

Dialysis-Related Factors Affecting Activities of Daily Living among Hemodialysis Patients in Erbil City

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ABSTRACT

Background and objectives: Hemodialysis procedure is one of the important replacement therapies for patients with renal failure. Maintenance hemodialysis is associated with many complications that play a significant role in the activities of daily living. The present study aimed to find out the factors affecting activities of daily living among patients with maintenance hemodialysis in Erbil City in the Kurdistan Region of Iraq.

Methods: The cross-sectional study was conducted on 268 patients undergoing maintenance hemodialysis for more than two months, and at least two times per a week at two dialysis centres in Erbil City from December 2019 to April 2020. The activities of daily living and complications from the hemodialysis procedure questionnaire to collect research data. The data analysis was conducted using descriptive statistical approach including frequency, percentages, and inferential statistical analysis consisting chi-square test.

Results: According to the findings of the study, the majority of participants were above 51 years of age, able to read and write, with middle income, and from an urban area. Almost half of the study sample were males, and most were on hemodialysis between one and three years. The majority of them had hypertension and complications associated with hemodialysis such as headache and hypotension, and more than half had back pain. A highly significant association was found between dependency in activities of daily living and some socio-economic and clinical variables. Furthermore, a significant association was found between dependency in activities of daily living and some hemodialysis complications with $P < 0.001$.

Conclusion: According to the result of the study, the researchers concluded that participants suffered from chronic diseases, hemodialysis complications and low level of activities of daily living. The complications of hemodialysis treatment were significantly affecting the activities of daily living. Haemodialysis patients need more education and nursing care to reduce treatment complications and to increase their activities.

Keywords: Activities; Daily living; Hemodialysis patient; Complication; Independency; Dependency.

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INTRODUCTION

Dialysis is the best technique to remove excess fluid and waste products from the body if the kidneys cannot perform this function. It can also balance acid-base and regulate fluid and electrolytes [1]. The hemodialysis machine (HD) filters and cleans the blood of the patients, usually three times per week, four to six hours at

A time [2]. Daily activities like self-care of an individual at home and other individual activities outdoors are called Activities of Daily Living (ADLs). Ability and inability of doing ADLs is an essential measure of the functional status of individual patients [3]. Main types of ADLs are self-care activities such as eating, personal hygiene,

shopping and mobility [4]. Treatment by HD always needs to be done at an HD centre or a hospital because the patients may develop many complications [5]. A study by Kopple et al. (2018) reported that patients with maintenance HD had reduced performance of physical mobility and daily physical activity [6]. Another study that was conducted on physical activity of HD patients revealed that their physical activity was lower than other patients, because of many problems, complications and stressful factors related to the condition and treatment [7]. It is essential to assess and monitor the level of physical activities of all HD patients, especially during the day of HD procedure because they often deal with several problems related to their sedentary lifestyle [8]. The patients should improve their daily activity and self-care to prevent HD complications and to continue the life of health and well-being [9]. The researchers assessed the patients' level of ADLs and determined the main complications and problems that occurred during and after HD. They also identified the main related factors that affected those problems and inactivity.

METHODS

The cross-sectional study design was conducted at both Dialysis Centers of Hawler Teaching Hospital in Erbil City in the Kurdistan Region of Iraq. The study sample included all patients with maintenance hemodialysis treatment in both Centers. From 318 HD patients treated in the centres, 268 patients were selected according to the inclusion criteria of the present study. The inclusion criteria encompassed all male and female patients above the age of 18 with chronic renal failure and maintenance HD at least twice a week. Fifty cases were excluded; 12 were under 18 years old, 10 were on HD less than two months, 13 had HD treatment less than

one time a week, and 15 refused to participate in the study. The study was conducted during the period of 1st December 2019 to 15th April 2020. The data were collected during one month after approval of the proposal. The researchers collected the data by face to face interviews using a questionnaire, which consisted of three parts based on the proposed research objectives. Part 1 included socio-demographic datasheet; part 2 contained clinical information, and part 3 recorded HD complications that the researchers identified through the literature review. Part 4 was used to assess the ADLs. The concept of the ADLs was first described by Sheldon in the Journal of Health and Physical Education in 1935, as reported by Feinstein et al. [10]. In 1969, Lawton and Brody were the first authors to describe two levels of ADLs as basic and instrumental ADLs, and they considered it to be a valid and reliable scale for health surveys [11]. The ADLs tool was used in many studies such as Singh et al., in 2007, Watanabe et al., in 2018 and Kutsuna et al., in 2019 [12,13,14]. The researchers modified the ADLs tool to achieve the research objectives and included 16 items divided into two domains subscales; basic ADLs (10 items), instrumental ADLs (6 items) and 3 levels of ADLs dependency (independent, requires assistance and dependent). The study was approved by the Scientific and Ethical Committees at the College of Nursing of Hawler Medical University in Erbil. The verbal consent was obtained from each patient with HD before the interview. The data were analysed using the Statistical Package for Social Sciences (SPSS, Version 25), and used two statistical approaches. The descriptive data analysis included frequency and percentage, and inferential data analysis calculated Chi-square test. P-value of ≤ 0.05 was considered statistically significant to find out

factors that affected daily ADLs among HD patients. Regarding the scoring, 0 was used for 'dependent', 1 for 'requires assistance' and 2 for 'independent' responses. An overall level of ADLs was also determined as 'independent', 'requires assistance' and 'dependent'.

RESULTS

Table 1 shows the socio-economic characteristics of HD patients. Most participants were more than 51 years old (68.3%), male (51.5%) and illiterate (61.2%). Moreover, the majority of the patients were married (70.2%), and 45.9% were housewives, had middle income (76.9%) and lived in urban areas (89.2%). Table 2 shows the clinical characteristics of the participants. Almost half of the patients (47.8%) who took part in the study had a normal weight.

Most of the patients (89.6%) had other chronic diseases (73.9% hypertension, 49.3% diabetes mellitus, 14.6% anaemia, 14.2% heart disease and 3.7% hepatitis). Regarding the duration of HD treatment, more than half of the participants (55.2%) received treatment for 1-3 years. A high percentage of them (94.8%) had information about the importance of ADLs. Table 3 demonstrates the overall activities of daily living divided into two main domains, basic and instrumental activities. The maximum percentage of basic ADLs (42.9%) was within the level of independence. However, more than half (52.6%) of the participants were dependent in the instrumental ADLs. In general, the largest proportion of participants (36.6%) was within the level of dependency in both types of ADLs (basic and instrumental).

Table 1: Socio-economic data of patients with maintenance hemodialysis

		n= 268	
		F	(%)
Age group (years)	18-35	28	(10.4)
	36-50	57	(21.3)
	51 and above	183	(68.3)
Sex	Male	138	(51.5)
	Female	130	(48.5)
Formal years of education	Read and/write	164	(61.2)
	Primary school	71	(26.4)
	Secondary	9	(3.4)
	Higher Educa-	24	(9)
Marital status	Single	18	(6.7)
	Married	188	(70.2)
	Widower	62	(23.1)
Current occupation	Employment	25	(9.3)
	Jobless	120	(44.8)
	Housewife	123	(45.9)
Economic Status	Low income	33	(12.3)
	Middle income	206	(76.9)
	High income	29	(10.8)
Residential	Urban	239	(89.2)
	Rural	29	(10.8)

Table 2: Clinical characteristic of the patients with maintenance hemodialysis

		n= 268	
Variables		F	(%)
Body Max Index (BMI)	Underweight	10	(3.7)
	Normal Weight	128	(47.8)
	Overweight	88	(32.8)
Associated disease with chronic Renal Failure	Obese	42	(15.7)
	Yes	240	(89.6)
	No	28	(10.4)
Type of chronic disease (n= 240)	Hypertension	198	(73.9)
	Diabetes Mellitus	132	(49.3)
	Anaemia	39	(14.6)
	Heart Disease	38	(14.2)
Duration of HD treatment	Hepatitis	10	(3.7)
	<1 year	56	(20.9)
	1-3 years	148	(55.2)
Information about ADL	>3 year	64	(23.9)
	Yes	254	(94.8)
	No	14	(5.2)

Table 3: Overall Activities of Daily Living items

Activities of Daily Living	Dependent		Requires assistance		Independent	
	F	(%)	F	(%)	F	(%)
Basic Activity	82	(30.6)	71	(26.5)	115	(42.9)
Instrumental Activity	141	(52.6)	90	(33.6)	37	(13.8)
Overall ADLs	98	(36.6)	86	(32.1)	84	(31.3)

Table 4 exhibits the common complications and problems that occurred during and after the HD procedure. The most common complications identified through the questionnaire included headache (81.7%) after HD procedure (39.9%), hypotension (72%) during HD procedure (59.3%) and back pain (58.2%) during HD procedure (43.3%). The least common problems and complications that occurred among HD patients included infiltration (4 cases, 1.5%) during HD procedure in all 4 patients (100%), air embolism (4 cases, 1.5%), 3 cases occurred during HD procedure (1.1%), and the least common complication was coma in 5 patients (1.7%), 4 (1.5%) of which occurred during HD procedure. Table 5 demonstrates the association between the ADLs and socio-economic characteristics of the patients. There was a highly significant association between the 'dependent' level of the ADLs and four variables; age group of the participants (46.1% for 56 years and above and 14% for 36 - 55 years vs 10.7% for 18 - 35 years, P-value <0.001), marital status (61.3% for a widower and 23.9% for married vs 16.7% for single, P-value <0.001), formal years of education (41.5% for illiterate and can read/ write and 19.7% for primary school graduates vs 16.7% for higher-level education, P-value <0.001), and current occupation (39.8% for housewife and 29.2% for unemployment vs 8% for employment, P-value <0.001).

Dependency was more significant among low income and middle-income participants than in high-income respondents (36.4% and 34%, 13.8% respectively, P = 0.025). Finally, there was no significant association between the ADLs and gender (P = 0.057) and residential area (P = 0.221). Table 6 shows the association between clinical characteristics and ADLs. Dependency of ADLs was significantly associated with the BMI (50% for underweight, 35.2% for normal weight, 27.3% overweight and 28.6% for obese, P-value = 0.020) and duration of HD treatment (33.9 % for <1 year and 31.8% for 1–3 years vs 31.3% for >3 year, P-value =0.037). Also, dependency was significantly associated with another chronic disease; hypertension (35.4% hypertension and 22.9% for no hypertension, P-value = 0.004), diabetes mellitus (41.7% diabetes mellitus and 22.8% for no diabetes mellitus, P-value = 0.002), hepatitis (32.9% for no hepatitis and 29.1%, for hepatitis, P-value = 0.029) and heart disease (50% heart disease and 29.1% for no heart disease, P-value = 0.003). Finally, dependency was significantly associated with not being informed about ADLs (35.7%) and 31.9% and being informed about ADLs (31.9%) (P-value = 0.006). There was no statistically significant association between ADLs and anemia (P-value = 0.062). Final results of the study are demonstrated in Table 7. They illustrate an association between some complications and problems of the HD procedure and overall level of ADLs. From all of 19 complications/ problems, only nine had a statistically significant association with ADLs. The dependent level of the ADLs was significantly higher in patients with nausea (44.4% nausea vs. 29% no nausea, P = 0.004), vomiting (42.3% vomiting vs. 28.4% no vomiting, P = 0.021), restlessness (37.3% no restlessness vs. 29.2% restlessness, P = 0.041), tightness

in the chest (37.2% no tightness in the chest vs. 27.8% tightness in the chest, P = 0.003), chills (32.9% no chills vs. 29.1% chills, P = 0.049), fever (38.2% no fever vs. 27.9% fever, P = 0.026), clotting (38.1% clotting vs.

28.7% no clotting, P = 0.043), blood line obstruction (80% blood line obstruction vs. 30.2% no blood line obstruction, P = 0.004) and hematoma (33.1% no hematoma vs. 0% hematoma, P = 0.003).

Table 4: Health problems associated with hemodialysis among the study sample

Complication or Problem	No		Yes		During procedure		Yes After procedure		Remaining by hours	
	F	(%)	F	(%)	F	(%)	F	(%)	F	(%)
Nausea	214	(79.9)	54	(20.1)	48	(17.9)	5	(1.9)	1	(0.4)
Vomiting	197	(73.5)	71	(26.5)	63	(23.5)	7	(2.6)	1	(0.4)
Restlessness	244	(91)	24	(9)	19	(7.1)	4	(1.5)	1	(0.4)
Headache	49	(18.3)	219	(81.7)	95	(35.4)	107	(39.9)	17	(6.3)
Seizure	258	(96.3)	10	(3.7)	5	(1.9)	5	(1.9)	0	(0)
Coma	263	(98.1)	5	(1.9)	4	(1.5)	1	(0.4)	0	(0)
Hypotension	75	(28)	193	(72)	159	(59.3)	29	(10.8)	5	(1.9)
Back pain	112	(41.8)	156	(58.2)	116	(43.3)	26	(9.7)	14	(5.2)
Tightness in the chest	250	(93.3)	18	(6.7)	11	(4.1)	5	(1.9)	2	(0.7)
Shortness of breath	215	(80.2)	53	(19.8)	44	(16.4)	8	(3)	1	(0.4)
Chill	213	(79.5)	55	(20.5)	46	(17.2)	6	(2.2)	3	(1.1)
Fever	225	(84)	43	(16)	34	(12.7)	8	(3)	1	(0.4)
Air embolism	264	(98.5)	4	(1.5)	3	(1.1)	1	(0.4)	0	(0)
Clotting	171	(63.8)	97	(36.2)	92	(34.3)	4	(1.5)	1	(0.4)
Blood line obstruction	258	(96.3)	10	(3.7)	10	(3.7)	0	(0)	0	(0)
Bleeding	249	(92.9)	19	(7.1)	14	(5.2)	5	(1.9)	0	(0)
Pain	231	(86.2)	37	(13.8)	31	(11.6)	4	(1.5)	2	(0.7)
Infiltration	264	(98.5)	4	(1.5)	4	(100)	0	(0)	0	(0)
Hematoma	260	(97)	8	(3)	3	(37.5)	5	(62.5)	0	(0)

Table 5: Association between socio-economic data and overall ADLs

Variables		Dependent		Requires assistance		Independent		P-Value
		F	(%)	F	(%)	F	(%)	
Age group (year)	18 - 35 (Young Adult)	3	(10.7)	3	(10.7)	22	(78.6)	<0.001
	36 - 55 (Middle-Aged Adults)	12	(14)	18	(20.9)	56	(65.1)	
	56 years old and above (Older Adult)	71	(46.1)	62	(40.3)	21	(13.6)	
Sex	Male	36	(26.1)	47	(34.1)	55	(39.9)	0.057
	Female	50	(38.5)	36	(27.7)	44	(33.8)	
Marital Status	Single	3	(16.7)	3	(16.7)	12	(66.7)	<0.001
	Married	45	(23.9)	60	(31.9)	83	(44.1)	
	Widower	38	(61.3)	20	(32.3)	4	(6.5)	
Formal years of education	Illiterate and Can read /write	68	(41.5)	58	(35.4)	38	(23.2)	<0.001
	Primary school	14	(19.7)	21	(29.6)	36	(50.7)	
	Secondary school	0	(0)	3	(33.3)	6	(66.7)	
	Higher Education	4	(16.7)	1	(4.2)	19	(79.2)	
Current occupation	Employment	2	(8)	2	(8)	21	(84)	<0.001
	Jobless	35	(29.2)	45	(37.5)	40	(33.3)	
	Housewife	49	(39.8)	36	(29.3)	38	(30.9)	
Economic status	Low income	12	(36.4)	13	(39.4)	8	(24.2)	0.025
	Middle income	70	(34)	63	(30.6)	73	(35.4)	
	High income	4	(13.8)	7	(24.1)	18	(62.1)	
Residential area	Urban	74	(31)	73	(30.5)	92	(38.5)	0.221
	Rural	12	(41.4)	10	(34.5)	7	(24.1)	

Table 6: Association between clinical data and the overall level of ADLs

Variables		Dependent		Requires as-		Independent		P-Value
		F	(%)	sistance	(%)	F	(%)	
Classification of BMI	Underweight	5	(50)	0	(0)	5	(50)	0.020
	Normal Weight	45	(35.2)	31	(24.2)	52	(40.6)	
	Overweight	24	(27.3)	39	(44.3)	25	(28.4)	
	Obese	12	(28.6)	13	(31)	17	(40.5)	
Duration of HD treatment	<1 year	19	(33.9)	16	(28.6)	21	(37.5)	0.037
	1–3 years	47	(31.8)	38	(25.7)	63	(42.6)	
	>3 year	20	(31.3)	29	(45.3)	15	(23.4)	
Do you have hypertension?	Yes	70	(35.4)	66	(33.3)	62	(31.3)	0.006
	No	16	(22.9)	17	(24.3)	37	(52.9)	
Do you have Diabetes Mellitus?	Yes	55	(41.7)	39	(29.5)	38	(28.8)	0.002
	No	31	(22.8)	44	(32.4)	61	(44.9)	
Do you have anaemia	Yes	17	(43.6)	14	(35.9)	8	(20.5)	0.062
	No	69	(30.1)	69	(30.1)	91	(39.7)	
Do you have hepatitis?	Yes	1	(10)	5	(50)	4	(40)	0.029
	No	85	(32.9)	78	(30.2)	95	(36.8)	
Do you have heart disease?	Yes	19	(50)	12	(31.6)	7	(18.4)	0.003
	No	67	(29.1)	71	(30.9)	92	(40)	
Do you have information about ADLs	Yes	81	(31.9)	80	(31.5)	93	(36.6)	0.006
	No	5	(35.7)	3	(21.4)	6	(42.9)	

Table 7: Association between overall ADLs and complications/ problems

Complications/ Problems		Overall ADL levels						P-Value
		Dependent		Requires assistance		Independent		
		F	(%)	F	(%)	F	(%)	
Nausea (*yes =54) (*no =214)	Yes	24	(44.4)	10	(18.5)	20	(37)	0.004
	No	62	(29)	73	(34.1)	79	(36.9)	
Vomiting (*yes =71) (*no=197)	Yes	30	(42.3)	20	(28.2)	21	(29.6)	0.021
	No	56	(28.4)	63	(32)	78	(39.6)	
Restlessness (*yes = 219) (*no= 49)	Yes	7	(29.2)	13	(54.2)	4	(16.7)	0.041
	No	91	(37.3)	73	(29.9)	80	(32.8)	
Headache (*yes = 219) (*no= 49)	Yes	21	(42.9)	9	(18.4)	19	(38.8)	0.071
	No	65	(29.7)	74	(33.8)	80	(36.5)	
Hypotension (*yes = 193) (*no= 75)	Yes	62	(32.1)	58	(30.1)	73	(37.8)	0.215
	No	24	(32)	25	(33.3)	26	(34.7)	
Back pain (*yes = 156) (*no= 112)	Yes	55	(35.3)	50	(32.1)	51	(32.7)	0.101
	No	31	(27.7)	33	(29.5)	48	(42.9)	
Tightness in the Chest (*yes = 18) (*no= 250)	Yes	5	(27.8)	12	(66.7)	1	(5.6)	0.003
	No	93	(37.2)	74	(29.6)	83	(33.2)	
Chill (*yes = 55) (*no= 213)	Yes	16	(29.1)	15	(27.3)	24	(43.6)	0.049
	No	70	(32.9)	68	(31.9)	75	(35.2)	
Fever (*yes = 43) (*no= 225)	Yes	12	(27.9)	10	(23.3)	21	(48.8)	0.026
	No	86	(38.2)	76	(33.8)	63	(28)	
Clotting (*yes = 97) (*no = 171)	Yes	37	(38.1)	34	(35.1)	26	(26.8)	0.043
	No	49	(28.7)	49	(28.7)	73	(42.7)	
Blood line obstruction (*yes =10) (*no= 258)	Yes	8	(80)	0	(0)	2	(20)	0.004
	No	78	(30.2)	83	(32.2)	97	(37.6)	
Hematoma (*yes = 8) (*no= 260)	Yes	0	(0)	6	(75)	2	(25)	0.003
	No	86	(33.1)	77	(29.6)	97	(37.3)	

DISCUSSIONS

This study explored the common complications and problems associated with HD during or after the procedure and factors that affected patients' ADLs. The results revealed that almost half of the participants were dependent in performing instrumental ADLs. In contrast, the maximum percentage of participants were independent in their basic ADLs. The overall level of patients' independence in ADLs was inadequate. According to extensive research data, the activity during the day is essential for all people and especially for patients with chronic kidney disease. In contrast, inactivity is one of the main problems associated with many diseases, complications and mortality as well as the quality of life [15, 16, 17]. The results of low activity in our study could be due to the age of the study participants as the majority of them were more than 51 years old. Low level of education could also contribute, as the activity in the older age group usually declines in the society. This result is supported by the study of Julius et al., which reported the highest dependency in ADLs among older patients, female and less educated [18]. Painter and Marcus found that, generally, participants with renal failure usually had low levels of physical activity [19]. The study of Cook and Jassal also supported this result; the majority of their study group was dependent in most items of basic and instrumental ADLs [20]. Self-care activities can increase if they are designed by educational program and improve patients' knowledge, as found in the quasi-experimental study of Mohamed et al., which was conducted in Egypt. It used Nottingham scale of ADLs and studied the effect of the interventional program on the HD patients and their ability of self-care. The results showed that before the intervention,

only 30% of participants were independent in ADLs, while post-intervention, 50% were independent, demonstrating an increased by two-thirds. 66.7% of patients in the study were independent after the follow-up period [21]. The treatment by HD procedure among patients in this study was associated with many complications and problems. The majority of patients had headache, hypotension and back pain. At the same time, the least common complication was a coma, and the least common problems were infiltration and air embolism that occurred during the HD procedure. Those complications or problems were expected as the majority of the study participants had other chronic diseases, and those complications could be due to those conditions. Moreover, the HD procedure is the major invasive procedure that transports the blood from the body of the patients into the dialyser machine through the hollow fibres, and after the filtration returns into the body, which takes 4 to 6 hours. Therefore the HD procedure carries the risk of many complications [22]. The HD patients experience multiple problems and health complications in the community and their daily lives because they have daily treatment as well as the treatment by hemodialysis procedure [23, 24]. The results of this study were supported by the Caplin et al., study that studied 550 HD patients in London, UK. After analysis, they identified the hypotension, headache, backache, pruritus, dizziness and cramps as the main complications of HD [25]. Another retrospective study in the Uttar Pradesh, India; during 11 years assessed 2325 renal failure HD patients and found that the most common intradialytic complications were hypotension, nausea, vomiting, fever and chills [26]. The cross-sectional survey study by Gela and Mengistu conducted in Ethiopia showed that the majority of the participants on HD treatment

Had anaemia as a complication [27]. Hemodialysis patients often complain about many complications before, during and after HD treatment. By improving nursing interventions, nurses can reduce the risk of complications [28]. The present study identified infiltration and air embolism as problems related to vascular access. The longitudinal cohort study that was conducted in North America observing vascular HD access during 90 days and second time end of the first year revealed many problems [29]. The ADLs of patients were significantly associated with many variables of socio-economic and clinical characteristic. There was a highly statistically significant association with age group, level of education and BMI of the participants, which could be because the majority of the study groups were older adults, and their level of education was low. Furthermore, almost half of the participants had a normal weight, however, the daily accumulation of waste products and excessive fluid led to an increase in their weight affecting their activity. These results are similar to the findings of a study by Johansen et al. in the California, USA, which showed age, level of education, and BMI were significantly associated with physical activity [30]. However, there was a difference with the study by Stack and Murthy, who found that severe limitations in the ADLs among HD patients were negatively related to the age and heart failure [31]. The current occupation and economic status, as well as the duration of HD treatment of the patients in the current study also affected the ADLs. This could be due to the high percentage of housewives and unemployed people in the study sample. Also, a majority of participants had middle income and were dependent on other people for daily income. Additionally, the duration of dialysis in the majority

of studied patients was over one year, which may lead to unemployment and inadequate income. All of the above challenges also affected the psychology of the patients and their ADLs [32,33]. This result was supported by Aucella et al. in Italy, whose research concluded that unemployment and age of HD patients affected their activity, and education, duration of dialysis and presence of anaemia were also associated with a low level of energy [34]. This research also agrees with many other studies that showed that occupational status of HD patients was significantly associated with daily activity [35, 36, 37]. The effect of the duration of HD treatment on ADLs in the present study was different from a descriptive study on 138 HD patients in Sivas, Turkey, which found no significant association between the duration of HD and patients' activity [38]. In the present study, the ADLs were positively associated with the income as in the study of Kamble and Shinde in India, in which the monthly income of the family was associated with physical activity [39]. The current study identified a highly significant association between marital status and ADLs as in the study by Julius et al.; in which dependency in ADLs was associated with the marital status and educational level [18]. Furthermore, the dependency in ADLs was significantly associated with the presence of another chronic disease. Thomas et al. in their study demonstrated that some of the chronic kidney diseases were significantly associated with many health complications like anaemia and cardiovascular disease [40]. The dependency in ADLs was significantly associated with some chronic disease like hypertension, diabetes mellitus, hepatitis and heart disease in research by Algarni, in 2014, who stated that the diabetes mellitus and hypertension were the leading causes of renal failure and affected ADLs[41].

This result agrees with many studies that explored diabetes mellitus as the main factors of renal disease which also significantly affected daily activity [42, 43]. Concerning the association of ADLs with heart disease, this study is supported by a cross-sectional study by Cheung et al., in which the majority of HD patients had other cardiovascular diseases, and there was a positive association between activity and all disease categories and age [44]. Another study similar to this research was by Mousa et al., in which the majority of study participants had a chronic disease, and activity of the patients was significantly associated with age, educational level, income, living status, occupation, and HD duration [45]. Further results of the current study illustrated that some of the HD complications or/and problems occurred during or after HD procedure or continued for some time after. The HD procedure is invasive, difficult for the patient to cope with, and carries the risk for myocardial infarction, heart failure, fluid overload and stroke that can also affect ADLs [46]. Furthermore, there could be some hidden problem such as coronary artery disease, aplastic bone disease, high turnover renal bone disease, bleeding diathesis (uremic platelets), and osteomalacia, which can be directly associated with decreased daily activity [47]. This is in agreement with the study of Alhajim, in 2017, found that HD patients often experience many complications such as cardiovascular disease that directly affect their ADLs [48]. This study is also supported by a descriptive and analytical study done in Iran by Asgari et al., which revealed that patients undergoing HD faced severe nausea and vomiting [49]. Another complication was restlessness and tightness in the chest, which were also significantly associated

with the dependency in ADLs. This result agrees with a study by Davenport, in 2006, which explored low functional activity among HD patients related to complications of HD procedure such as chest tightness, angioedema with throat and laryngeal oedema fever, tachycardia, flushing, headache, chest pain, dyspnea, pruritus, anxiety, laryngeal oedema, numbness of the fingers toes and lips, hypotension and hypertension [50]. Moreover, this study was supported by Mehmood et al., who, in 2016, observed an association between complications during hemodialysis and activity like; hypotension, cramps, itching, vomiting and dialysis reaction [51].

CONCLUSION

This study found that the ADLs of hemodialysis patients were low, which could be due to the ageing process, low level of education and the presence of other chronic diseases. The results of the study showed that there was a highly significant statistical association between ADLs and the majority of the socio-economic and clinical characteristics. Most patients suffered from complications and problems of HD during and after treatment, which increased their dependency in ADLs. Nursing care and patient education are essential for hemodialysis patients and can increase functional daily living activity and decrease in HD related complications and problems.

CONFLICTS OF INTEREST

The authors report no conflicts of interest.

REFERENCES

- [1] Smeltzer SO, Bare BG. *Brunner and Suddarth's Textbook of Medical-Surgical Nursing*. 10th ed. Philadelphia: JB Lippincott; 2003. P. 1289.
- [2] Rhoades, RA, Tanner, GA. *Medical Physiology*. 2nd ed. Lippincott-Raven. Part VI Renal Physiology and Body Fluids, Chapter 23, Kidney Function; 2003. P.378.

- [3] Shabila NP, Alhagbaker JM, Ali SS. Daily living activities among geriatric residents at geriatric homes in Erbil and Sulaimaniyah cities, Kurdistan Region. *Zanco Journal of Medical Sciences*. 2017; 21(1):1619-28. Available from: <https://doi.org/10.15218/zjms.2017.012>.
- [4] Mlinaca ME, Fengb MC. Assessment of Activities of Daily Living, Self-Care, and Independence. *Archives of Clinical Neuropsychology*. 2016;506–516. Available from: DOI:10.1093/arclin/acw049.
- [5] Williams LS, Hopper PD. *Understanding Medical-Surgical Nursing*. 2nd ed. USA, Philadelphia: F.A. Davis Company Publishing; 2003. p. 645-7.
- [6] Kopple JD, Kim JC, Shapiro BB, Zhang M, Li Y, Porszaz J et al. Factors affecting daily physical activity and physical performance in maintenance dialysis patients. *Journal of Renal Nutrition*. 2018; 25(2): 217–22. Available from: DOI:10.1053/j.jrn.2014.10.017.
- [7] Atashpeikar S, Jalilazar T, Heidarzadeh M. Self-care ability in hemodialysis patients. *Journal of Caring Sciences*. 2012 May; 1(1): 31-5.
- [8] Johansen KL, Chertow GM, Ng AV, Mulligan K, Carey S, Schoenfeld PY, et al. Physical activity levels in patients on hemodialysis and healthy sedentary controls. *Kidney International*. 2000 1st June; 57(6):2564-70. Available from: DOI: 10.1046/j.1523-1755.2000.00116.x.
- [9] Shukla B, Kaur A. Study to assess knowledge and attitude regarding self-care among patients undergoing hemodialysis in selected hospital of Punjab, India. *JARS International Research Journal*. 2012; 2 (1): 3-4.
- [10] Feinstein AR, Josephy BR, Wells CK. Scientific and clinical problems in indexes of functional disability. *Annals of Internal Medicine*. 1986 Sep 1; 105 (3):413-20.
- [11] Lawton MP, Brody EM. Assessment of older people: self-maintaining and instrumental activities of daily living. *The Gerontologist*. 1969 1st October; 9 (3): 179-86.
- [12] Singh S, Multani NK, Verma SK. Development and validation of geriatric assessment tools: A preliminary report from Indian population. *Journal of Exercise Science and Physiotherapy*. 2007 Dec; 3 (2):103.
- [13] Watanabe T, Kutsuna T, Yoneki K, Harada M, Shimoda T, Matsunaga Y, et al. Determinants of difficulty in activities of daily living in ambulatory patients undergoing hemodialysis. *Renal Replacement Therapy*. 2018 Dec 1; 4 (1): 1-8. Available from: DOI 10.1186/s41100-018-0146-y.
- [14] Kutsuna T, Isobe Y, Watanabe T, Matsunaga Y, Kusaka S, Kusumoto Y, et al. Comparison of difficulty with activities of daily living in elderly adults undergoing hemodialysis and community-dwelling individuals: a cross-sectional study. *Renal Replacement Therapy*. 2019 Dec 1; 5 (1):50. Available from: <https://doi.org/10.1186/s4110-019-0250-7>.
- [15] Jagannathan R, Ziolkowski SL, Weber MB, Cobb J, Pham N, Long J, et al. Physical activity promotion for patients transitioning to dialysis using the “Exercise is Medicine” framework: a multi-centre randomised pragmatic trial (EIM-CKD trial) protocol. *BMC Nephrology*. 2018 Dec 1; 19 (1): 230. Available from: <https://doi.org/10.1186/s12882-018-1032-0>.
- [16] Anding K, Bär T, Trojniak-Hennig J, Kuchin S, Krause R, Rost JM, et al. A structured exercise programme during haemodialysis for patients with chronic kidney disease: clinical benefit and long-term adherence. *BMJ Open*. 2015 Aug 1; 5 (8):e008709. Available from: DOI:10.1136/bmjopen-2015-008709.
- [17] Kutner NG, Zhang R, Allman RM, Bowling CB. Correlates of ADL difficulty in a large hemodialysis cohort. *Hemodialysis International*. 2014 Jan; 18 (1):70-7. Available from: DOI:10.1111/hdi.12098.
- [18] Julius M, Hawthorne VM, Carpentier-Alting P, Kneisley J, Wolfe RA, Port FK. Independence in activities of daily living for end-stage renal disease patients: biomedical and demographic correlates. *American Journal of Kidney Diseases*. 1989 Jan 1; 13 (1):61-9.
- [19] Painter P, Marcus RL. Assessing physical function and physical activity in patients with CKD. *Clinical Journal of the American Society of Nephrology*. 2013 May 7; 8 (5):861-72. Available from: DOI: 10.2215/CJN.06590712.
- [20] Cook WL, Jassal SV. Functional dependencies among the elderly on hemodialysis. *Kidney International*. 2008 Jun 1; 73 (11):1289-95. Available from: DOI:10.1038/ki.2008.62.
- [21] Mohamed SK, El-Fouly YA, El-Deeb MA. Impact of a designed self-care program on selected outcomes among patients undergoing

- hemodialysis. *International Journal of Research in Applied*. 2016; 4 (5):73-90.
- [22] Timby BK, Smith NE. *Introductory medical-surgical nursing*. 10th ed. Lippincott Williams & Wilkins: 2010; P. 931.
- [23] Rahimi F, Oskouie F, Naser O, Sanandji ME, Gharib A. The effect of self-care on patients undergoing hemodialysis in the Sanandaj Hospitals affiliated to Kurdistan University of Medical Sciences in 2016. *Bali Medical Journal*. 2017 Jan 1; 6 (3):684-9. Available from: DOI:10.15562/bmj.
- [24] McCaleb A, Cull VV. Sociocultural influences and self-care practices of middle adolescents. *Journal of Pediatric Nursing*. 2000 Feb 1; 15(1):30-5.
- [25] Caplin B, Kumar S, Davenport A. Patients' perspective of haemodialysis-associated symptoms. *Nephrology Dialysis Transplantation*. 2011 1st August;26(8):2656-63. Available from: DOI: 10.1093/ndt/gfq763.
- [26] Singh RG, Singh S, Rathore SS, Choudhary TA. Spectrum of intradialytic complications during hemodialysis and its management: a single-center experience. *Saudi Journal of Kidney Diseases and Transplantation*. 2015 Jan 1; 26 (1):168.
- [27] Gela D, Mengistu D. Self-management and associated factors among patients with end-stage renal disease undergoing hemodialysis at health facilities in Addis Ababa, Ethiopia. *International Journal of Nephrology and Renovascular Disease*. 2018; 11:329. Available from: <http://dx.doi.org/10.2147/IJNRD.S184671>.
- [28] Minn WW. Enhancing patient safety in hemodialysis nursing care practice among nurses in the renal unit at the Defence Services General Hospital: a best practice implementation project. *JBIR Database of Systematic Reviews and Implementation Reports*. 2014 Sep 1; 12 (9):467-88. Available from: DOI: 10.11124/jbisir-2014-1368.
- [29] Xue H, Ix JH, Wang W, Brunelli SM, Lazarus M, Hakim R, et al. Hemodialysis access usage patterns in the incident dialysis year and associated catheter-related complications. *American Journal of Kidney Diseases*. 2013 Jan 1; 61(1):123-30. Available from: <http://dx.doi.org/10.1053/j.ajkd.2012.09.006>.
- [30] Johansen KL, Chertow GM, Kutner NG, Dalrymple LS, Grimes BA, Kaysen GA. Low level of self-reported physical activity in ambulatory patients new to dialysis *Kidney International*. 2010 Dec 1; 78 (11):1164-70. Available from: DOI:10.1038/ki.2010.312.
- [31] Stack AG, Murthy B. Exercise and limitations in physical activity levels among new dialysis patients in the United States: an epidemiologic study. *Annals of Epidemiology*. 2008 Dec 1; 18 (12):880-8.
- [32] Na L, Streim JE. Psychosocial well-being associated with activity of daily living stages among community-dwelling older adults. *Gerontology and Geriatric Medicine*. 2017 Mar 21; 3 (1): 1-13. Available from: doi.10.1177/23337214177000.
- [33] Yu F, Chen Y, Mathiason MA, Wan Q, Lin FV. Cognitive and physical factors affecting daily function in Alzheimer's disease: A cross-sectional analysis. *Nursing & Health Sciences*. 2019 Mar; 21(1):14-20. Available from: DOI: 10.1111/nhs.12426.
- [34] Aucella F, Battaglia Y, Bellizzi V, Bolignano D, Capitanini A, Cupisti A. Physical exercise programs in CKD: lights, shades and perspectives: a position paper of the "Physical Exercise in CKD Study Group" of the Italian Society of Nephrology. *Journal of Nephrology*. 2015 Apr 1;28 (2):143-50. Available from: DOI 10.1007/s40620-014-0169-6.
- [35] Mollaoglu M. Fatigue in people undergoing hemodialysis. *Dialysis & Transplantation*. 2009 Jun; 38 (6):216-20.
- [36] Muehrer RJ, Schatell D, Witten B, Gangnon R, Becker BN, Hofmann RM. Factors affecting employment at initiation of dialysis. *Clinical Journal of the American Society of Nephrology*. 2011 Mar 1; 6 (3):489-96. Available from: DOI: 10.2215/CJN.02550310.
- [37] Hallab A, Wish JB. Employment among patients on dialysis: An unfulfilled promise. *Clinical Journal of the American Society of Nephrology*. 2018 January 18; 13 (1): 1-2. Available from: DOI: 10.2215/CJN.13491217.
- [38] Bağ E, Mollaoglu M. The evaluation of self-care and self-efficacy in patients undergoing hemodialysis. *Journal of Evaluation in Clinical Practice*. 2010 Jun; 16 (3):605-10. Available from: DOI:10.1111/j.1365-2753.2009.01214.x.
- [39] Kamble DS, Shinde MB. Factors Affecting Quality of Life among Hemodialysis Patients. *International Journal of Science and Research*. 2015; 6(1):572-6.

- [40] Thomas R, Kanso A, Sedor JR. Chronic kidney disease and its complications. Primary care: *Clinics in office practice*. 2008 Jun 1; 35 (2):329-44. Available from: DOI:10.1016/j.pop.2008.01.008.
- [41] Algarni RS. *Exploring the Concept of Health-related Quality of Life for Patients with End-stage Renal Disease on Haemodialysis in the Eastern Region of Saudi Arabia*. (Doctoral dissertation). The University of Manchester (United Kingdom)). 2014. Accessed: 10th February 2020. Available from: <https://www.semanticscholar.org/paper/Exploring-the-concept-of-health-related-quality-of-Algarni/ef304884f6e87594bf6c00509c3b10d5d3b1e4a2>
- [42] Gutman, RA, Stead, WW, Robinson, RR. Physical activity and employment status of patients on maintenance dialysis. *New England Journal of Medicine*. 1981 Feb 5; 304 (6):309-13.
- [43] Anees M, Hameed F, Mumtaz A, Ibrahim M, Saeed KM. Dialysis-related factors affecting quality of life in patients on hemodialysis. *Iranian Journal of Kidney Diseases*. 2011 Jun; 5 (1):329-44.
- [44] Cheung AK, Sarnak MJ, Yan G, Dwyer JT, Heyka RJ, Rocco MV, et al. Atherosclerotic cardiovascular disease risks in chronic hemodialysis patients. *Kidney International*. 2000 Jul 1; 58 (1):353-62.
- [45] Mousa I, Ataba R, Al-Ali K, Alkaiyat A, Sa'ed HZ. Dialysis-related factors affecting self-efficacy and quality of life in patients on haemodialysis: a cross-sectional study from Palestine. *Renal Replacement Therapy*. 2018 Dec; 4 (1):21. Available from: <https://doi.org/10.1186/s41100-018-0162-y>.
- [46] Morfin JA, Fluck RJ, Weinhandl ED, Kansal S, McCullough PA, Komenda P. Intensive hemodialysis and treatment complications and tolerability. *American Journal of Kidney Diseases*. 2016 Nov 1; 68 (5):S43-50. Available from: <http://dx.doi.org/10.1053/j.ajkd.2016.05.021>.
- [47] Schrier RW. *Diseases of the Kidney & Urinary Tract*. 8th ed. Volume 1. Lippincott Williams & Wilkins; 2007. Chapter 100. P. 2649-69.
- [48] Alhajim SA. Assessment of the quality of life in patients on haemodialysis in Iraq. *Eastern Mediterranean Health Journal*. 2017 Jan 1; 23 (12):815-20.
- Available from: <https://doi.org/10.26719/2017.23.12.815>
- [49] Davenport A. Intradialytic complications during hemodialysis. *Hemodialysis International*. 2006 Apr; 10 (2):162-7.
- [50] Asgari MR, Asghari F, Ghods AA, Ghorbani R, Motlagh NH, Rahaei F. Incidence and severity of nausea and vomiting in a group of maintenance hemodialysis patients. *Journal of Renal Injury Prevention*. 2017; 6 (1):49. Available from: DOI: 10.15171/jrip.2017.09.
- [51] Mehmood Y, Ghafoor S, Ashraf MI, Riaz H, Atif SR, Saeed M. Intradialytic complications found in patients at a tertiary care hospital. *Austin Journal of Pharmacology and Therapeutics*. 2016; 4 (1):107.