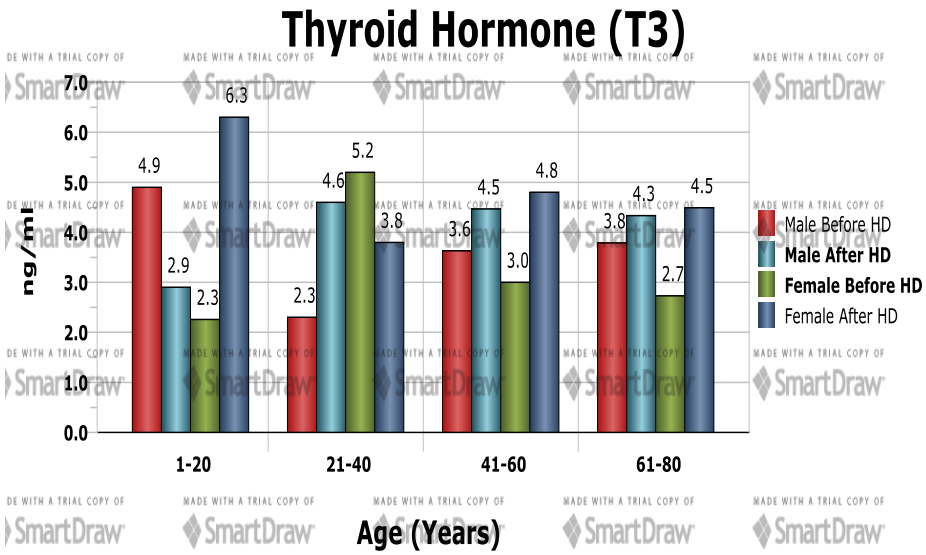
Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Pre_T3	3.3577	71	2.13733	.25365
	Post_T3	4.5155	71	1.37401	.16306
Pair 2	Pre_T4	7.9261	71	3.31853	.39384
	Post_T4	11.4113	71	3.20243	.38006
Pair 3	Pre_TSH	2.6017	71	2.87885	.34166
	Post_TSH	1.8831	71	2.14676	.25477
Pair 4	Pre_Triglyeb	148.3099	71	82.01630	9.73354
	Post_Triglyeb	144.4085	71	80.57305	9.56226
Pair 5	Pre_Chole	122.5634	71	40.67106	4.82677
	Post_Chole	161.0141	71	45.28591	5.37445
Pair 6	Pre_HDL	39.2958	71	10.54432	1.25138
	Post_HDL	29.7887	71	8.98398	1.06620
Pair 7	Pre_LDL	48.2394	71	12.81457	1.52081
	Post_LDL	35.4085	71	10.93824	1.29813

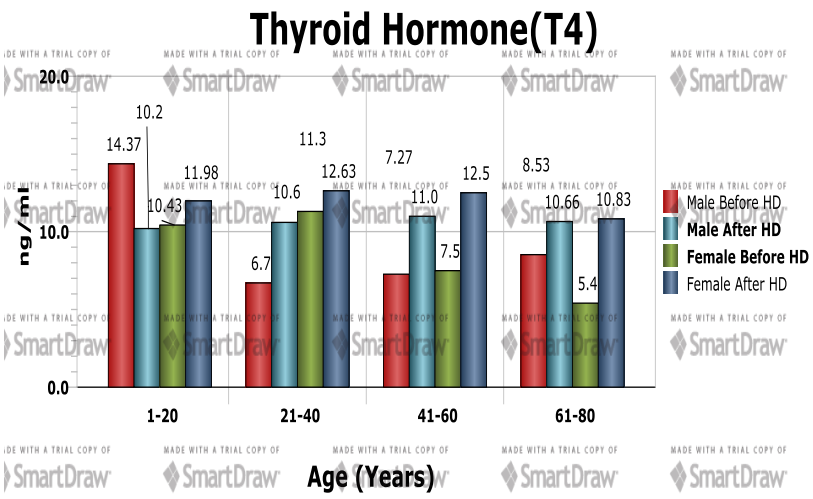
3.b. T-test, Differentiation (df) and Significance:

Paired Samples Test

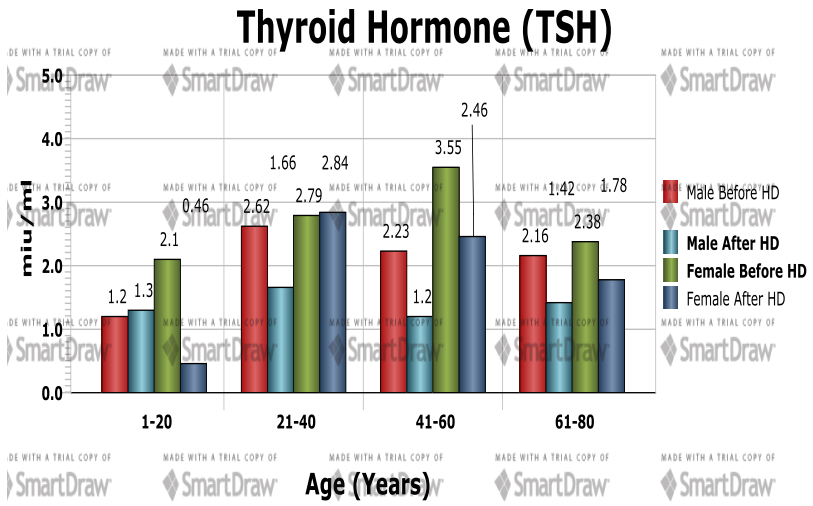
		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Pre_T3 - Post_T3	-1.15775	2.63231	.31240	-1.78080	-.53469	-3.706	70	.000
Pair 2	Pre_T4 - Post_T4	-3.48521	5.13518	.60943	-4.70069	-2.26973	-5.719	70	.000
Pair 3	Pre_TSH - Post_TSH	.71859	2.66008	.31569	.08896	1.34822	2.276	70	.026
Pair 4	Pre_Triglyeb - Post_Triglyeb	3.90141	80.58751	9.56398	-15.17334	22.97616	.408	70	.685
Pair 5	Pre_Chole - Post_Chole	-38.45070	39.44392	4.68113	-47.78693	-29.11448	-8.214	70	.000
Pair 6	Pre_HDL - Post_HDL	9.50704	6.39391	.75882	7.99363	11.02046	12.529	70	.000
Pair 7	Pre_LDL - Post_LDL	12.83099	8.33579	.98928	10.85794	14.80403	12.970	70	.000



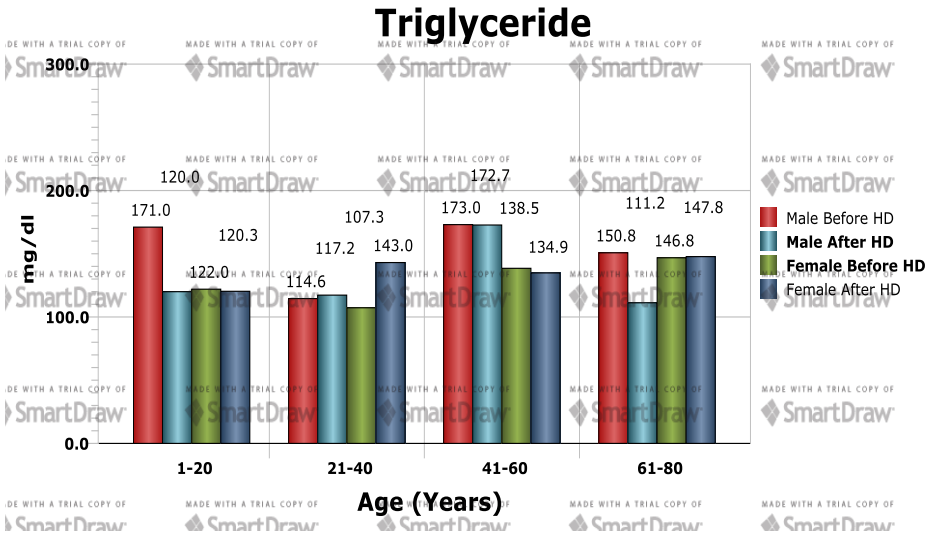
Graph 1: Thyroid Hormone (T3) levels in CKD patients (Normal value-06-1.8ng/ml).



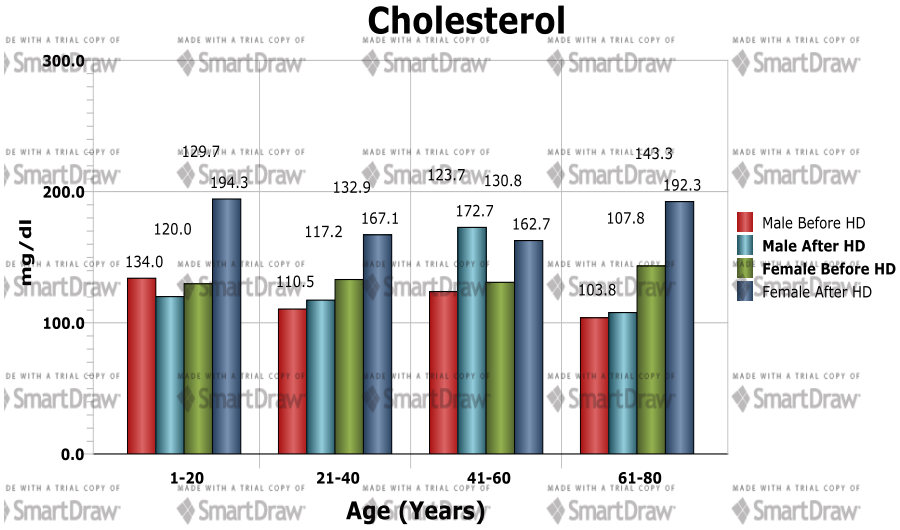
Graph 2 : Thyroid Hormone (T4) levels in CKD Patients (Normal Value-4.8-12.0ng/ml).



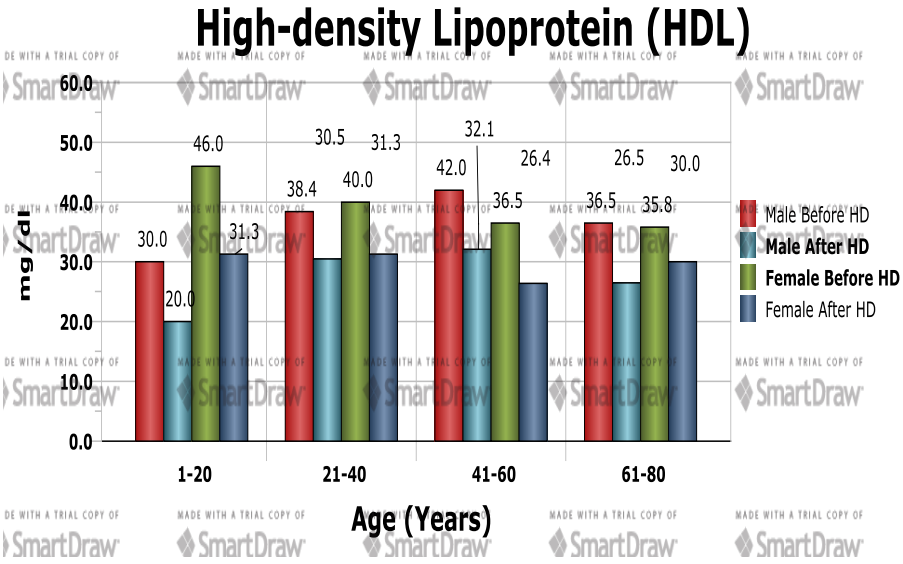
Graph 3: TSH level in CKD patients (Normal value-0.4-6.0miu/ml).



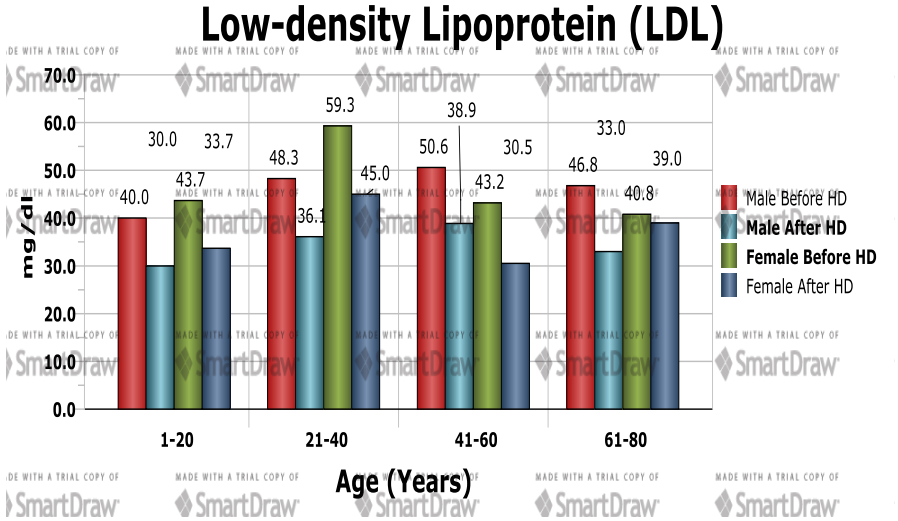
Graph 4: Triglyceride levels in CKD patients (Normal value-60-165mg/dl).



Graph 5: Cholesterol levels in CKD patients (Normal value-Up to 220mg/dl).



Graph 6: HDL levels in CKD patients (Normal value-30-70mg/dl).



Graph 7: LDL levels in CKD patients (Normal value-Up to 150mg/dl).

The mean and standard deviation value (Mean±SD) of T3 at Pre-Haemodialysis is 3.36±0.23 and Post Haemodialysis is 4.52±0.16 (Table 3a). The paired t-test value is 3.706 (70) and P=0.001 (Table 3b). So the result is significant.

The T4 concentration in the blood (Average 6.7ng/ml of 21 – 40 years old before Haemodialysis and 10.63ng/ml after Haemodialysis) is higher than the T3 concentration (2.28ng/ml of 20-40 years old male before and Haemodialysis and 4.56ng/ml after Haemodialysis) on par with sex (Table 1a and 1b; Graph 2). The levels of T4 hormone in the experimental patients are among the level of normal peoples (Table 1a and 1b and Graph 2). This result is in support of the result of Basu and Anjali (2012) [(2)].

Mean and standard deviation (Mean±SD) of T4 during Pre-Haemodialysis is 7.93±3.32 lower than the Post Haemodialysis is 11.41±3.20 (Table 3a). Paired test t-value is 5.72 (70) and the p=0.001 (Table 3b). Significant result is observed.

But Thyroid Stimulating Hormone (TSH) concentration shows it is decreasing after Haemodialysis (Table 1a and 1b and Graph 3). This TSH decreasing result is similar to the findings of Silverberg et al., (1973) [(8)]. This TSH decreasing may be due to decreased Pituitary function. This in turn may be due to less stimulation of Pituitary function by T3 hormones.

Mean and standard deviation (Mean±SD) of TSH during Pre-Haemodialysis is 2.60±2.88 higher than the Post Haemodialysis is 1.88±2.15 (Table 3a). Paired test t-value 2.28 (70) and the p=0.026 (Table 3b). Significant result is observed.

2. Lipid profiles of CKD Patients during before and after HD:

The varied results of Lipid profiles have observed in this study. The Triglyceride (TG) levels of all experimental patients are above 100mg/dl (Table 2a and 2b; Graph 4). But one 13 year old and 10 persons of age between 41 and 60 years old males have higher than 165 mg/dl. The Triglyceride level of Post-Haemodialysis patients is lesser than the Pre-Haemodialysis patient. This shows HD ha some beneficial effect on CKD patients. Present result is similar to the result of Chijioke et al., (2009) [(9)] and Ashwini et al., (2013) [(10)].

Mean and standard deviation (Mean±SD) of TG during Pre-Haemodialysis is 148.31±82.02 higher than the Post Haemodialysis is 144.41±80.57 (Table 3a). Paired test t-value 0.41 (70) and the p=0.0.69 (Table 3b). Significant result is observed.

Cholesterol levels are also higher in all experimental patients and the level is decreased after HD. Female patients have higher levels of cholesterol than the male patients (Table 2a and 2b; Graph 5). These higher levels of total cholesterol may increase the Cardio Vascular Diseases of the patients. Chijioke et al., (2009) [(9)] and Ashwini et al., (2013) [(10)] findings on total cholesterol results are matching with the present study.

Mean and standard deviation (Mean±SD) of Cholesterol during Pre-Haemodialysis is 122.56±40.67 higher than the Post Haemodialysis is 161.01±45.29 (Table 3a). Paired test t-value 8.21 (70) and the p=0.001 (Table 3b). Significant result is observed.

Value of HDL (Table 2a and 2b; Graph 6) and LDL (Table 2a 2b; Graph 7) shows, there is a reduction in the levels in HD patients. Too much LDL or "bad" cholesterol and not enough HDL or "good" cholesterol may lead to heart disease and stroke. To avoid these problems, people need to maintain the proper ratio between good and total cholesterol. Low-density lipoprotein, or LDL cholesterol, is the bad cholesterol. The higher the level of LDL cholesterol, the greater the risk of a heart attacks. When the level of LDL cholesterol goes up, excess cholesterol can build up and stick to the walls of your arteries. This causes damage. The build up is called plaque and the formation of plaque can cause arteries to harden and narrow. This hardening is called atherosclerosis. It's also known as hardening of the arteries. If a plaque becomes unstable, a blood clot can form, suddenly blocking an artery. This causes a heart attack or stroke. The present study shows HD helps to improve the health of CKD patients [(10)].

Mean and standard deviation (Mean±SD) of HDL during Pre-Haemodialysis is 39.30±10.54 higher than the Post Haemodialysis is 29.79±8.98 (Table 3a). Paired test t-value 12.53 (70) and the p=0.001 (Table 3b). Significant result is observed.

Mean and standard deviation (Mean±SD) of LDL during Pre-Haemodialysis is 48.24±12.81 higher than the Post Haemodialysis is 35.41±10.94 (Table 3a). Paired test t-value 12.97 (70) and the p=0.001 (Table 3b). Significant result is observed.

IV. Conclusion:

CKD patients of Pre-Haemodialysis have higher Blood Thyroid hormones and higher Lipid profiles. These higher levels lead to other dangerous diseases. Haemodialysis help to decrease the above parameters in the blood may decrease the burden on Kidneys. Different parameters like T3, T4, TG and cholesterol levels are increased than the normal or show highest level reveals the patients involved in the study have CKD. Male cases have more levels of TG and Cholesterol than the female. A comprehensive health education campaign and

screening of the general populace are needed in order to detect CKD early. These measures will ensure appropriate and timely institution of proven measures to halt or reduce the progression of CKD in Libya.

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