

Role of Time of Hemodialysis Shifts on Quality of Life: A Comparative Study between Morning versus Evening Conventional Hemodialysis at Nephrology & Urology Unit, Minia University Hospital

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ABSTRACT

Background: End-stage renal failure (ESRF) is a prevalent problem at national and global levels. It's a public health concern. Quality of life (QOL) conception had evolved over time but still emerging in Egypt. Reduced QOL of hemodialysis (HD) patients has been linked to non-compliance to treatment, a surge in hospital admissions, hemodialysis complications, and mortality.

Objective: It was to evaluate QOL of the hemodialysis patients in Minia, Egypt.

Patients and Methods: A cross-sectional study was carried out at Nephrology and Urology Unit, Minia University Hospital on 60 patients. A validated questionnaire was utilized.

Results: The study revealed that the patients aged 33.5-60 years and most (56.7%) of them were males. There were significant differences between patients at morning and night shift regarding kidney disease effect, disease burden, cognitive function, and sleep (p-values = 0.001, 0.027, 0.002, and 0.001; respectively). There was a significant negative correlation between hemoglobin level and the effect and burden of kidney disease, cognitive function as well as social function (p= 0.035, 0.033, 0.02, and 0.031; respectively). Nevertheless, there was no correlation between total and ionized calcium, phosphorus, PTH, URR, KT/V, or S. albumin and QOL.

Conclusions Time of hemodialysis, either morning or night shift, has an impact on QOL of HD patients as the morning shift was significantly associated with better QOL in contrast to the night shift in our study in terms of kidney disease effect, kidney disease burden, cognitive function, and sleep.

Keywords: Quality of Life, Time of Hemodialysis Shifts, Nephrology & Urology.

INTRODUCTION

End-stage renal failure (ESRF) is a significant health issue at both personal and national levels and has become a worldwide public health concern⁽¹⁾.

The number of ESRF patients reached 2,786,000 in 2011 worldwide and continues to increase at a significantly higher rate⁽²⁾.

The prevalence of ESRF increased from 225 PMP (per million populations) to 484 PMP from 2003 to 2011⁽³⁾ in Egypt. In Minia Governorate, the prevalence of ESRF also changed from 250 to 367 PMP from 2002 to 2007⁽⁴⁾.

Independence, weakened familial and social communication⁽⁵⁾, lethargy, fatigue, diminished libido, and even depression are some of the misery of ESRF patients. Therefore, the overall quality of life (QOL) declines among them⁽⁶⁾.

QOL conception has been modified over the years in chronic diseases but still emerging in Egypt. There are very few published studies concerning this

topic, especially in ESRF⁽⁷⁾, most of which are from developed countries. Reduced QOL of hemodialysis (HD) patients are associated with non-compliance to treatment, a surge in hospital admissions, hemodialysis complications, and even mortality⁽⁸⁾.

The aim of the present study was to evaluate quality of life of hemodialysis patients and to compare between hemodialysis time shifts as regard to QOL.

PATIENTS AND METHODS

A cross-sectional study was conducted from December 2020 to June 2021 in Minia Nephrology and Urology hospital /Hemodialysis Unit.

The study included 60 patients attending the dialysis unit; 30 during the morning shift and 30 during the evening shift. The manager of Minia University Hospital Dialysis Unit and HD patients approved the current study.

A validated questionnaire was utilized to measure the QOL of our HD patients. According to

the criteria of the sample; HD patients for at least three months, more than 18 years, and registered in Minia University Hospital, Hemodialysis Unit at either morning or evening shift.

The Kidney Disease Quality of Life Short Form (KDQOL-SF)TM questionnaire was chosen as it is disease targeted questionnaire; its items concentrate on health-related issues of HD patients, and it is composed of eight domains: Symptom/problems (12 items), kidney disease Effects on daily life (8 items), kidney disease Burden (4 items), Work status (2 items), Cognitive function (3 items), Quality of social interaction (3 items), Sexual function (2 items), and Sleep (4 items).

More three QOL scales were added; social support (2 items), Dialysis staff encouragement (2 items), and Patient satisfaction (1 item)⁽⁹⁾.

Each question has multiple answer options ranging from 2 to 7.

Each question was scored on a scale ranging from 0 to 100 (best health). All items were summarized to give an average score for each domain, which ranges from 0 to 100 (best health)⁽¹⁰⁾.

Ethical consent:

An approval of the study was obtained from Minia University Academic and Ethical Committee. Every patient signed an informed written consent for acceptance of participation in the study.

This work has been carried out in accordance with The Code of Ethics of the World Medical Association (Declaration of Helsinki) for studies involving humans.

Statistical analysis

The collected data were coded, processed and analyzed using the SPSS (Statistical Package for Social Sciences) version 22 for Windows® (IBM SPSS Inc, Chicago, IL, USA). Data were tested for normal distribution using the Shapiro Walk test. Qualitative data were represented as frequencies and relative percentages. Chi square test (χ^2) to calculate difference between two or more groups of qualitative variables.

Quantitative data were expressed as mean \pm SD (Standard deviation). Independent samples t-test was used to compare between two independent groups of normally distributed variables (parametric data). P value < 0.05 was considered significant.

RESULTS

A total of 60 ESRF patients whose age ranged from 33.5-60 years on HD. Most of them were males (56.7% Vs 43.3%).

The results revealed that the cause of ESRF was hypertension (40%) of patients, 30% of cardiac, and 10% were diabetic patients (Table 1 and Fig. 1). The study also demonstrated that the majority of the sample (56.7%) were high school or less (Table 1 and Fig. 2).

The results clarified that the patient duration from starting dialysis ranged from 10-72 months. In regards to the emplacement of the sample (73.3%) of them live in rural areas.

Concerning the marital status before ESRF (76.7%) were married. According to the occupation, only (23.3%) had jobs, and about (40%) were in housekeeping (Table 1 and Fig. 3).

Table (1): Statistical distribution of the patient's studied sample according to their socio-demographic data.

Variable		Studied cases (N=60)
Age	Median	41
	IQR	(33.5-60)
Sex	Male	34 (56.7%)
	Female	26 (43.3%)
Duration	Median	30
	IQR	(10.5-72)
Number of sessions / week	Range	(1-3)
	Mean ± SD	2.8±0.4
Residence	Rural	44(73.3%)
	Urban	16(26.7%)
Diabetes	No	54(90%)
	Yes	6(10%)
Hypertension	No	14(23.3%)
	Yes	46(76.7%)
Cardiac problems	No	42(70%)
	Yes	18(30%)
Cause of Kidney disease	Don't know	6(10%)
	HTN	24(40%)
	DM	4(6.7%)
	Polycystic kidney	4(6.7%)
	Ch. GN	6(10%)
	Ch. Pyelonephritis	2(3.3%)
	Others	14(23.3%)
Education	8 th grade or less	22(36.7%)
	Some high school or less	34(56.7%)
	High school diploma or GED	2(3.3%)
	Vocational school or some college	0(0%)
	College degree	0(0%)
	Professional or graduate degree	2(3.3%)
Marital status before ESRF	No	14(23.3%)
	Yes	46(76.7%)
Marital status after ESRF	No	14(23.3%)
	Yes	46(76.7%)
Working	Working full time	2(3.3%)
	Working part time	12(20%)
	housekeeping	24(40%)
	Unemployed	34(56.7.7%)
	Retired	12(20%)
	Disabled	0(0%)
	In school	0(0%)
Health insurance	None	52(86.7%)
	Medicare only	8(13.3%)
	Medicare and any other insurance	0(0%)
No. of medications	Median	2
	IQR	(2-4)
Hospital stay overnight	Median	0
	IQR	(0-0)
Hospital stay discharge same day	Median	2
	IQR	(0.3-3)

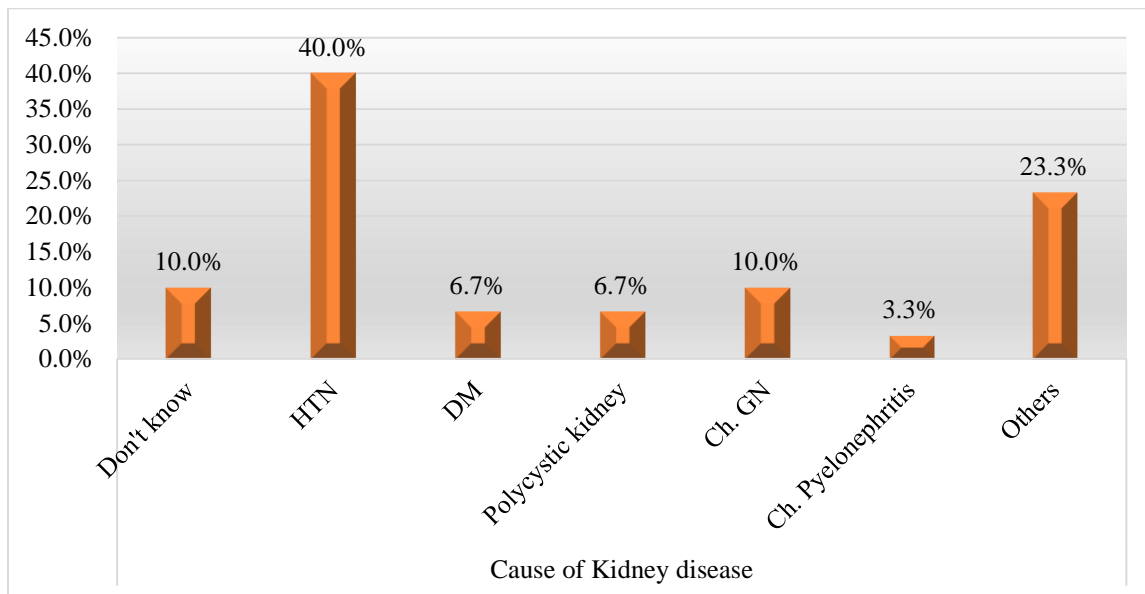


Figure (1): Distribution of studied cases regarding cause of kidney disease.

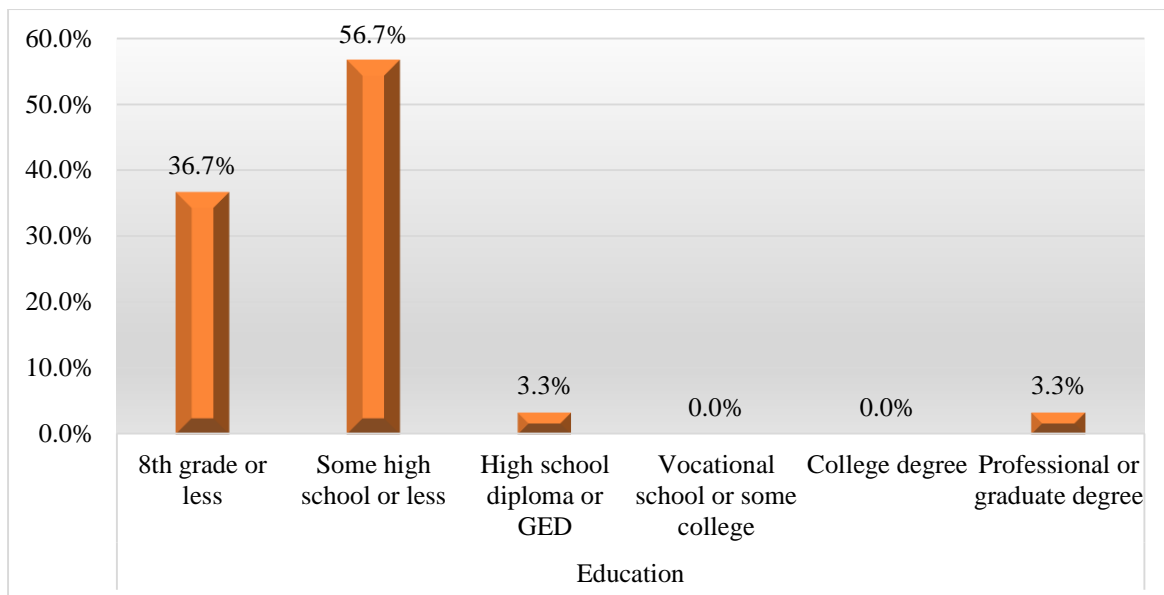


Figure (2): Distribution of studied cases regarding education.

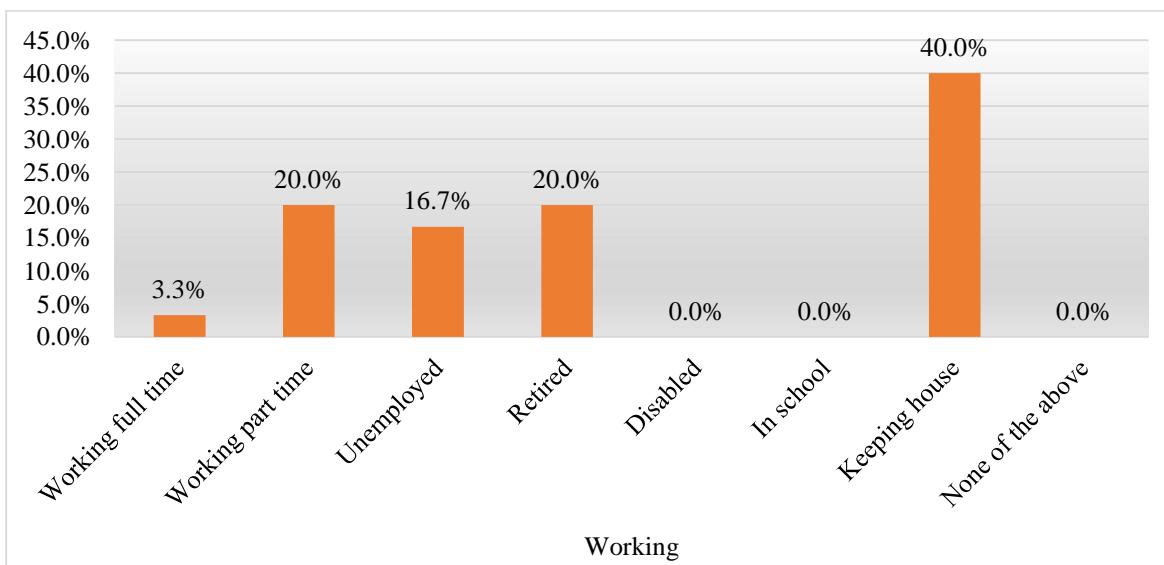


Figure (3): Distribution of studied cases regarding education.

The results showed that about 91.7% had some symptoms forming problems like decreased appetite, nausea, or depression. The results also revealed that the patients had an excellent cognitive and sexual function, but about 86.7% had accepted social interaction, and 87.5% had a quiet sleep. In

addition, 75% of patients stated that kidney disease was a burden, and 93.8% demonstrated that kidney disease affected their daily life. Although the social support and dialysis staff encouragement was about 83.3% & 75%, according to their own opinions, and patient satisfaction was 50%, as shown in Table (2).

Table (2): Distribution of the studied cases concerning response to clinical assessment

Variable		Studied cases (N=60)
Symptom/problem list	Median IQR	91.7 (87.5-95.8)
Effect of Kidney disease	Median IQR	93.8 (90.6-96.9)
Burden of Kidney disease	Median IQR	75 (62.5-87.5)
Work Status	Median IQR	50 (13.6-87.5)
Cognitive function	Median IQR	100 (93.3-100)
Quality of social interaction	Median IQR	86.7 (80-93.3)
Sexual function	Median IQR	100 (100-100)
Sleep	Median IQR	87.5 (65.6-92.5)
Social support	Median IQR	83.3 (66.7-100)
Dialysis staff encouragement	Median IQR	75 (62.5-87.5)
Patient satisfaction	Median IQR	50 (50-66.7)
Physical functioning	Median IQR	80 (60-90)
Role physical	Median IQR	100 (25-100)
Pain	Median IQR	77.5 (67.5-90)
General health	Median IQR	60 (45-70)
Emotional well being	Median IQR	84 (76-88)
Role emotional	Median IQR	100 (66.7-100)
Social function	Median IQR	87.5 (75-100)
Energy/Fatigue	Median IQR	80 (70-85)

The effect of kidney disease, burden of kidney disease, cognitive function, and sleep quality was significantly higher in patients with morning shift compared to night hemodialysis, as depicted in Table (3) & Figure (4) with p-value = 0.001, 0.027, 0.002, and 0.001; respectively. There was a significant negative correlation between hemoglobin level and

the effect & burden of kidney disease, cognitive function as well as social function (p= 0.035, 0.033, 0.02, and 0.031; respectively), as shown in Table (4). However, there was no correlation between total & ionized calcium, phosphorus, PTH levels, URR & KT/V or S. albumin, and the QOL assessment questionnaire.

Table (3): Comparison between patients with morning and night hemodialysis as per response to clinical assessment.

Variables		Morning	Night	P value
		N=30	N=30	
Symptom/problem list	Median IQR	91.7 (87.5-97.9)	91.7 (87.5-93.8)	0.362
Effect of Kidney disease	Median IQR	95.3 (93.8-96.9)	90.6 (87.5-93.8)	0.001*
Burden of Kidney disease	Median IQR	81.3 (68.8-87.5)	68.8 (56.3-87.5)	0.027*
Work Status	Median IQR	50 (50-50)	50 (0-100)	0.682
Cognitive function	Median IQR	100 (98.3-100)	93.3 (86.7-100)	0.002*
Quality of social interaction	Median IQR	86.7 (78.3-93.3)	86.7 (80-93.3)	0.608
Sexual function	Median IQR	100 (100-100)	100 (100-100)	0.290
Sleep	Median IQR	92.5 (88.8-95.6)	78.8 (51.3-87.5)	<0.001*
Social support	Median IQR	100 (66.7-100)	83.3 (66.7-100)	0.143
Dialysis staff encouragement	Median IQR	75 (62.5-87.5)	75 (62.5-87.5)	0.272
Patient satisfaction	Median IQR	50 (50-66.7)	58.3 (50-66.7)	0.420
Physical functioning	Median IQR	80 (65-85)	77.5 (55-96.3)	0.959
Role physical	Median IQR	100 (0-100)	87.5 (25-100)	0.610
Pain	Median IQR	77.5 (67.5-90)	77.5 (67.5-90)	0.737
General health	Median IQR	62.5 (45-70)	60 (45-70)	0.738
Emotional well being	Median IQR	86 (76-92)	82 (72-88)	0.136
Role emotional	Median IQR	100 (58.3-100)	100 (91.7-100)	0.332
Social function	Median IQR	87.5 (75-100)	81.3 (62.5-100)	0.654
Energy/Fatigue	Median IQR	85 (78.8-90)	80 (70-85)	0.052

Table (4): Correlation between hemoglobin level and questionnaire clinical assessment data in all cases.

In all Cases (N=60)	Hb	
	r	P value
Symptom/problem list	-0.075	0.568
Effect of Kidney disease	-0.273	0.035*
Burden of Kidney disease	-0.276	0.033*
Work Status	-0.087	0.508
Cognitive function	-0.300	0.020*
Quality of social interaction	-0.095	0.468
Sexual function	-0.115	0.503
Sleep	-0.181	0.167
Social support	-0.119	0.365
Dialysis staff encouragement	-0.031	0.816
Patient satisfaction	0.105	0.424
Physical functioning	-0.185	0.156
Role physical	-0.148	0.260
Pain	-0.212	0.104
General health	0.040	0.761
Emotional well being	-0.104	0.428
Role emotional	-0.238	0.067
Social function	-0.278	0.031*
Energy/Fatigue	-0.115	0.381

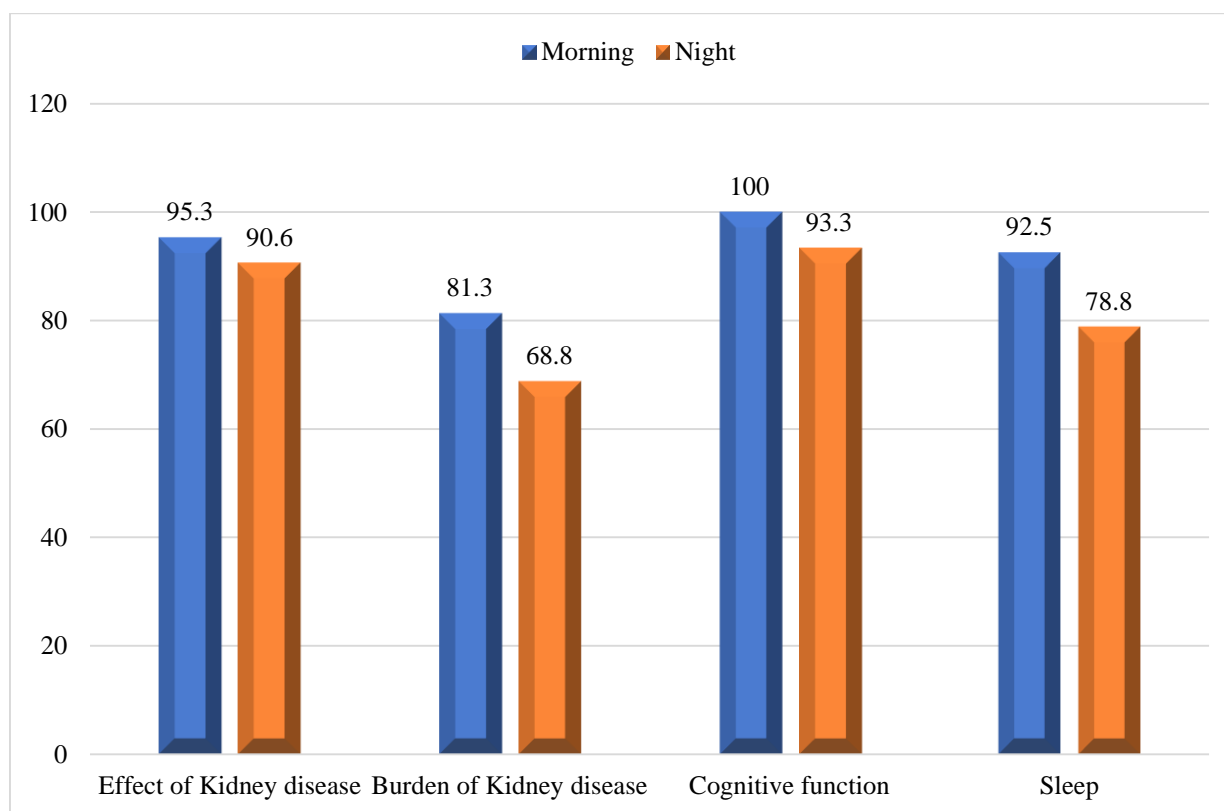


Figure (5): Comparison between patients with morning and night hemodialysis as regard effect of kidney disease, burden of kidney disease, cognitive function and sleep.

DISCUSSION

The study showed that the bulk of the sample was males (56.7%), which agrees with the study of **Bayoumi and Al-Wakeel**⁽¹¹⁾, **Murali et al.**⁽¹²⁾, and **Wan et al.**⁽¹³⁾, in which most of the sample (56.2%) was males what may be explained as males were more exposed to a difficult work environment that may affect their kidneys. Regarding the educational level, a high percentage of the sample (56.7%) were in high school or less, which is inconsistent with **Bukhary et al.**⁽¹⁴⁾ and **Hameed and Brzanji**⁽¹⁵⁾, who found that the bulk of the sample was unlettered. Also, 73.3% of the patients were existing in rural areas, which is incompatible with **Anees et al.**⁽¹⁶⁾ and **Zyoud et al.**⁽¹⁷⁾ who illustrated that most of their samples living in urban areas. Our explanation for our results was that the urban subjects who had kidney disease obeyed the medical prescriptions perfectly and entered ESRF many years after, in contrast to rural patients who presented to health care staff for the first time with signs of ESRF and even required urgent dialysis. Our study clarified that the bulk of the sample (76.7%) were married before starting hemodialysis and still married after, which aligns with **Rayyani et al.**⁽¹⁸⁾ and **Kharama et al.**⁽¹⁹⁾. Therefore, the patient and his partner overcame the difficulties they met in their life, which is attributed to the strong social relationship between them as one of the features of the Egyptian public.

Regarding occupational status, about (56.7%) of the sample was unemployed, and (23.3%) of the sample had jobs which were supported by **Dhia et al.**⁽²⁰⁾ and **Hameed and Brzanji**⁽¹⁵⁾ who showed that most of the samples were housewives what may be explained by the disease effect and its treatment on patient lifestyle and daily routine. However, a previous study reported that ESRF patients were enforced earning lower salaried jobs or lost their jobs after starting dialysis, resulting in decreased income and worse QoL⁽²¹⁾. We found that 40% of cases knew that hypertension was the cause of kidney disease, supported by **El-Minshawy**⁽⁴⁾ study.

In the present study, we used the Kidney Disease QOL-36 to evaluate the QOL among the morning and night hemodialysis patients. Our results revealed a statistically higher significance in the morning HD patients than night HD patients regarding QOL at points of Effect & Burden of Kidney disease, Cognitive function, and sleep. Our results are incompatible with the study of **Abassi et al.**⁽²²⁾, who stated that there was no association between the timing of hemodialysis with QOL, although it may affect the sleeping pattern of patients, especially morning HD patients. In contrast to our findings, **Bastos et al.**⁽²³⁾ illustrated that poor quality of sleep, and excessive daytime sleepiness were common and unrelated to the timing of dialysis. Our results were strengthened by **Ajeebi et al.**⁽²⁴⁾, who

used KDQOL-36 scales to evaluate the QOL of HD patients and reported that patients under dialysis during morning shifts had better Mental and Kidney Disease Effect scores compared to night shifts. Nevertheless, these results are not consistent with our results as there was a significant difference between different shifts regarding physical component score, and no significant difference was found regarding the burden on the kidney.

Furthermore, the study by **Firoz et al.**⁽²⁵⁾ found no significant correlation between sleep quality and depression to time of hemodialysis, which disagrees with our study. In our study, there was a significant negative correlation between Hb and KDQOL-36 scales, as well as between Hb and Kidney disease effect, Kidney disease burden, Cognitive function, and social functions (P= 0.035, 0.033, 0.020, and 0.031; respectively), which contradicts the studies of **Saad et al.**⁽²⁶⁾ and **Tanod et al.**⁽²⁷⁾. They revealed that there were non-significant correlations between Hb and Kidney disease Effect, Kidney disease Burden, Symptoms as well as problems. Our results revealed that there were no significant correlations between the QOL and total calcium, ionized calcium, phosphorus levels (P), and parathyroid hormone (PTH), which is inconsistent with **Firoz et al.**⁽²⁵⁾, who demonstrated that sleep quality was significantly related to P and PTH. Our findings are supported by **Norozi et al.**⁽²⁸⁾ and **Saad et al.**⁽²⁶⁾, who found no significant correlations between PTH, S. creatinine, hemodialysis timing, and sleep quality. In our results, there was no significant correlation between the QOL and URR & KT/V, as reinforced by **Tanod et al.**⁽²⁷⁾. There were no significant correlations between the QOL and S. albumin in our study, which is in agreement with **Saad et al.**⁽²⁶⁾ but inconsistent with **Soleymanian et al.**⁽²⁹⁾ and **Tanod et al.**⁽²⁷⁾, who detected a significant positive correlation between albumin level and QOL.

CONCLUSION

Time of hemodialysis, either morning or night shift, has an impact on QOL of HD patients as the morning shift was significantly associated with better QOL in contrast to the night shift in our study regarding kidney disease effect, kidney disease burden, cognitive function, and sleep.

RECOMMENDATIONS

- (1) Provide ESRF Patients on HD with needed posters and videos containing facts about hemodialysis diet list, medication, and lifestyle modifications.
- (2) Training hemodialysis patients and their families about the challenges of ESRF and hemodialysis through sharing them to specific instructive programs incorporated into QOL aspects.
- (3) Involve psychiatrists in the dialysis unit to establish training programs for HD patients to improve their QOL.
- (4)

Additional studies on large geographical scales and larger sample size are needed to emphasize our findings.

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