



Nurse-Led structured program for improving quality of life among haemodialysis patients

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Abstract

Haemodialysis patients often experience poor quality of life and low adherence to treatment, leading to increased morbidity and mortality. Nurse-led structured program have shown promise in improving patient outcomes. This study aimed to investigate the effect of a nurse-led structured program on quality of life among haemodialysis patients. Research design: Pre-experimental research design (one group pre- post-test). Dairout General Hospital at haemodialysis unit. A purposive sample of 100 adult's patients, male and female, their age ranged from 20-65 years, undergoing haemodialysis for 10 years, and agreed to participate in this study. Patient assessment. Kidney Disease Quality of Life Short Form. (KDQOL_SF). The intervention group showed significant improvement in quality of life ($p < 0.001$) compared to pre intervention. Nurse-led structured programs can improve quality of life among haemodialysis patients, and should be considered as a standard component of care. Conduct further research to evaluate the long-term effects of such programs on patients' quality of life.

Keywords: Haemodialysis, Nurse-Led structured program, Quality of life.

Introduction

Haemodialysis (HD) is used to manage patients with End Stage Renal Disease (ESRD) through using artificial kidney machine to substitute the failed kidneys' functions. HD is the best strategy for expelling accumulated poisons from the body and improving quality of life. However, this procedure alone can complicate the condition due to side effects. Chronic Renal Failure (CRF) Patients, who are on dialysis, may be at increased cardiovascular and metabolic hazard. It is well known that dialysis patients have significantly impaired functional outcomes and vascular stiffness (Um-e Kalsoom, Khan& Ahmad, 2024).

Quality of Life (QOL) reflects the overall enjoyment of life, sense of well-being, freedom from disease comfort, and ability to pursue daily activities (Wang et al;2023). QoL a measure of the optimal energy or force that endows a person with the power to cope successfully with the full range of challenges encountered in the real world (Bakewell et al;2022).

Dialysis alters the life style of the patient and family and interferes with their lives. The major areas of life

affected by ESRD and its treatment includes employment, eating habits, vacation activities, sense of security, self-esteem, social relationships and the ability to enjoy life (Sherwood, 2023).

The life of these patients changes due to changes in diet, frequent use of nutritional supplements, fluid restriction and multiple dialysis sessions. Due to the lifestyle changes and treatment, these patients often experience Physical and mental problems (Griva et al;2024), all of which can lead to a lower Quality of Life (QOL) (Hare et al;2022). Quality of Life (QOL) is considered an important issue in evaluating the outcomes of patients receiving health care (Howren et al;2023). Although there is no consensus on the definition of quality of life, It has been found that in patients with kidney failure, especially in patients undergoing dialysis, QOL affects more physical aspects and less mental functioning. It is important to pay attention to the quality of life of these patients because, according to some evidence, it is related to medical outcomes, including the reduction of hospitalization and mortality due to hospitalization (Chen et al;2022).

Patients undergoing hemodialysis encounter many

problems based on the blood flow rate and solutes removal rate including hypotension, nausea, vomiting, muscle spasm, headache, and chest pain. Hemodialysis leads to life style changes for families and patients, and the time required for hemodialysis reduce the time accessible for social activities (Um-e Kalsoom, Khan & Ahmad, 2024). Therefore, it is essential to implement nurse-led structured program to support these patients in achieving improved laboratory and clinical outcomes, independently performing activities of daily living and complying with educational guidelines. In order to provide essential care to patients undergoing hemodialysis, current study was established to assist those patients to improve their quality of life (Viecelli et al., 2022).

Patients requiring long-term hemodialysis are often concerned about the unpredictability of the illness and the disruption of their lives. They often have financial difficulties, difficulty holding a job, weakening sexual desire and impotence, depression from being chronically ill and fear of dying. Younger patients worry about marriage, having children, and the burden that they bring to their families. The regimented life style that frequent dialysis treatments and restrictions in food and fluid intake impose is often demoralizing to the patient and family. Health functioning of patient's receiving hemodialysis is rather poor and it is a significant reason for increased dependency (Hoshino, 2023).

Apart from the financial dependency caused by unemployment, patients are extremely dependent on the medical staff and family environment. Most of patients on dialysis fell powerless, as they are unable to maintain their employment or deal effectively with their daily activities (Hinkle & Cheever (2023), the more their illness become severe, the more they become dependent, which creates feelings of being a burden on others (González, et al., 2022), therefore, it can be viewed as a significant reason why a substantial proportion of patients wish to withdraw from their treatment in an attempt to gain their independence and freedom again (Hansen, 2023).

Nurse-led Structured Program is associated with better patient outcomes and supported by international guidelines and organizations that give basic resources for patient knowledge about renal diseases but many barriers remain in progress

preventing comprehensive education of patients with progressive renal disease to improve their knowledge about management and treatment alternatives of illness (Yang, et al., 2022). Patient education and decision support can be strengthened, with particular attention to low educational literacy, which is common among dialysis patients (Wyld, et al., 2023). Diet instruction and nutrition education are recommended for the prevention and management of CKD and ESRD (Fujii, Kono, & Nishi, 2023).

Significance of the study

Through clinical researcher's experience as a head nurse in haemodialysis unit in Dairout General Hospital for four years, and also from the international research, it has been observed that; Haemodialysis is a life-saving treatment for patients with end-stage renal disease, but it can significantly impact their quality of life. Patients on haemodialysis often experience fatigue, muscle cramps, and dietary restrictions, which can limit their daily activities and social interactions. Additionally, the time-consuming nature of dialysis sessions, which can take up to 4 hours, 3 times a week, can disrupt their work, family, and social life. Furthermore, haemodialysis patients are at risk of developing depression, anxiety, and other mental health issues, which can further compromise their quality of life. However, with proper management, support, and lifestyle adjustments, many haemodialysis patients are able to lead active and fulfilling lives (Gerogianni et al; 2022). A nurse-led structured program will help in improvement of quality of life for haemodialysis patients. Therefore, the current study was carried out to investigate the effect of a nurse-led structured program on quality of life among haemodialysis patients.

Aim of the study

The aim of the study is to investigate the effect of a nurse-led structured program on quality of life among haemodialysis patients.

Research hypothesis

The quality of life for haemodialysis patients will be improved post implementation of nurse-led

structured program than pre.

Patients & Method

Research design

Pre-experimental research design (one group pre-post-test) was utilized to conduct this study.

Study variables

Two variables were used in this study:

Independent variable in this study was a nurse-led structured program.

Dependent variable includes quality of life among haemodialysis patients.

Research setting

This study was conducted in Dairout General Hospital at haemodialysis unit (affiliated to the Ministry of Health), Assiut Governorate.

The haemodialysis unit at Dairout General Hospital found in the first floor of hospital and has a total capacity of thirty-five beds distributed in two sectors, the first sector for positive hepatitis C virus patients and the second sector for negative hepatitis C virus patients. The haemodialysis unit work three shifts per day.

Subjects

A purposive sample of 100 adult's patients, male and female, their age ranged from 20-65 years, undergoing haemodialysis for 10 years, 4 hours each session and agreed to participate in this study.

Exclusion criteria

New patients or undergoing haemodialysis for less than 10 years, and treated less than 4 hours for each session.

Sample size was selected by using the following equation according to Steven K. Thompson (2012):
 $N = \text{total patient population size of 165 during year 2023.}$

$Z = \text{confidence levels is 0.95 and is equal to 1.96}$

$D = \text{The error ratio is } = 0.05$

$P = \text{The property availability ratio and neutral } = 0.50$

$$n = \frac{N \times p(1-p)}{\left[\left[N - 1 \times \left(d^2 \div z^2 \right) \right] + p(1-p) \right]}$$

Tools

Two tools were utilized for data collection to achieve the aims of the study:

Tool(I): Patient assessment tool (AnnexI)

It was developed and utilized by the researcher based on current national and international literature (Naalweh et al;2022), (Berry C; 2022) & (Baiardi et al; 2022).

This tool consisted of the following two parts:

Part (I): Demographic patient data: - it included eight items (age, gender, marital status, educational level, occupation, residence, type of family and household size in numbers).

Part (II): Medical data about haemodialysis patient: - it included six items (duration of haemodialysis, number of sessions per week, hours of haemodialysis per session, type of vascular access, presence of chronic illnesses and assessing presence of complications during haemodialysis).

Tool(II): Kidney Disease Quality of Life Short Form. (KDQOL_SF)

Adopted from (Hays et al; 1995) and used to measure or assess the quality of life for individuals with kidney disease and on dialysis.

It included disease-targeted nineteen items focus on particular health-related concern of individuals with kidney disease and on dialysis and each item consisted of numbers of questions:

1-symptoms/problems(12 questions), 2-effects of kidney disease on daily life (8 questions), 3-Burden of kidney disease (4 questions), 4-work status (2 questions), 5-cognitive function(3 questions), 6-Quality of social interaction (3 questions), 7-sexual

function (2 questions), 8-sleep (4 questions), 9-social support (2 questions), 10-dialysis staff encouragement (2 questions), 11-patient satisfaction (1 question), 12-physical functioning (10 questions), 13-role limitations caused by physical health problem (4 questions), 14-role limitations caused by emotional health problem (questions), 15-social functioning (2 questions), 16-emotional well-being (5 questions), 17-pain (2 questions), 18-energy/fatigue (4 questions) and 19-good health perception (5 questions).

Scoring system:

Each question was scored on a likert scale, with responses reflecting the frequency or intensity of symptoms or feelings. Responses were assigned numeric values, and each item was reverse-coded if necessary to ensure higher scores represent better quality of life. For each domain, raw scores were summed and then transferred to a 0-100 scale. A higher score (closer to 100) indicated a better quality of life in that domain. Low scores indicated significant impact on quality of life related to kidney disease. The Cronbach alpha internal consistency reliability estimates for the KDQOL-SF kidney disease-targeted scales exceeded 0.80, with two exception (0.68 for cognitive function, 0.61 for quality of social interaction).

Ethical consideration

Research proposal was approved from the Ethical Committee in the Faculty of Nursing at Assiut University with an approved number (1120240910) on 27 October 2024. There was no risk for the study subjects during application of the research. The study followed common ethical principles in clinical research. Informed consent was obtained from patients or guidance that were willing to participate in the study, after explaining the nature of the study. Confidentiality and anonymity were assured. Study subjects were had the right to participate and or withdraw from the study without any rational any time. Study subjects privacy was considered during collection of data.

Face validity and reliability:

A jury of five experts from the medical-surgical

nursing and nephrology staff tested the tool's face validity. They reviewed the tools for clarity, relevance, comprehensiveness, and understanding. There were no modifications were made. Then, the tools were designed in their final format and tested for reliability.

Pilot study

The purpose of this pilot study to assess the, clarity of the designated study tools, and to evaluate their utility while identifying any challenges that needed to be addressed before the main study commenced. In January 2025, the pilot study involved 10% of the sample, comprising ten patients. Based on the findings, there were no modifications were made to the tools, so the sample of the pilot study were included in the study sample.

Procedure

This study was carried out on three phases:

1-Preparatory Phase

Administrative approval

- The Dean of the Faculty of Nursing issued an official letter explaining the study's purpose to the Head of Haemodialysis Unit.

- Patient' agreement for voluntary participation was obtained and the purpose and nature of the study was explained.

- The study tools and nurse-led structured program were formulated after extensive national and international literature review (textbooks, journals, internet resources, etc.). A panel of experts checked the final form of the proposed protocol to test face validity.

- The reliability of the test was calculated by using correlation coefficient and it was estimated by Alpha Cronbach's test for the study tools.

- The head of haemodialysis unit granted official permission to proceed with the proposed study.

- The researcher collected data 2 day/week during morning and afternoon haemodialysis sessions.

Nurse-led Structured Program

Based on the findings of the preparatory phase, A nurse-led structured program was developed after extensive literature review considering patient's needs, interests and their level of education, as well as researcher's experience as a head nurse in the haemodialysis unit, and opinions of the medical and nursing experts. It was written in simple Arabic and supported by photo illustrations and colored pictures to suit all patients regardless of their educational level. It involves information on quality of life for haemodialysis patients.

2-implementation phase

-The researcher introduced himself to initiate a line of communication, explained the nature and purpose of the study.

- Each patient involved in the study was assessed (pretest) by using (Tool I).

- Data were collected from study patients (pretest) for assessing quality of life (Tool II).

- A nurse-led structured program was provided to the study patients through 3 sessions.

First session: the researcher explained the contents of nurse-led structured program to the patients during haemodialysis session to support the patient and increase their sense of responsibility. The researcher took the patient's telephone numbers to complete the data collection process after finishing haemodialysis session and if any patient want to ask any question. This session took about 15 minutes with 30 patients.

Second session: included instructions and information about haemodialysis, importance of adherence to haemodialysis sessions, complications or adverse effects of non-adherence to haemodialysis sessions which includes accumulation of toxins in the body, cardiovascular problems and muscles and bones diseases. Teach patients how to adhere well to haemodialysis sessions through attending haemodialysis sessions in its time and contact with the health team members in case of any problems. This session took about 30 minutes with 35 patients.

Third session: included instructions and information about healthy life pattern to increase haemodialysis patients's quality of life, importance of practicing exercises, types of allowed exercises, importance of healthy sleep and ways to improve quality of sleep, importance of decrease tension and insomnia, importance of medical follow up, importance of peer and social support, ways to deal with psychological problems such as depression and worries, importance of contact with friends and family, importance of contact with support groups and sharing problems. This session took about 30 minutes with 35 patients.

- Each patient obtained a hard copy of the booklet. The researcher also used pictures to enhance patients' knowledge and help them retain the learned material.

- After finishing nurse-led structured program, each patient received a regular telephone call to ensure compliance or adherence to the provided care.

- The collection of data lasted through the period from September 2024 to March 2025.

3-Evaluation phase

-This phase consists of evaluating the effect of a nurse-led structured program on patient's quality of life.

- Posttest was done to the study patients by using (Tool II) 1 months after implementation of nurse-led program.

Statistical design

Data entry was done using compatible personal computer by the researcher. All data was entered into statistical packages for the Social Sciences (SPSS) version 20.0 software for analysis and Excel for figures. The content of each tool was analyzed, categorized and then coded by the researcher. Data were presented as number, percentage, mean, median, and standard deviation. Categorical variables were described by number and percent, where continuous variables described by mean and standard deviation (Mean, SD).

Table (1): clarifies that the highest percentage of

studied patients their ages ranged between 50-65 years old, and the highest percentage of them were male, married and illiterate. As regard to occupation, residence and type of family, the majority of studied patients were unemployed from rural area and joint family, and the majority of them, their numbers ranged between 5 and less than 10.

Table 1: Distribution of patients regarding demographic data n=100

%	N	Medical data
		Duration of dialysis
30	30	-6-10yrs
56	56	-11-15 yrs.
14.0	14	-more than 15 yrs
		Number of session
97	97	-three day
1	1	-two day
2	2	-one day
		Hours of session
100	100	-4-5h
		Types of vascular access
99	99	-arterio venous access
1	1	-arterio venous graft
		Chronic disease
28	28	-Diabetes
80	80	-Hypertension
16	16	-Cardiovascular
1	1	-Pulmonary
62	62	-Kidney disease
6	6	-Endocrine
3	3	-Tumors

Table (2): reflects that the highest percentage of studied patients their duration of haemodialysis ranged from 11-15 years and number of sessions was 3 sessions per week. 100% of patients treated for each haemodialysis 4-5 hours. Regarding type of vascular access, majority of patients use arteriovenous fistula (99%), and complain of hypertension, and kidney disease (80%,62% respectively).

Table 2: Distribution of patients regarding medical data n=100

%	N	Demographic data
		Age
6	6	-18<29yrs
11	11	-29<40yrs
23	23	-40<50yrs
60	60	-50<65yrs
		Sex
71	71	-male
29	29	-female
		Marital status
7	7	-single
74	74	-married
8	8	-divorced
11	11	-widower
		Level of education
41	41	-illiterate
14	14	-non school completed
7	7	-primary school
24	24	-secondary education
13	13	-bachelor degree
1	1	-master degree
		Occupation
67	67	-unemployed
33	33	-employed
		Residence
88	88	-rural
12	12	-urban
		Types of family
3	3	-nuclear
96	96	-joint
		House hold size in Number
10	10	1- less 5
84	84	5- less 10
6	6	10 and more

Table (3): shows that the highest percentage of studied patients suffering from hypotension, chest pain, bones disease and muscle cramp during haemodialysis session (71%,57%,78% and 79% respectively).

Table 3: Distribution of general complications during haemodialysis n=100

%	N	Variables
		Hypertension
52	52	no
48	48	yes
		Hypotension
29	29	no
71	71	yes
		Air embolism
99	99	no
1	1	yes
		Dis equilibrium
100	100	no
		Electrolyte alteration
100	100	no
		encephalopathy
99	99	no
1	1	yes
		Hemorrhage
99	99	no
1	1	Yes
		Hepatitis
100	100	no
		Sepsis
100	100	no
		Shock
99	99	no
1	1	Yes
		Dysrhythmia
95	95	no
5	5	Yes
		Chest pain
43	43	no
57	57	Yes
		Bone disease
22	22	no
78	78	Yes
		Muscle cramp
21	21	no
79	79	Yes
		Shivering
55	55	no
45	45	Yes

Table 4a: Comparison between pre and post intervention kidney disease quality of life short form regarding health perception n=100

Compared to one year ago,how would you rate your health in general now?	Follow up	Much better n%		Some what		About the some		Some what worse n%		Much worse		p.v
		N%	N%	N%	N%	N%	N%	N%	N%			
	Pre- intervention	1	1	20	20	5	5	20	20	54	54	0
	Post-intervention	0	0	23	23	9	9	66	66	2	2	
In general would you say your health	Follow up	Very good n%		Good		Fair		Poor		p.v		
		N%	N%	N%	N%	N%	N%	N%	N%			
	Pre- intervention	0	0	22	22	32	16	46	23	0		
	Post-intervention	8	8	41	20.5	51	25.5	0	0			

Table (4a): reflects that the highest percentage of studied patients answered that their health is poor, fair (23%, 16% respectively) pre-intervention regarding in general, would you say your health. But post-intervention, the highest percentage of them answered that their health is fair, good (25.5%, 20.5% respectively). the highest percentage of studied patients answered that their health is much worse (54%) pre-intervention regarding compared to one year ago, how would you rate your health in general now. But post-intervention, the highest percentage of them answered that their health is somewhat worse (66%).

Table (4b): reflects that Regarding activities might be done during atypical day, Pre-intervention, the highest percentage of studied patients answered that yes limited a lot on their vigorous activities such as running, lifting heavy objects, moderate activities, such as moving a table, pushing a vacuum cleaner, lifting or carrying groceries, climbing several flights

of stairs, walking more than a mile and walking several blocks. (98%, 57%, 77%, 96%, 98%, 97% respectively), and the highest percentage of them answered that their health has limited a little on climbing one flight of stairs, Bending, kneeling, or stooping, walking one block and bathing or dressing yourself (56%, 59%, 77%, 61% and 55% respectively). But post- intervention, almost all of the studied patients answered that their health has limited a lot on their vigorous activities such as running, lifting heavy objects, climbing several flights of stairs, walking more than a mile and walking several blocks. (97% for all), and the majority of them answered that their health has limited a little on their moderate activities, such as moving a table, pushing a vacuum cleaner, lifting or carrying groceries, climbing one flight of stairs, bending, kneeling, or stooping, and walking one block. (98%, 94%, 80%, 54% and 89% respectively). The highest percentage of the studied patients answered that their health not limited on bathing or dressing self. (78%).

Table 4b: Comparison between pre and post intervention kidney disease quality of life short form regarding physical functioning n=100

Variables	Follow up	Pre-intervention N%	Post-intervention N%	p.v		
-The following items are about activities you might do during atypical day. Does your health now limit you in these activities? If so, how much?						
Vigorous activities such as running, lifting heavy objects	Yes limited a lot	98	98	97	97	1
	Yes limited a little	2	2.00%	3	3	
Moderate activities, such as moving a table, pushing a vacuum cleaner	Yes limited a lot	57	57	2	2	0
	Yes limited a little	43	21.5	98	98	
Lifting or carrying groceries	Yes limited a lot	77	77	3	3	0
	Yes limited a little	23	23	94	94	
	No, not limited	0	0	3	3	
Climbing several flights of stairs	Yes limited a lot	96	96	97	97	1
	Yes limited a little	4	4	3	3	
Climbing one flight of stairs	Yes limited a lot	42	42	16	16	0
	Yes limited a little	56	56	80	80	
	No, not limited	2	2	4	4	
Bending, kneeling, or stooping	Yes limited a lot	26	26	1	1	0
	Yes limited a little	59	59	54	54	
	No, not limited	15	15	45	45	
Walking more than a mile	Yes limited a lot	98	98	97	97	1
	Yes limited a little	2	2.00%	3	3	
Walking several blocks	Yes limited a lot	97	97	97	97	1
	Yes limited a little	3	3	3	3	
Walking one block	Yes limited a lot	38	38	11	11	0
	Yes limited a little	61	61	89	89	
	No, not limited	1	1	0	0	
Bathing or dressing yourself	Yes limited a lot	9	9	0	0	0
	Yes limited a little	55	55	22	22	
	No, not limited	36	36	78	78	

Table (4c):clarifies that all of the studied patients had problems in their work and activities as a result of physical health (100%) Pre-intervention, while post-intervention the majority of them hadn't problems except in limiting in the kind of work or other activities and difficulty performing the work or other activities (84% and 92%respectively).Also , this table

clarifies that all of the studied patients had problems in their work and activities as a result of any emotional problems (100%)Pre-intervention, while post-intervention the majority of them had' nt problems except in didn't do work or other activities as carefully as usual (85%).

Table 4c: Comparison between pre and post intervention kidney disease quality of life short form regarding role limitations caused by physical and emotional health problem n=100

Variables	Follow up	Pre - intervention N%	Post-intervention N%	p.v	
-During the past 4 weeks, have you had any of the following problems with your work or other regular activities as a result of your physical health?					
Cut down the amount of time you spent on work or other activities?	Yes	100	100	6	0
	No	0	0	94	
Accomplished less than you would have liked?	Yes	100	100	2	0
	No	0	0	98	
Were limited in the kind of work or other activities	Yes	100	100	84	0
	No	0	0	16	
Had difficulty performing the work or other activities (for example, it took extra effort)	Yes	100	100	92	0.004
	No	0	0	8	
-During the past 4 weeks, have you had any of the following problems with your work or other regular daily activities as a result of any emotional problems (such as feeling depressed or anxious)					
Cut down the amount of time you spent on work or other activities	Yes	100	100	6	0
	No	0	0	94	
Accomplished less than you would like	Yes	100	100	1	0
	No	0	0	99	
Didn't do work or other activities as carefully as usual?	Yes	100	100	85	0
	No	0	0	15	

Table (4d):shows that the highest percentage of the studied patients their physical health or emotional problems extremely interfered with their normal social activities with family, freinds, neighbors, or groups(55%)Pre-intervention, while post-intervention half of them their physical health or emotional problems moderate interfered with their normal social activities with family, freinds, neighbors, or groups(50%).Also this table shows that

the majority of the studied patients had severe bodily pain during the past 4 weeks (75%)which interfered extremely with their normal work including both work outside the home and housework (74%)Pre-intervention, but post-intervention the highest percentage of them had moderate bodily pain during the past 4 weeks (45%) which interfered moderate with their normal work including both work outside the home and housework (45%).

Table 4d: Comparison between pre and post intervention kidney disease quality of life short form regarding pain n=100

Variables	Follow up	Pre - intervention N%	Post-intervention N%	p.v	
-During the past 4 weeks, to what extent have your physical health or emotional problems interfered with your normal social activities with family, friends, neighbors, or groups?					
your physical health or emotional problems interfered with your normal social activities with family, friends, neighbors, or groups?	Not at all	0	0.00%	7	0
	slightly	2	2.00%	32	
	moderate	22	22	50	
	quite a bite	21	21	11	
	extremely	55	55	0	
How much bodily pain have you had	Non	0	0	9	0

during the past 4 weeks?	Very mild	0	0	22	22	
	Mild	3	3	23	23	
	Moderate	13	13	45	45	
	Sever	75	75	1	1	
	Very sever	9	9	0	0	
During the past 4 weeks, how much did pain interfere with your normal work (including both work outside the home and housework)?	Not at all	0	0	11	11	0
	A little	0	0	28	28	
	moderate	9	9	45	45	
	quite a bite	17	17	16	16	
	extremely	74	74	0	0	

Table (4e):reflects that the highest percentage of the studied patients answered that None of the time during the past week they feel full of pep, felt so down in the dumps that nothing could cheer then up, felt calm and peaceful and feel worn out (65%, 58%, 65% and 58% respectively),this table also reflects that the highest percentage of the studied patients answered that Most of the time they have been a very nervous person, have alot of energy and felt down hearted and blue (60%, 61% and 66%)respectively, Pre-intervention. But post-intervention, the highest percentage of them answered that Some of the time they feel full of pep, have been a very nervous person, felt so down in the dumps that nothing could cheer

them up, felt calm and peaceful, have a lot of energy, felt down hearted and blue and feel worn out (44%, 77%, 47%, 40%, 88%, 87% and 46%) respectively. This table also shows that pre-intervention half of the studied patients feel tired All of the time (51%),but post-intervention the majority of them Some of the time feel tired (83%).Also this table shows that pre-intervention Most of the time the studied patients had physical health or emotional problems interfered with social activities like visiting with friends, relatives, etc. (27%), But post-intervention, A little of the time they had physical health or emotional problems interfered with social activities like visiting with friends, relatives, etc. (46%).

Table 4e: Comparison between pre and post intervention kidney disease

-These questions are about how you feel and how things have been with you during the past 4weeks						
Did you feel full of pep?	All of time	1	1	1	1	0
	Most of time	4	4	27	27	
	Good bite	2	2	17	17	
	Some of the time	17	17	44	44	
	A little of time	11	11	11	11	
	Non of the time	65	65	0	0	
Have you been a very nervous person	All of time	6	6	0		0
	Most of time	60	60	17	17	
	Good bite	1	1	3	3	
	Some of the time	26	26	77	77	
	A little of time	5	5	3	3	
	Non of the time	2	2	0	0	
Have you felt so down in the dumps that nothing could cheer you up	All of time	3	3	0	0	0
	Most of time	5	5	23	23	
	Good bite	1	1	17	17	
	Some of the time	19	19	47	47	
	A little of time	14	14	13	13	
	Non of the time	58	58	0	0	

Quality of life short form regarding energy/fatigue n=100

Have you felt calm and peaceful?.....	Most of time	3	3	28	28	0
	Good bite	1	1	15	15	
	Some of the time	21	21	40	40	
	A little of time	10	10	17	17	
	Non of the time	65	65	0	0	0
Did you have a lot of energy	All of time	10	10	0	0	
	Most of time	61	61	5	5	
	Good bite	0	0	3	3	
	Some of the time	21	21	88	88	
	A little of time	2	2	4	4	
	Non of the time	6	6	0	0	

Table (4f): reveals that pre-intervention the majority of the studied patients answered that Definite true regarding they seem to get sick a little easier than other people and they expect health to get worse (82% and 83%)respectively, But post-intervention the majority of them answered that Mostly true (95%and59%)respectively. Also this table reveals that Pre-intervention, half of the studied patients

answered that Mostly false regarding they are as healthy as anybody they know and their health is excellent (51%and 49%)respectively, But post-intervention the highest percentage of them answered that Don't know regarding they are as healthy as anybody they know (62%), and the highest percentage of them answered that Mostly true regarding their health is excellent (56%).

Table 4f: comparison between pre and post intervention kidney disease quality of life short form regarding energy/fatigue n=100 cont

Variables	Follow up	Pre - intervention N%		Post-intervention N%		p.v
I seem to get sick a little easier than other people	Definite true	82	82	0	0	0
	Mostly true	18	18	95	95	
	Don't know	0	0	5	5	
I am as healthy as anybody I know	Definite true	6	6	0	0	0
	Mostly true	0	0	28	28	
	Don't know	7	7	62	62	
	Mostly false	51	51	10	10	
	Definite false	36	36	0	0	
I expect my health to get worse	Definite true	83	83	0	0	0
	Mostly true	12	12	59	59	
	Don't know	0	0	22	22	
	Mostly false	0	0	19	19	
	Definite false	5	5	0	0	
My health is excellent	Definite true	5	5	0	0	0
	Mostly true	1	1	56	56	
	Don't know	7	7	6	6	
	Mostly false	49	49	38	38	
	Definite false	38	38	0	0	

Table (4g): reflects that the majority of the studied patients answered that Definite true regarding their kidney disease interferes too much with their life, Too much of their time is spent dealing with their kidney disease, they feel frustrated dealing with their kidney

disease and they feel like a burden on their family as a result of their kidney disease (89%, 91%, 91% and 89%)respectively Pre-intervention. But post-intervention, almost all of them (97%) answered that Mostly true regarding their kidney disease interferes

too much with their life and Too much of their time is spent dealing with their kidney disease, and the highest percentage of them answered that Mostly false regarding they feel frustrated dealing with their kidney disease and they feel like a burden on their family (50% and 57%) respectively.

Table 4g: Comparison between pre and post intervention kidney disease quality of life short form regarding burden of kidney disease n=100

Your kidney disease	Follow up	Pre intervention N%	Post-intervention N%	p.v	
My kidney disease interferes too much with my life	Definite true	89	89	2	2
	Mostly true	6	6	97	97
	Mostly false	0	0	1	1
	Definite false	5	5	0	0
Too much of my time is spent dealing with my kidney disease	Definite true	91	91	2	2
	Mostly true	6	6	97	97
	Mostly false	0	0	1	1
	Definite false	3	3	0	0
I feel frustrated dealing with my kidney disease	Definite true	91	91	2	2
	Mostly true	6	6	39	39
	Don't know	0	0	9	9
	Mostly false	0	0	50	50
	Definite false	3	3	0	0
I feel like a burden on my family	Definite true	89	89	1	1
	Mostly true	5	5	5	5
	Don't know	3	3	34	34
	Mostly false	0	0	57	57
	Definite false	3	3	3	3

Table (4h): reflects that Pre-intervention, the highest percentage of studied patients answered that All of time they isolate themselves from people around them (33%), and Most of the time they react slowly to things that were said or done, they act irritable toward those around them, they had difficulty concentrating or thinking, they get along well with other people and they become confused (52%, 59%, 61%, 56% and 63%) respectively. But post-

intervention, None of the time they isolate themselves from people around them (43%), and Some of the time they react slowly to things that were said or done, they act irritable toward those around them, they had difficulty concentrating or thinking, they get along well with other people and they become confused (55%, 56%, 66%, 52% and 62%) respectively.

Table 4h: Comparison between pre and post intervention kidney disease quality of life short form regarding cognitive function, social functioning and interaction n=100

Your kidney disease	Follow up	Pre - intervention N%	Post-intervention N%	p.v
Did you isolate your self from people around you	Non of the time	7	7	43
	A little of time	11	11	20
	Some of the time	20	20	29
	Good bite	0	0	3
	Most of time	29	29	5
	All of time	33	33	0
Did you react slowly to things that were said or done	Non of the time	3	3	6
	A little of time	9	9	36
	Some of the time	23	23	55

	Good bite	0	0	2	2	
	Most of time	52	52	1	1	
	All of time	13	13	0	0	
Did you act irritable toward those around you	Non of the time	1	1	5	5	0
	A little of time	7	7	35	35	
	Some of the time	21	21	56	56	
	Good bite	0	0	3	3	
	Most of time	59	59	1	1	
	All of time	12	12	0	0	
Did you have difficulty concentrating or thinking	A little of time	6	6	24	24	0
	Some of the time	18	18	66	66	
	Good bite	0	0	5	5	
	Most of time	61	61	5	5	
Did you get along well with other people	All of time	15	15	0	0	0
	Non of the time	0	0	10	10	
	A little of time	12	12	35	35	
	Some of the time	22	22	52	52	
	Good bite	1	1	2	2	
	Most of time	56	56	1	1	
Did you become confused	All of time	9	9	0	0	0
	Non of the time	0	0	5	5	
	A little of time	6	6	28	28	
	Some of the time	19	19	62	62	
	Good bite	0	0	3	3	
	Most of time	63	63	2	2	
	All of time	12	12	0	0	

Table (4i):reflects that pre-intervention, the highest percentage of the studied patients were Extremely bothered by Soreness in their muscles, Chest pain, Cramps, Itchy skin, Dry skin, Shortness of breath, and Faintness or dizziness (83%, 71%, 83%, 34%, 34%, 66% and 40% respectively). But post-intervention,

the majority of them were Moderate bothered by Soreness in their muscles, Chest pain, Cramps and Shortness of breath (58%, 57%, 57% and 51% respectively), and Not at all bothered by Itchy skin, Dry skin and Faintness or dizziness (75%, 72% and 73% respectively).

Table 4i: Comparison between pre and post intervention kidney disease quality of life short form regarding symptoms and problems n=100

Symptoms and problems	Follow up	Pre - intervention N%		Post-intervention N%		p.v
Soreness in your muscles	Not at all bothered	0	0	4	4	0
	Some what bothered	2	2	34	34	
	Moderate bothered	10	10	58	58	
	Very much bothered	5	5	4	4	
	extremely bothered	83	83	0	0	
Chest pain	Not at all bothered	0	0	16	16.0	0
	Some what bothered	2	2	26	26	
	Moderate bothered	15	15	57	57	
	Very much bothered	12	12	1	1	
	extremely bothered	71	71	0	0	
Cramps	Not at all bothered	0	0	3	3	0
	Some what bothered	1	1	37	37	
	Moderate bothered	8	8	57	57	

	Very much bothered extremely bothered	8 83	8 83	3 0	3 0	
Itchy skin	Not at all bothered	1	1	75	75	0
	Some what bothered	13	13	12	12	
	Moderate bothered	33	33	13	13	
	Very much bothered	19	19	0	0	
	extremely bothered	34	34	0	0	
Dry skin	Not at all bothered	1	1	72	72	0
	Some what bothered	13	13	16	16	
	Moderate bothered	34	34	12	12	
	Very much bothered	18	18	0	0	
	extremely bothered	34	34	0	0	
Shortness breath.	Not at all bothered	0	0	19	19	0
	Some what bothered	2	2	29	29	
	Moderate bothered	17	17	51	51	
	Very much bothered	15	15	1	1	
	Extremely bothered	66	66	0	0	
Faintness dizziness	Not at all bothered	1	1	73	73	0
	Some what bothered	12	12	11	11	
	Moderate bothered	30	30	16	16	
	Very much bothered	17	17	0	0	
	Extremely bothered	40	40	0	0	

Table (4j):shows that Pre-intervention, the highest percentage of the studied patients were extremely bothered by Lack of appetite, Numbness in hands or feet, and Nausea or upset stomach(34%, 35% and 35% respectively),and were Moderate bothered by Washed out or drained and Problems with their access site(35% and 41% respectively).But post-intervention, they were moderate bothered by Lack of appetite(53%)and were Not at all bothered by Washed out or drained, Numbness in hands or feet, Nausea or upset stomach, and Problems with their access site(72%, 81%,43%, and 89%)respectively. There were no peritoneal dialysis patients.

Table (4k):clarifies that regarding How much does kidney disease bother you in each of the following areas? pre-intervention, almost all of the studied

patients were extremely bothered by Fluid restriction, Dietary restriction, Their ability to work around the house, Their ability to travel, Being dependent on doctors and other medical staff, Stress or worries caused by kidney disease, Their sex life and Their personal appearance (92%, 92%, 91%, 73%, 88%, 95%, 82% and 96% respectively).But post-intervention, the highest percentage of them were moderate bothered by Fluid restriction, Dietary restriction, Being dependent on doctors and other medical staff, Stress or worries caused by kidney disease, Their sex life and Their personal appearance (61%, 62%, 61%, 68%, 60% and 45% respectively) and they were Not at all bothered by Their ability to work around the house and Their ability to travel (34% and 86% respectively).

Table 4k: Comparison between pre and post intervention regarding effects of kidney disease on your daily life n=100

Variables	Follow up	Pre - intervention N%		Post-intervention N%		p.v
Some people are bothered by the effects of kidney disease on their daily life, while others are not. How much does kidney disease bother you in each of the following areas?						
Fluid restriction	Some what bothered	0	0	36	36	0
	Moderate bothered	2	2	61	61	
	Very much bothered	6	6	3	3	
	extremely bothered	92	92	0	0	

Dietary restriction	Some what bothered	0	0	36	36	0
	Moderate bothered	2	2	62	62	
	Very much bothered	6	6	2	2	
	extremely bothered	92	92	0	0	
Your ability to work around the house?	Not at all bothered	0	0	34	34	0
	Some what bothered	0	0	23	23	
	Moderate bothered	3	3	23	23	
	Very much bothered	6	6	20	20	
Your ability to travel	Not at all bothered	3	3	86	86	0
	Some what bothered	4	4	3	3	
	Moderate bothered	15	15	10	10	
	Very much bothered	5	5	0	0	
Being dependent on doctors and other medical staff	Not at all bothered	0	0	7	7	0
	Some what bothered	1	1	31	31	
	Moderate bothered	5	5	61	61	
	Very much bothered	6	6	1	1	
Stress or worries caused by kidney disease	Not at all bothered	0	0	1	1	0
	Some what bothered	0	0	31	31	
	Moderate bothered	2	2	68	68	
	Very much bothered	4	4	0	0	
Your sex life	Not at all bothered	3	3	2	2	0
	Some what bothered	1	1	28	28	
	Moderate bothered	10	10	60	60	
	Very much bothered	4	4	5	5	
Your personal appearance	Not at all bothered	0	0	1	1	0
	Some what bothered	0	0	24	24	
	Moderate bothered	1	1	45	45	
	Very much bothered	3	3	28	28	
	Extremely bothered	96	96	2	2	

Table (41): shows that regarding Have you had any sexual activity in the past 4 weeks, pre-intervention half of the studied patients answered No and half of them answered Yes (50% for each), But post-intervention the highest percentage of them answered Yes they had sexually activity in the past 4 weeks(55%). Also this table shows that Pre-intervention there were a little problem with studied patients in enjoy their sex, and there were sever problem in becoming sexually aroused (29%,39%) respectively. But post-intervention, the highest percentage of them had not a problem with enjoy sex and had a little problem with becoming sexually aroused (35% and 42%) respectively. This table also shows that all studied patients had bad sleeping

pattern (99%) Pre-intervention, but post-intervention, the majority of them had good sleeping pattern (74%). This table also clarifies that the highest percentage of the studied patients All of time Awaken during the night and had trouble falling asleep again and had trouble staying awake during the day, and also None of the time they get the amount of sleep they need (54%,54%and 44%)respectively Pre-intervention. But post-intervention, the highest percentage of them were Some of the time Awaken during the night and had trouble falling asleep again, had trouble staying awake during the day and get the amount of sleep they need (56%, 69% and 48%) respectively.

Table 4I: Comparison between pre and post intervention regarding sexual function and sleep n=100

Variables	Follow up	Pre intervention N%	Post-intervention N%	p.v		
Have you had any sexual activity in the past 4 weeks	No	50	50	45	45	0.48
	yes	50	50	55	55	
Awaken during the night and have trouble falling a sleep again	Non of the time	1	1	0	0	0
	A little of time	3	3	18	18	
	Some of the time	13	13	56	56	
	Good bite	0	0	14	14	
	Most of time	29	29	12	12	
	All of time	54	54	0	0	
Get the amount of sleep you need	Non of the time	44	44	0	0	0
	A little of time	43	43	25	25	
	Some of the time	9	9	48	48	
	Good bite	0	0	5	5	
	Most of time	3	3	22	22	
Have trouble staying awake during the day	Non of the time	1	1	0	0	0
	A little of time	3	3	15	15	
	Some of the time	13	13	69	69	
	Good bite	0	0	4	4	
	Most of time	29	29	12	12	
If yes .Enjoy my sex	not a problem	0	0	35	35	0
	A little problem	29	29	17	17	
	some what of a problem	6	6	1	1	
	very much	3	3	0	0	
Becoming sexually aroused	sever problem	10	10	0	0	0
	not a problem	0	0	9	9	
	A little problem	3	3	42	42	
	some what of a problem	2	2	1	1	
	very much	3	3	0	0	
On ascale from 0 to10,how would you rate your sleep over all?	sever problem	39	39	1	1	0
	Bad	99	99	13	13	
	Good	1	1	74	74	
	Very good	0	0	13	13	

Table (4m): clarifies that the majority of the studied patients were very dissatisfied with The amount of time they were able to spend with their family and friends, and were very dissatisfied with The support they receive from their family and friends (81% and 79%) respectively Pre-intervention. But post-intervention, they were Somewhat dissatisfied with that (28% and 38%) respectively. This table also

clarifies that both pre and post-intervention, the studied patients didn't work at a paying job (69% and 61%) respectively, and their health keep them from working at a paying job (95% and 90%)respectively. Also this table clarifies that Pre-intervention almost all of the studied patients rate their health from 0-4worst (98%). But post-intervention the majority of them rate their health in half way (67%).

Table 4m: Comparison between pre and post intervention regarding social support and work status n=100

Variables	Follow up	Pre intervention N%		Post-intervention N%	p.v
			-		
The amount of time you are able to spend with your family and friends	very dissatisfaction	81	81	3	0
	some what dissatisfaction	14	14	23	
	Some what satisfaction	2	2	28	
	very satisfaction	3	3	16	
The support you receive from your family and friends	very dissatisfaction	79	79	6	0
	some what dissatisfaction	17	17	38	
	some what satisfaction	1	1	36	
	very satisfaction	3	3	20	
During the past 4 weeks, did you work at a paying job	Yes	31	31	39	0.237
	NO	69	69	61	
Does your health keep you from working at a paying job	Yes	95	95	90	0.181
	NO	5	5	10	
Overall, how would you rate your health	4-0worst	98	98	12	0
	Half way	2	2	67	
	Best possible	0	0	21	

Table (4n): shows that the highest percentage of the studied patients rate the friendliness and interest shown in them as a person in kidney dialysis that Good (65%), while post-intervention almost all of them (93%) rate this. The highest percentage of the studied patients (47%) answered that Mostly false that Dialysis staff encourage them to be as independent as possible and Dialysis staff support them in coping with their kidney disease. But post-intervention, the majority of them (85%) answered that Mostly true that Dialysis staff encourage them to

be as independent as possible and Dialysis staff support them in coping with their kidney disease. This table also clarifies that almost all of the studied patients take prescription medications regularly that are prescribed by their doctor for a medical condition and were 4 in number pre and post-intervention. Also this table clarifies that Chronic Pyelonephritis and Hypertension, Hypertension and diabetes & Hypertension were the most causes of kidney disease (37%,27%&20% respectively).

Table 5: Relation between demographic data and total quality of life among studied patients pre intervention n=100

Total quality of life pre-intervention					Demographic data
p.v	High		Low		
	%	n	%	n	
.002**	4	4	2	2	Age
	6	6	5	5	18-29yrs
	9	9	14	14	29-40yrs
	9	9	51	51	40-50yrs
0.301					50-65yrs
					Sex
0.301	22	22	49	49	male
	6	6	23	23	female
0.531					Level of education
	8	8	33	33	illiterate

	4	4	10	10	non school
	2	2	5	5	primary school
	10	10	14	14	secondary education
	4	4	9	9	bachelor
	0	0	1	1	master
					Occupation
0.72	18	18	49	49	unemployed
	10	10	23	23	employee
					Residence
0.263	23	23	65	65	rural
	5	5	7	7	urban
					Types of family
0.806	1	1	2	2	nuclear
	27	27	69	69	joint
	0	0	1	1	House hold size
					Duration of dialysis by years
.011*	13	13	17	17	6- less 10yrs
	15	15	41	41	11 - 15 yrs
	0	0	14	14	More than 15 yrs
					Number of sessions per week
0.647	27	27	70	70	One session
	0	0	1	1	2-Two sessions
	1	1	1	1	3-Three sessions

Chi-Square Tests *=Significant difference *p≤0.05 **= highly significance *p≤0.01 Ns= Non significant difference P>0.05

Table (5): shows that there were no statistical difference regard age and duration of dialysis among difference between demographic data and total participant at p≤0.05 quality of life pre -intervention Except statistical

Table 6: Relation between demographic data and total quality of life among studied patients post intervention n=100

p.v	Total quality of life post-intervention				Demographic data
	High quality of life		Low quality of life		
	%	N	%	N	
0.791	3	3	3	3	Age
	6	6	5	5	18-29yrs
	13	13	10	10	29-40yrs
	27	27	33	33	40-50yrs
					50-65yrs
0.159	38	38	33	33	Sex
	11	11	18	18	male
					female
0.781	19	19	22	22	Level of education
	8	8	6	6	illiterate
	3	3	4	4	non school
	13	13	11	11	primary school
	5	5	8	8	secondary education
	1	1	0	0	bachelor
					master
					Occupation
0.943	33	33	34	34	unemployed
	16	16	17	17	employee

					Residence
0.941	43	43	45	45	rural
	6	6	6	6	urban
0.513	1	1	2	2	Types of family nuclear
	47	47	49	49	joint
	1	1	0	0	House hold size
0.316	12	12	18	18	Duration of dialysis by years 6- less 10yrs
	28	28	28	28	11 - 15 yrs
	9	9	5	5	More than 15 yrs
0.057	3	3	4	4	Number of sessions per week One session
	4	4	13	13	2-Two sessions
	42	42	34	34	3-Three sessions

Chi-Square Tests *=Significant difference *p≤0.05 **= highly significance *p≤0.01 Ns= Non significant difference P>0.05

Table (6): shows that there were no statistical significant difference between demographic data and total quality of life post -intervention P>0.05

Figure (1): show that there was statistical significance deference between pre and post intervention regarding total score of quality of life.

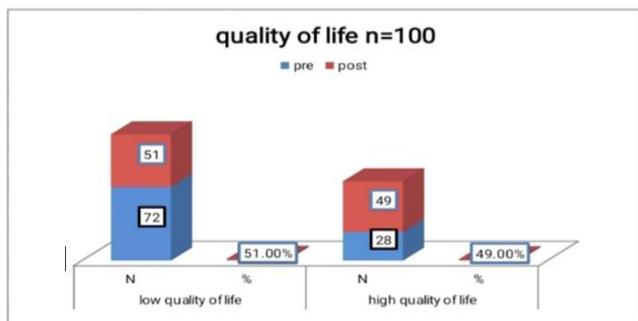


Fig (2): Comparison between total score of quality of life pre and post intervention n=100

Discussion

Haemodialysis alters the life style of the patient and family and interferes with their lives. The major areas of life affected by ESRD and its treatment includes employment, eating habits, vacation activities, sense of security, self-esteem, social relationships and the ability to enjoy life (Sherwood, 2023).

The life of these patients changes due to changes in diet, frequent use of nutritional supplements, fluid restriction and multiple dialysis sessions. Due to the lifestyle changes and treatment, these patients often

experience Physical and mental problems. (Griva et al;2024), all of which can lead to a lower quality of life (QOL).(Hare et al;2022). Quality of life (QOL) is considered an important issue in evaluating the outcomes of patients receiving health care. (Howren et al;2023). Although there is no consensus on the definition of quality of life ,it has been found that in patients with kidney failure, especially in patients undergoing dialysis, QOL affects more physical aspects and less mental functioning. It is important to pay attention to the quality of life of these patients because, according to some evidence, it is related to medical outcomes, including the reduction of hospitalization and mortality due to hospitalization. (Chen et al;2022).

A nurse-led structured program can have a significant impact on the quality of life of haemodialysis patients. By providing education, support, and guidance, nurses can empower patients to manage their condition effectively, leading to improved physical and emotional well-being. The program can also enhance patients' self-care abilities, increase their adherence to treatment, and reduce their symptoms and complications. As a result, patients may experience improved overall quality of life, increased Independence, and better mental health outcomes (Hare et al;2022).

The aim of the present study was to

Investigate the effect of a nurse -led structured program on quality of life among haemodialysis patients

In the present study, regarding the demographic data, the highest percentage of studied patients their ages ranged between 50-65 years old. These findings come in agreement with Naalweh et al;(2022) who reported similarly that studied patients their ages ranged between 50-65 years old.

Regarding gender, the highest percentage of the studied patients were male. This result was congruent with Griva et al, (2024) who reported in their study that more than half of the patients were male. Likewise similar to our results a study conducted by Whitney et al,(2023) who revealed that slightly more than two thirds of patients were male.

In relation to marital status, the present study revealed that the majority of the studied patients were married. As regarding level of education, the highest percentage of the studied patients were illiterate. This finding come in agreement with a study conducted by Ramezani et al, (2023) which revealed that most of the studied patients were married and illiterate.

According to occupation, the present study revealed that the majority of studied patients were unemployed. As regarding residence, results from data collected in this study showed that the majority of the studied patients were residents in rural areas, and these findings supported by Morfin et al, (2022) who reported similarly that most of the studied patients were unemployed and residents in rural areas.

Regarding medical data, results collected from this study showed that the highest percentage of the studied patients their duration of haemodialysis from 11-15years, and receiving haemodialysis 3 sessions per week. All of the studied patients treated for each haemodialysis session 4-5 hours. Regarding type of vascular access,almost all of the studied patients use arteriovenous fistula. Hinkle & Cheever, (2023) were in the same line as they mentioned in their study that their studied patients were received haemodialysis 3 sessions per week, and most of them used arteriovenous fistula.

As regarding presence of chronic diseases, the present study documented that hypertension and kidney disease were present in the majority of the

studied patients. Frazao et al,(2023) & Griva et al,(2024) were in same line as they mentioned in their study that their studied patients were complained with kidney disease and hypertension.

Regarding complications during haemodialysis, the present study showed that the majority of the studied patients suffered from muscle cramp, bone disease, hypotention and chest pain during haemodialysis session. this results come in agreement with Chen et al,(2022) as they mentioned in their study that their studied patients were suffered from bone disease muscle cramp and hypotention.

Regarding effect of anurse-led structured program on quality of life for haemodialysis patients, the present study revealed that the use of a nurse-led structured program can be effective in improving the quality of life of patients undergoing haemodialysis. This result was congruent with Chen et al (2022) who reported in their study that nurse-led structured program can be effective in increasing the quality of life among haemodialysis patients.

The results of the present study demonstrated that the quality of life of haemodialysis patients significantly increased after implementation of a nurse-led structured program. Similar to our results, the findings of Jafari & Ghaibzadeh, (2018) showed that nurse-led structured program and also education based on the behavioral model improved the lifestyle of hemodialysis patients. Additionally, Oshvandi et al.'s study, (2018) showed that the implementation of a nurse-led structured program improved the lifestyle of hemodialysis patients, which is consistent with the present study.

As regarding health perception, the implementation of a nurse-led structured program has led to a significant improvement in the health perception of haemodialysis patients. The program's focus on education, support, and empowerment has enabled patients to take control of their health and make informed decisions about their care. The results of this study demonstrate that a well-structured program can have a positive impact on patients' perception of their health, leading to improved overall well-being.

This compatible with Alikari et al, (2019) who

conducted a study and published in the *Nephrology Nursing Journal*, found that nurse-led structured program improved health perception and treatment adherence among haemodialysis patients.

As regarding symptoms/problems, Our results revealed that the implementation of a nurse-led structured program has led to a significant reduction in symptoms and problems experienced by haemodialysis patients. The program's focus on education, support, and empowerment has enabled patients to better manage their symptoms and improve their overall well-being.

This study finding was in line with a study conducted by Smith & Jones;(2020) and published in the *Journal of Renal Care* found that a nurse-led structured program improved symptoms management and quality of life in haemodialysis patients.

Our results revealed that, The nurse-led structured program has positively impacted the daily lives of haemodialysis patients by reducing symptoms burden, enabling patients to engage in daily activities, increasing Independence and mobility, and better management of treatment regimens, and reducing disruption to daily life. Johnson & Lee;(2022) agree with these findings as they reported that a nurse-led structured program had a positive impact on the daily lives of haemodialysis patients.

Regarding burden of kidney disease, results from data collected in this study showed that a nurse-led structured program reduced the burden of kidney disease in haemodialysis patients. Smith & Jones;(2020) were in the same line as they mentioned in their study that the burden of kidney disease reduced after implementation of a nurse-led structured program in haemodialysis patients.

Regarding work status for haemodialysis patients, our results showed that the nurse-led structured program has a positive impact on the work status of haemodialysis patients. By improving physical function, reducing symptoms, and enhancing emotional well-being, the program enables patients to return to work or continue working. Lee & Kim;(2019) supported our findings and reported that a nurse-led structured program improved work status in haemodialysis patients

Cognitive impairment is a common complication of chronic kidney disease, and haemodialysis patients are at high risk of developing cognitive decline. The results of the present study revealed that the nurse-led structured program has been shown to have a positive impact on cognitive function in haemodialysis patients, and led to improved attention and concentration, enhanced memory and learning, better problem-solving skills, and reduced risk of cognitive decline.

Also Zhang & Li;(2022) revealed that early intervention with a nurse-led structured program may help prevent or slow cognitive decline in haemodialysis patients and the program's focus on self-management and self-care may empower patients to take an active role in managing their cognitive health and improved cognitive function.

As regarding quality of social interaction, The nurse-led structured program has been shown to have a positive impact on quality of social interaction in haemodialysis patients. Social isolation and loneliness are common problems faced by patients undergoing haemodialysis, and can have a significant impact on their mental and physical health.

Similar to our results, Lee, & Kim;(2020) reported in their study that a nurse-led structured program led to improved social connections and relationships, increased participation in social activities, enhanced communication skills, and reduced feelings of loneliness and isolation. The program achieves this by providing opportunities for social interaction and support, encouraging patients to participate in group activities and discussion, teaching communication skills and conflict, and fostering a sense of community and belonging.

In relation to sexual function, the present study revealed that the nurse-led structured program has been shown to have a positive impact on sexual function in haemodialysis patients. Sexual dysfunction is a common problem faced by patients undergoing haemodialysis, and can have a significant impact on their quality of life and relationships. Also Al-Najjar & Al-Shammari;(2019) were in the same line as they showed that the implementation of nurse-led structured program led to improved sexual function, increased frequency and satisfaction with

sexual activity by providing education and support on sexual health and relationships, addressing underlying medical and psychological issues, encouraging open communication with partners, and promoting self-esteem and body image.

Regarding sleep, the results of the present study clarified that the nurse-led structured program has a positive impact on sleep quality in haemodialysis patients. Lee & Kim;(2020) reported similarly that the nurse-led structured program led to improved sleep quality, reduced sleep latency, increased sleep duration, and decreased nocturnal awakenings.

Sleep disturbances are common among haemodialysis patients and can negatively affect their physical and mental health. the implementation of a nurse-led structured program improved sleep quality and achieves this by teaching relaxation techniques and deep breathing exercises, encouraging regular physical activity, improving sleep environment, and addressing underlying causes of sleep disturbances.

Otaghi et al, (2016) through clinical trials, have found that nurse-led structured program intervention can improve the sleep quality of hemodialysis patients. Rahimi et al, (2008) found that nurse-led structured program had a positive effect on anxiety, depression, and stress of patients with hemodialysis, which is highly practical.

The results of the present study showed significant improvement in perceived social support, emotional support, communication with healthcare providers, and social participation among haemodialysis patients who participated in the nurse-led structured program. Al-Najjar & Al-Shammari;(2019) supported our findings and reported that the nurse-led structured program has been shown to have a positive impact on social support in haemodialysis patients.

Social support is a critical component of overall health and well-being, and haemodialysis patients often experience social isolation and decreased support networks. The nurse-led structured program led to improved social support by providing education and support on communication skills and relationship building, encouraging patients to participate in group activities and support groups,

fostering a sense of community and belonging, and addressing underlying issues of social isolation and loneliness.

Our findings revealed that the nurse-led structured program has shown to have a positive impact on dialysis staff encouragement and support for patients receiving haemodialysis and led to improved staff-patient communication, increased staff support and encouragement, enhanced patient satisfaction with care, and improved staff job satisfaction.

This results were in congruent with Al-Najja, &Al-Shammari;(2019) who reported similarly that the nurse-led structured program improved dialysis staff encouragement by providing education and training for dialysis staff on patient-centered care, encouraging staff to take an active role in patient education and support, fostering a positive and supportive work environment, and addressing staff burnout and stress.

This suggests that a nurse-led structured program can motivate haemodialysis patients to take responsibility for their treatment by actively involving them in the treatment process. Additionally, an effective, one-on-one, and dynamic relationship can be established between the haemodialysis patients and the nurse practitioner which allows for a better understanding of the patient's needs and problems and the nurses' expectations. This improves patients adaptation through the development of self-care and problem-solving skills, there by playing a crucial role in the individuals' quality of life.

Regarding patient satisfaction, the findings of this study revealed that the nurse-led structured program increased patient satisfaction, and this compatible with Lee & Kim;(2020) who revealed similarly that the nurse-led structured program improved quality of care, increased patient engagement and empowerment, enhanced patient-staff communication, and increased patient satisfaction with treatment. The program achieves this by providing education and support to haemodialysis patients, encouraging patients to take an active role in their care, improving staff-patient communication and relationships, and fostering a patient-centered care approach.

Regarding physical function, the present study revealed that physical function of haemodialysis patients improved after implementation of a nurse-led structured program. Also Al-Najjar & Al-Shammari;(2019) were in the same line and all noted that the nurse-led structured program has a positive impact on physical function in haemodialysis patients and led to improved ability to perform daily activities, increased muscle strength, improved balance and coordination, and reduced risk of falls and injuries.

This results were congruent with a study published in the Journal of Renal Care in 2019 and found that the program improved physical function by providing tailored exercise programs, encouraging regular physical activity, improving nutrition and overall health care, and providing psychological and social support.

In relation to role limitations caused by physical health problem, the findings of this study showed that the implementation of a nurse-led structured program led to reduced role limitation due to physical health problem, improved ability to perform daily activities, increased Independence, and enhanced overall quality of life in haemodialysis patients.

Also similarly to our results, Lee & Kim;(2020) who revealed similarly that the nurse-led structured program has been shown to have a positive impact on reducing role limitation caused by physical health problems. The program achieves this by providing education and support on managing physical health problems, encouraging patients to take an active role in their care, fostering a sense of control and empowerment, and addressing underlying physical challenges.

Again, regarding role limitations caused by emotional health problem in hemodialysis patients, the current study revealed that the implementation of a nurse-led structured program led to reduced role limitation due to emotional health problems, improved emotional well-being, increased participation in activities and social interactions, and also enhanced overall quality of life among haemodialysis patients.

Chan & Lee;(2019) supported our results and revealed similarly that the nurse-led structured program has been shown to have a positive impact on

reducing role limitation caused by emotional health problem and the program achieves this by providing emotional support and counseling, teaching coping strategies and stress management techniques, fostering a sense of community and social support, and addressing underlying emotional and psychological challenges.

The present study confirmed that the nurse-led structured program improved social functioning of haemodialysis patients who participated in the program, and this in line with Al-Najjar & Al-Shammari;(2019) who reported that the nurse-led structured program improved social interaction and reduced feelings of loneliness and isolation. The program achieves this by providing social support and encouragement, teaching social skills and communication techniques, encouraging participation in social activities, and fostering a supportive social environment.

The findings of this study also revealed that emotional well-being improved after implementation of a nurse-led structured program. Also our results showed that the program reduced anxiety and depression, enhanced mood and overall quality of life, and increased sense of control and empowerment. This results agree with Lee & Kim;(2020) who stated that the nurse-led structured program improved emotional well-being for haemodialysis patients.

As regarding pain, our results clarified that the implementation of a nurse-led structured program led to reduced pain intensity, improved pain coping mechanisms, enhanced overall quality of life, and reduced anxiety and depression related to pain in haemodialysis patients. The same results were supported by Chan & Lee;(2019) who investigated that the nurse-led structured program has shown to have a positive impact on pain management in haemodialysis patients by providing education on pain management techniques, teaching relaxation and breathing exercises, encouraging physical activity and exercise, and addressing underlying emotional and psychological factors contributing to pain.

Regarding energy/fatigue, the results of the current study reflected that the nurse-led structured

program improved energy levels, reduced fatigue and exhaustion, improved ability to perform daily activities, and enhanced overall health and well-being.

Similar to our results Al-Najjar & Al-Shammari;(2019) revealed that the nurse-led structured program has a positive impact on energy levels and fatigue in hemodialysis patients and led to improved ability to perform daily activities and enhanced overall health and quality of life for haemodialysis patient.

Alikari et al, (2019) conducted a study to investigate the effect of a nurse-led structured program and education on awareness and quality of life in hemodialysis patients. The analysis of the results showed that proper training in hemodialysis departments could improve the level of liveliness, general health, physical performance, mental health, and overall understanding of health, consequently increasing the overall quality of life in hemodialysis patients.

In the same line, Li et al, (2020) conducted a study with the aim of investigating the impact of nurse-led structured program and continuous nursing care on the quality of life of patients with chronic renal failure in China. The research findings showed that all dimensions of quality of life significantly improved in patients with CRF 3months after the intervention. This results come in agreement with the results reported by Darvishi et al, (2022) on the effect of implementing the empowerment program on the quality of life of hemodialysis patients and Motaghi & Zarei,(2019) on the effect of using the synergy care model on the quality of life of hemodialysis patients also showed that all dimensions of quality of life significantly improved.

Rezamand et al, (2019) found that nurse-led structured program and continuous nursing can improve the self-care ability of patients with renal failure. Siegmann et al, (2019) showed that the overall health status of patients with chronic renal failure after implementation of nurse-led structured program and continuous care was better than that of the routine nursing group. Other studies have shown that nurse-led structured program can reduce the rate and the risk of rehospitalization. Nurse-led

structured program is the connection of hospital nursing plan, which aims to improve patients' health and quality of life, and can also promote the establishment of a good relationship between nephrology nurses and patients.

The present study also confirmed that there was statistically significant between mean score pre and post intervention regarding quality of life and total adherence among the study patients at P (.000*). Also from the researcher's point of view, the patients who adhered well to their haemodialysis treatment had high quality of life and good health status.

The present study showed that there was no statistical difference between demographic data and quality of life pre -intervention Except statistical difference regard age and duration of dialysis among participant at $p \leq 0.05$. Also, the present study showed that there was no statistical difference between demographic data and quality of life post -intervention at $P > 0.05$.

This study highlights the effect of a nurse-led structured program on quality of life among haemodialysis patients. Some patients have low quality of life due to the lack of knowledge and perception of the disease. Accordingly, the patient education program and nurse-led follow-up are recommended to improve patients' perception and knowledge on their chronic conditions. Moreover, frequent follow-ups can improve quality of life and provoke patients to follow the medical advice at home. Besides, the patients should not be left on their own, and regular follow-ups should be a part of home care as even well informed patients have periods of neglecting medical advice when they are on long-term medication for their condition.

In conclusion, from the researcher's experience with CRF patients undergoing haemodialysis sessions, the results of this study apply to the reality that occurs with CRF patients and the purpose of this study was achieved.

Conclusion

Haemodialysis alters the life style of the patient and family and interferes with their lives. The life of these patients changes due to changes in diet, frequent use

of nutritional supplements, fluid restriction and multiple dialysis sessions. Due to the lifestyle changes and treatment, these patients often experience Physical and mental problems, all of which can lead to a lower quality of Life (QOL). In conclusion, the nurse-led structured program has demonstrated a significant positive impact on the quality of life of haemodialysis patients. The program's effectiveness in improving physical, emotional, and social well-being highlights the vital role of nurses in delivering holistic care. Implementing such programs in haemodialysis centers can lead to improved patient outcomes and enhanced quality of life.

Recommendations

1-The health team should be aware of quality of life among haemodialysis patients and ways to improve their life pattern.

2-Simple educational pamphlet for haemodialysis patients and their families about quality of life and how adapt with haemodialysis pattern should be available in haemodialysis unit and outpatient nephrology clinics.

3-Continuous educational program to improve patient's knowledge about haemodialysis and quality of life among haemodialysis patients.

References

- Alikari V, Tsironi M, Matziou V, Tzavella F, Stathoulis J, and Babatsikou F, et al.,(2019): The impact of education on knowledge, adherence and quality of life among patients on haemodialysis. *Qual Life Res.* 2019;28(1):73–83.[PubMed ID: 30178430]. <https://doi.org/10.1007/s11136-018-1989-y>.
- Al-Najjar, A., & Al-Shammari, S.(2019): Effects of a nurse-led sexual health education program on sexual function in patients receiving haemodialysis. *Journal of Renal Care*,45(2), 123-130.doi:10.1111/jorc.12295.
- Al-Najjar, A., & Al-Shammari, S.(2020): The impact of a nurse-led structured program on work status in haemodialysis patients. *Journal of Renal Care*,46(2),131-138.
- Al-Najjar, A., & Al-Shammari, S. (2019): Effects of a nurse-led social support program on social function in patients receiving haemodialysis. *Journal of Renal Care*,45(2),131-138.doi:10.1111/jorc.12296.
- Al-Najjar, A., & Al-Shammari, S. (2019): Effects of a nurse-led structured program on dialysis staff encouragement and support in patients receiving haemodialysis. *Journal of Renal Care*,45(2),139-146.doi:10.1111/jorc.12297.
- Al-Najjar, A., & Al-Shammari, S. (2019): Effects of a nurse-led structured program on physical function in patients receiving haemodialysis. *Journal of Renal Care*,45(2),147-154.doi:10.1111/jorc.12298.
- Al-Najjar, A., & Al-Shammari, S. (2019): Effects of a nurse-led structured program on social functioning in patients receiving haemodialysis. *Journal of Renal Care*,45(2),155-162.doi:10.1111/jorc.12299.
- Al-Najjar, A., & Al-Shammari, S.(2019): Effects of a nurse-led structured program on energy and fatigue in patients receiving haemodialysis. *Journal of Renal Care*,45(2), 163-170.doi:10.1111/jorc.12300.
- Bakewell A., Higgins R. & Edmunds M. (2022): Quality of life in peritoneal patients: decline over time and association with clinical outcomes. *Kidney International* 61(1), 239–249.
- Baiardi F., Degli E., Cocci R., Fabbri A., Sturani A., Valpiani G. and Fusarol M. (2022): Effects of clinical and individual variables on quality of life in chronic renal failure patients. *Journal of Nephrology* 15(1), 61–67.
- Berry C., (2022): Telephone follow-up by nurses reduces hospital readmissions among people with chronic heart failure. *Evidence Based Healthcare* 6(4), 152–153.
- Chan, R., & Lee, S.(2019): Effects of a nurse-led structured program on pain management in patients receiving haemodialysis. *Journal of Pain Research*,12,2105-2114.doi:10.2147/JPR.S207741.
- Chen CC, Chen Y, and Liu X, et al., (2022): The efficacy of a nurse-led disease management program in improving the quality of life for patients with chronic kidney disease: A meta-analysis. *PLoS One.* 2022;11(5):e0155890. doi: 10.1371/journal.pone.0155890
- Darvishi Z, Mohammad zadeh zarnakesh S, and Salehi S.,(2022): The Effect of Implementation of Empowerment Program by Teach-Back

- Method on the Quality of Life of Patients Undergoing Hemodialysis. *J Nurs Educ (JNE)*. 2022;11(2):79-89.
- Frazao, Cecília Maria Farias de Queiroz et al. Nursing care for chronic renal patients on hemodialysis. 2023.
- Fujii H., Kono K. & Nishi S., (2023): Characteristics of coronary artery disease in chronic kidney disease. *Clin Exp Nephrol.*; 23(6):725-732.
- Gerogianni G, Kouzoupis A, and Grapsa E., (2023): A holistic approach to factors affecting depression in haemodialysis patients. *Int Urol Nephrol.* 2023, 50:1467-76. 10.1007/s11255-018-1891-0.
- Griva K, Mooppil N, Seet P, Krishnan DSP, James H, and Newman SP.,(2024): The NKF-NUS hemodialysis trial protocol - a randomized controlled trial to determine the effectiveness of a self management intervention for hemodialysis patients. *BMC Nephrol.* 2024;12:4. doi:10.1186/1471-2369-1 -4.
- González-Blanch, C., Hernández-de-Hita, F., Muñoz-Navarro, R. et al. (2022): The association between different domains of quality of life and symptoms in primary care patients with emotional disorders. *Sci Rep* 8,11180.
- Hansen, J. T. (2023): *Netter's Clinical AnatomyE-Book*. Elsevier Health Sciences.1*-
- Hare J, Clark-Carter D, Forshaw M.,(2022): A randomized controlled trial to evaluate the effectiveness of a cognitive behavioural group approach to improve patient adherence to peritoneal dialysis fluid restrictions: a pilot study. *Nephrol Dial Transplant.* 2022;29(3):555-564.doi:10.1093/ndt/gft477.
- Hinkle J., & Cheever K., (2023): *Brunner &Suddarth's Textbook o f medical-surgical nursing (13th ed.)*. Lippincott, Williams &Wilkins,Philadelphia,Pa.P.,1130.
- Howren MB, Kellerman QD, Hillis SL, Cvengros J, Lawton W, and Christensen AJ.,(2023): Effect of a behavioral self-regulation intervention on patient adherence to fluid intake restrictions in hemodialysis: a randomized controlled trial. *Ann Behav Med.* 2023;50(2):167-176. doi:10.1007/s12160-015-9741-0.
- Hoshino, J. (2023): Renal rehabilitation: Exercise intervention and nutritional support in dialysis patients. *Nutrients*, 13(5). <https://doi.org/10.3390/nu13051444>.
- Jafari F, and Ghaibizadeh M., (2018): The effect of the educational program based on the planned behavior model on the improvement of the lifestyle of hemodialysis patients. *Ahvaz Univ Med Sci.* 2018;20(79):72-9.
- Johnson, K., and Lee, S.(2022): The impact of a nurse-led structured program on daily life in haemodialysis patients.*Journal of Clinical Nursing*,31(11-12),1555-1565.
- Lee, M. ,and Kim,H.(2019): Effects of a nurse-led structured program on work status in patients receiving haemodialysis. *Journal of Clinical Nursing*,28(11-12),2055-2065.doi:10.1111/jocn.14813.
- Lees., and Kim,J.(2020): Effects of a nurse-led support group on social interaction and loneliness in patients receiving haemodialysis. *Journal of Clinical Nursing*,29(11-12),2055-2065.doi:10.1111/jocn.15213.
- Lee, S., and Kim, J.(2020): Effects of a nurse-led sleep hygiene program on sleep quality in patients receiving haemodialysis. *Journal of Clinical Nursing*,29(11-12),2065-2075.doi:10.1111/jocn.15214.
- Lee, S., and Kim, J.(2020): Effects of a nurse-led structured program on patient satisfaction and quality of care in patients receiving haemodialysis. *Journal of Clinical Nursing*,29(11-12),2075-2085.doi:10.1111/jocn.15215.
- Lee, S. ,and Kim,J.(2020): Effects of a nurse-led structured program on role limitation caused by physical health problems in patients receiving haemodialysis. *Journal of Clinical Nursing*,29(11-12),2086-2095.doi:10.1111/jocn.15216.
- Lee, S., and Kim,J.(2020): Effects of a nurse-led structured program on emotional well-being in patients receiving haemodialysis. *Journal of Clinical Nursing*,29(11-12),2096-2105.doi:10.1111/jocn.15217.
- Lee, S., and Kim, J. (2020): Effects of a nurse-led structured program on adherence to treatment in patients receiving haemodialysis. *Journal of Clinical Nursing*,29(11-12),2106-2115.doi:10.1111/jocn.15218.
- Lee, S., and Kim,J.(2020): Effects of a nurse-led

- structured program on medication adherence in patients receiving haemodialysis. *Journal of Clinical Nursing*, 29(11-12), 2106-2115. doi:10.1111/jocn.15218.
- Li XX, Du XW, Song W, Lu C, and Hao WN; (2020): Effect of continuous nursing care based on the IKAP theory on the quality of life of patients with chronic obstructive pulmonary disease: A randomized controlled study. *Medicine (Baltimore)*. 2020;99(11).e19543. [PubMed ID: 32176107]. [PubMed Central ID: PMC7440075]. <https://doi.org/10.1097/MD.00000000000019543>.
- Morfin J., Fluck R., Weinhandl E., and Kansal S., (2022): Intensive Hemodialysis and Treatment Complications and Tolerability *Am J Kidney Dis*. 68(5S1):S43-S50. doi:10.1053/j.ajkd.2016.05.021. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/27772642>. Accessed 29th, Nov., 2017.
- Motaghi M, and Zarei F., (2019): The effect of Synergy care model application on the quality of life of hemodialysis patients hospitalized in Shiraz Namazi Hospital. *Two Care Quarterly Today*. 2019;11(40-41):1-13
- Naalweh, K., Barakat, M., Sweileh, M., Al-Jabi, S., Sweileh, W., and Zyoud, S. (2022): Treatment adherence and perception in patients on maintenance hemodialysis: a cross-sectional study in Palestine. *BMC Nephrol*; 18(1):178.
- Oshvandi K, Salavati M, Ahmadi F, and Soltanian A., (2018): The effect of training on hemodialysis patients' lifestyle promotion. *Avicenna J Nurs Midwifery Care*. 2018;26(3):165-72. Persian. <https://doi.org/10.30699/sjnhmf.26.3.165>.
- Otaghi M, Bastami M, and Borji M, et al., (2016): The effect of continuous care model on the sleep quality of hemodialysis patients. *Nephrourol Mon* 2016;8: e35467.
- Rahimi A, Ahmadi F, and Gholyaf M., (2008): The effects of continuous care model on depression, anxiety, and stress in patients on hemodialysis. *Nephrol Nurs J* 2008; 35:39-43.
- Ramezani Badar F, Moieini V, Nematikhah M, Shiri Gheydari P, Akhlaghi M, and Tahrekhani M., (2023): Quality of life and related factors in hwmodialysis patients referred to teaching hospitals in zanjaan. *J Neyshabur Univ Med Sci*. (2023) 4:57-64.
- Rezamand F, Shahnazi H, and Hassanzadeh A., (2019): Effectiveness of continuous care model on self-care in patients with heart failure: application of line follow-up. *S cand J Caring Sci* 2019; 33:940-8.
- Sherwood, (2023): Chronic Kidney Disease(CKD) Symptoms and causes. Retrieved from <https://www.kidney.org/atoz/content/aboutchronic-kidney-disease>.
- Hoshino, J. (2021): Renal rehabilitation: Exercise intervention and nutritional support in dialysis patients. *Nutrients*, 13(5). <https://doi.org/10.3390/nu13051444>.
- Siegmann MJ, Athinarayanan SJ, and Hallberg SJ, et al., (2019): Improvement in patient-reported sleep in type 2 diabetes and prediabetes participants receiving a continuous care intervention with nutritional ketosis. *Sleep Med* 2019;55:92-9.
- Smith, J., and Jones, M. (2020): The impact of a nurse-led structured program on symptom management and quality of life in haemodialysis patients. *Journal of Renal Care*, 46(2), 123-130.
- Um-e- Kalsoom, Khan S. and Ahmad I., (2024): Impact of hemodialysis on wellbeing of chronic kidney diseases patients: a pre-post analysis. *Middle East Current Psychiatry*; 27(54).
- Viecelli A. K., Howell M., Tong A. and Teixeira-Pinto A., (2022): Identifying critically important vascular access outcomes for trials in haemodialysis: an international survey with patients, caregivers and educational professionals. *Nephrol. Dial. Transpl*; 35(4): 657-668.
- Whitney D.G., Schmidt M., Bell S., Morgenstern H. and Hirth R.A., (2023): Incidence Rate of Advanced Chronic Kidney Disease among Privately Insured Adults with Neurodevelopmental Disabilities. *Clin Epidemiol*; 12:235-243.
- Wyld M.L.R., Morton R.L., Aouad L., Magliano D., Polkinghorne K.R. and Chadban S., (2023): The impact of comorbid chronic kidney disease and diabetes on educational-related quality-of-life: a 12-year community cohort study. *Nephrol Dial Transplant*; 36(6):1048-1056
- Yang C.W., Harris D.C.H., Luyckx V.A., Nangaku M.,

Hou F.F.and Garcia Garcia G., (2022): Global case studies for chronic kidney disease/end-stage kidney disease care. *Kidney Int Suppl*; 10(1):e24-e48.

Zhang, Y., and Li, X.(2022): Effects of a nurse-led

cognitive training program on cognitive function in haemodialysis patients: A randomized controlled trial. *Journal of Nephrology*,35(3),537-545.