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Research Article

Effectiveness of Nursing Intervention Strategies on Physiological and Psychosocial Problems among Patients with Chronic Kidney Disease in Selected Hospital of Kashmir

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A B S T R A C T

Background: Chronic Kidney Disease (CKD) is a worldwide serious condition associated with increased premature mortality, decreased quality of life and increased health-care expenditures. Learning about issues such as: disease process, strict adherence to renal diet, exercises and relaxation therapies in addition to adherence the medical treatment have helped chronic kidney disease patients to self regulate and improve their physical and social functioning. With this background the investigator got strongly convinced to design some evidence based 'Nursing intervention strategies' for CKD patients through clinical research to alleviate their sufferings with better clinical outcomes.

Methodology: A quasi-experimental study based upon two group pre-test post-test control group design was conducted on 200 adult chronic kidney disease patients (100=experimental group and 100=control group) with an aim to evaluate the effectiveness of 'Nursing intervention strategies' in improving their physiological and psychosocial problems in nephrology ward of a tertiary care hospital of Jammu and Kashmir i.e. Sher-i-Kashmir Institute of Medical Sciences (SKIMS) from 5th March 2012 to 31st July 2013.

Result: The findings revealed that the subjects in experimental group who received the 'Nursing Intervention Strategies' for two weeks within hospital as well as at home till first follow up visit had shown a significant ($p \leq 0.05$) improvement in 9 health problems, 11 biochemical parameters, 5 physiological parameters and 2 psychosocial parameters than the subjects in control group who reported improvement in: only 6 health problems; 5 biochemical parameters and 3 physiological parameters.

Conclusion: It can be concluded that 'Nursing Intervention Strategies' such as: Dietary advice, progressive muscle relaxation, deep breathing, leg massaging, leg elevation and talk therapy were effective in reducing the magnitude of physiological and psychosocial problems among chronic kidney disease patients. However the long term efficacy of these strategies needs to be investigated.

Keywords: Chronic Kidney Disease, Nursing Intervention Strategies, Physiological Problems, Psychosocial Problems

Introduction

Kidney disease as a global health problem and 9th leading cause of death in the United States with increasing incidence of hypertension, diabetes and aging corresponding approximately to 26.3 million people. It is a worldwide public health problem with an increasing incidence and prevalence, poor outcomes, and high cost. Diabetes mellitus and hypertension are the leading causes of kidney diseases which can be controlled by life style modification.[1] As disease progresses, the patient gets overburdened with various physiological and psychosocial discomforts which make them physically, psychologically and socially morbid and dependent.[2] There is need for non-pharmacological intervention to address all these discomforts as an adjunct to the normal routine care and pharmacological intervention. Various studies have reported that learning about issues such as: disease process, strict adherence to renal diet, exercises and drug therapy have helped chronic kidney disease patients to manage their lifestyles, to self-regulate and improve their physical and social functioning.[1-7]

Need for the Study

There are many medical studies which have been conducted on patients with chronic renal failure within Kashmir valley but as such no nursing study related to non-pharmacological intervention for chronic kidney disease patients has been reported so far in the valley. With this background the investigator got strongly convinced to design some evidence based 'nursing intervention strategies' for CKD patients through clinical research.

It is expected that regular practice of various preventive approaches such as strict adherence to renal diet, relaxation therapies , massaging, exercises and interaction sessions by CKD patients will have the impact of modifying their life style patterns to self-regulate and improve their physical and social functioning, thereby alleviating their distressing physiological and psychosocial dilemmas with better clinical outcomes.

Objectives

The study was undertaken to:

- Assess the pre- and post-interventional physiological and psycho-social problems viz: health problems; biochemical, physiological and psycho-social parameters among patients with chronic kidney disease in experimental and control group.
- Find out the effectiveness of 'Nursing interventional strategies' by comparing the pre and post-interventional physiological and psycho-social problems among patients with chronic kidney disease between experimental and control group.
- Associate the demographic characteristics viz: age, gender, place of domicile, education, occupation, income, co-morbidity, body mass index and stage of chronic kidney disease with physiological parameters viz: hypertension, anemia, edema of feet, insomnia, fatigue, restless leg syndrome and psychosocial parameters viz: anxiety and low self-esteem among patients with chronic kidney disease.

Hypotheses

H_1: There is a significant improvement in physiological problems and psycho-social problems viz: significant decrease in health problems (H1.1), significant change in biochemical parameters (H1.2), significant decrease in physiological parameters (H1.3) and significant decrease in psycho-social parameters (H1.4) after implementation of 'Nursing intervention strategies' among patients with chronic kidney disease in experimental group than in control group (at 0.05 level of significance)

H_2: There is a significant association of demographic characteristics with physiological and psychosocial problems among patients with chronic kidney disease (at 0.05 level of significance).

Methodology

A quantitative research approach and quasi-experimental non-equivalent two group pre-test post-test research design was used to conduct study on adult chronic kidney disease patients in nephrology ward of a tertiary care hospital of Jammu and Kashmir (SKIMS Soura Srinagar) from 5th March 2012 to 31st July 2013 with an aim to evaluate the effectiveness of nursing intervention strategies in reducing the physiological and psychosocial problems among chronic kidney disease patients.

The sample consisted of 200 study subjects (100= experimental group and 100=control group), who were selected through purposive sampling as per inclusion criteria and assigned to groups. The matching of the subjects in the two groups was done by identifying and selecting subjects as per inclusion criteria and baseline data.

Inclusion Criteria

- Non-dialysis Chronic kidney disease patients
- Having co-morbidities such as: hypertension/ diabetes mellitus/ dyslipedemia.
- Adult patients between the age group of 20-69 years
- Fully conscious and fully co-operative patients
- Patients willing to participate in study

Exclusion Criteria

Chronic kidney disease patients:

- Undergoing hemodialysis or peritoneal dialysis.
- Having co-morbidities other than hypertension/ diabetes mellitus/ dyslipedemia
- Below 20 and above 69 years of age

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- Having altered level of consciousness and psychiatric disorders
- Not willing to participate in study

Variables

The variables of study were:

Independent variable: "Nursing Intervention Strategies" including package of 6 alternating therapies (dietary advice, progressive muscle relaxation therapy, deep breathing exercises, leg massaging, leg elevation therapy and talk therapy).

Dependent Variable: Improvement in physiological and psychosocial problems (Health problems, biochemical parameters, physiological parameters and psychosocial parameters) among CKD patients.

Demographic Variables: Age, gender, place of domicile, education, occupation, income, co-morbidity, body mass index and stage of chronic kidney disease.

Time distribution for collecting data from experimental group subjects

(N=100)

1st day	2nd day to 5th day	6th day	7th day to 14th day	15th day
Pre-test (1st assessment was conducted on admission in hospital)	**Intervention** (Subjects received 'Nursing Intervention Strategies' during hospitalization)	**Post-test 1** (On discharge 2nd assessment was conducted and 'Nursing Intervention Strategies & Adherence check list' was given for home practice)	Practice of 'Nursing Intervention Strategies' and completion of Adherence check list at home	**Post-test 2** (3rd assessment in OPD on first follow up visit)
Time = 1 hour	Time = 1 & ½ hours	Time = 1 hour	Time = 1 & ½ hours	Time = 1 hour
Parameters Demographic variables (10 minutes) Health problems (5 minutes) Biochemical parameters (15minutes) Physiological and Psychosocial problems (30minutes)	**Morning therapies** Leg elevation therapy (20 minutes) Leg massaging (10 minutes) Deep breathing exercises (5 minutes) Progressive muscle relaxation therapy (5 minutes) **Evening therapies** Leg elevation therapy (20 minutes) Leg massaging (10 minutes) Deep breathing exercises (5 minutes) Progressive muscle relaxation therapy (5 minutes) Dietary advice (5 minutes) Talk therapy (5 minutes)	**Parameters** Demographic variables (10 minutes) Health problems (5 minutes) Biochemical parameters (15 minutes) Physiological and psycho social problems (30 minutes)	The subjects performed 'Nursing Intervention Strategies' as demonstrated in scheduled time at home and recorded them on adherence check list	**Parameters** 1.Demographic variables (10 minutes) 2. Health problems (5minutes) 3. Biochemical parameters (15 minutes) 4. Physiological and Psycho-social problems (30 minutes)
Subject: 1	10.30 am to 11.10 am **(Morning therapies)** 1.30 pm to 2.20 pm **(Evening therapies)**	11am to 12 pm	Home practice as per schedule	10. 30am to 11. 30 am
Subject: 2	11.10 am to 11.50 am **(Morning therapies)** 2.20 pm to 3.10 pm **(Evening therapies)**	1pm to 2pm	-------do----------	11.30am to 12.30pm
Subject: 3	11.50 pm- 12.30 pm **(Morning therapies)** 3.10 pm to 4 pm **(Evening therapies)**	3pm to 4pm	-------do----------	12.30pm to 1.30 pm

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After seeking ethical clearance from Ethical Clearance Committee of Sher-i-Kashmir Institute of Medical Sciences (SKIMS) Soura Srinagar as well as permission from HOD nephrology department of same institution and informed consent from study subjects, pilot study was conducted which was followed by final study. The data was systematically gathered from individual study subjects on study variables viz; the data on demographic characteristics and health problems was gathered through physical assessment, observation and interview techniques by using self-developed observation check list and interview schedule after getting validated by experts. Patient's health records and laboratory reports were referred for assessing the level of biochemical parameters. The data on physiological and psychosocial parameters was gathered by using standardised tools after seeking written permission from researchers. These tools were as follows:

- Classification of anemia (set by National kidney Foundation Disease outcome quality initiative- NKF-DOQI-1997) for assessing anemia
- Classification of hypertension (set y of Cardiology scale (ESH-ESC-2003) for assessing hypertension
- Pitting edema scale for assessing edema
- Pittsburgh's sleep quality index (PSQI-1989 Pittsburgh's sleep quality index (PSQI-1989) Pittsburgh's sleep quality index (PSQI-1989) for assessing insomnia
- Fatigue piper scale (1982) for assessing fatigue
- International Restless leg-syndrome Study group Rating scale (IRLS-2003) for assessing Restless leg syndrome
- Speil-berger's state anxiety inventory (1977) for assessing anxiety
- Rosenberg's self-esteem scale (1965) for assessing low self esteem

The tools were pre-tested on 5 study subjects for their reliability by test-retest methods. The agreement between the scores was determined by Spearman's rank correlation co-efficient which was highly significant in all tools.

The data was first gathered from the experimental group by conducting pre-test (1stobservation-0_1) on the study subjects which included assessment of demographic variables, physiological and psychosocial problems including: (health problems, biochemical parameters, physiological parameters and psychosocial parameters). The pre-test (0_1) i.e. 1st observation was conducted on the 1st day of admission of patients followed by 2nd observation (post-test 1-0_2) which was conducted on 6th day after patients received 1 & half hour treatment of 'Nursing intervention strategies' in morning and evening sessions continuously daily for 5 days in addition to daily routine care (as shown in table below).

Post-test 1 (0_2) was conducted on 6th day on discharge to assess the 1st outcome of 'Nursing Intervention Strategies' on physiological and psychosocial problems among CKD patients. To ensure scheduled practice at home 'Nursing intervention strategies' were demonstrated to patients and written information through 'Adherence Checklist' on 'Nursing intervention strategies' was given to experimental group subjects.

Nursing Intervention Strategies" so developed for chronic kidney disease patients from current and reliable literature and validated by experts consisted of a comprehensive package of following six components which were administered to study subjects:

Dietary Advice

It refers to the re-enforcement of patient for strict adherence to the therapeutic diet calculated by the dietician under prescription of nephrologist.

Progressive Muscle Relaxation Therapy (PMRT)

The progressive muscle relaxation therapy refers to a technique of reducing anxiety by alternately tensing and relaxing the muscles in the 16 different muscle groups. The therapy includes isolating one muscle group at a time, then intentionally creating muscle tension for 10 seconds and then allowing the muscle to totally relax for 20 seconds before continuing with the next muscle group which causes the release of tension.

Deep Breathing Exercises

It refers to instructing the patient to inhale slowly and deeply through the nose and exhale slowly through the pursed lips while placing his/ her left hand on the stomach and right hand on the chest for 10 times.

Leg Massaging Therapy

It is pressing and manipulating the skin and muscles of both legs from ankles to knees of the patient with hands of investigator for 10-15 minutes to relieve tension by moving extra fluid out of legs.

Leg Elevation Therapy

It refers to raising the legs of the patient up to 45° above the heart level for 20 minutes, to allow the flow of fluid back from legs through the body.

Talk Therapy

It refers to one-to-one interaction between the patient and researcher on health risks related to disease process/ medication and issues related to personal, family and social problems and their remedial measures.

After collecting data from experimental group, the control group subjects were studied for data collection. The same procedure was adopted for data collection in control group except that they received routine care during hospitalization and routine health teaching at discharge. The pre and post test findings so gathered from experimental and control group subjects was compared by statistical computation.

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Result

Findings related to Frequency and Percentage score Distribution of Demographic Characteristics of Study Subjects

Table 1.Distribution of study subjects in experimental and control group according to frequency and percentage score of demographic characteristics

(N=200)

S.No	Demographic Characteristics	Experimental Group (n_1 = 100) Frequency	Percentage (%)	Control Group (n_2=100) Frequency	Percentage (%)	Unpaired 't'test Value	p Value
1.	**Age (in years)**						
1.1	20 - 29	26	26.%	25	25%	0.002	0.940 (NS)
1.2	30 - 39	16	16%	18	18%		
1.3	40 – 49	05	5%	06	6%		
1.4	50 - 59	38	38%	35	35%		
1.5	60-69	15	15%	16	16%		
2.	**Gender**						
2.1	Male	46	46%	48	48%	0.080	0.777 (NS)
2.2	Female	54	54%	52	52%		
3.	**Place of domicile**						
3.1	Urban	52	52%	50	50%	0.000	1.000 (NS)
3.2	Rural	48	48%	50	50%		
4.	**Education**						
4.1	≤ Primary	55	55%	55	55%	0.418	0.812 (NS)
4.2	≤Higher secondary	44	44%	43	43%		
4.3	≥ Graduate	1	1%	2	2%		
5.	**Occupation**						
5.1	Unemployed (students/retired/housewife)	63	63%	58	58%	0.362	0.948 (NS)
5.2	Employed (govt./private/professional)	17	17%	20	20%		
5.3	Business	20	20%	22	22%		
6.	**Monthly family income**						
6.1	(in rupees) ≤10,000	72	72%	71	71%	0.384	0.965 (NS)
6.2	10,001to 15,000	15	15 %	15	15 %		
6.3	15,001 to 20,000	12	12 %	13	13 %		
6.4	20,001 to 25,000	0	0 %	0	0 %		
6.5	>25,000	1	1 %	1	1 %		
7.	**Body mass index (Body wt. in kg/ht in m^2)**						
7.1	<30.0(no obesity)	66	66%	69	69%	0.105	0.588 (NS)
7.2	30-34.9 (type I obesity)	18	18%	16	16%		
7.3	35-39.9 (type II obesity)	14	14%	12	12%		
7.4	> 40.0(type III obesity)	2	2%	3	3%		

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8.	**Co-morbidity**						
8.1	Hypertension	64	64%	63	63%	0.201	0.904 (NS)
8.2	Diabetes mellitus &hypertension	28	28%	28	28%		
8.3	Hypertension, diabetes mellitus & Dsylipedemia	8	8%	9	9%		
9.	**Stage of CKD**						
9.1	Stage IV	53	53%	53	53%	0.353	1.000 (NS)
9.2	Stage V	47	47%	47	47%		

Significant (p-value ≤ 0.05); NS (Non-significant; p value > 0.05).

Table 2.Assessment and Comparison of Pre-test and Post-test (Frequency and Percentage) score distribution of Health problems among subjects with CKD between Experimental and Control group

(N=200)

		Experimental Group (n_1 =100)				Control Group (n_2 =100)			
S. No.	**Health problems**	**Pre-test (%)****	**Post-test 1 (%)****	**Post-test 2 (%)****	**p-value**	**Pre-test (%)****	**Post-test 1 (%)****	**Post-test 2 (%)****	**p-value**
1.	**Oliguria**								
	No Yes	44 56	70 30	80 20	<0.001*	50 50	56 44	66 34	0.005*
2.	**Poor appetite**								
	No Yes	13 87	27 73	54 46	<0.001*	8 92	15 85	25 75	<0.001*
3.	**Vomiting**								
	No Yes	67 33	78 22	87 13	<0.001*	72 28	75 25	82 18	0.027*
4.	**Joint pain**								
	No Yes	10 90	23 77	28 72	<0.001*	6 94	9 91	15 85	0.041*
5.	**Breathlessness**								
	No Yes	30 70	42 58	48 52	<0.001*	26 74	34 66	39 61	0.045*
6.	**Muscle cramp**								
	No Yes	25 75	41 59	56 44	<0.001*	28 72	30 70	40 60	0.030*
7.	**Mouth ulcer**								
	No Yes	79 21	81 19	92 8	0.010*	64 36	66 34	68 32	0.530 NS
8.	**Itching**								
	No Yes	82 18	90 10	95 5	0.050*	76 24	78 22	80 20	0.241 NS
9.	**Irritability**								
	No Yes	65 35	72 28	80 20	<0.001*	70 30	73 27	74 26	0.101 NS

Significant (p value ≤ 0.05; <0.001); NS (Non-significant; p value > 0.05); Percentage = %.

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The findings in Table 1, reveals no significant difference (p value > 0.05) in all the demographic characteristics between the study subjects in experimental and control group indicating that the sample characteristics were homogeneous in both the groups.

Findings Related to 1st and 2ndobjective

Findings in table: 2 reveal a significant decline in scores (p value ≤ 0.05) of all 9 health problems such as: (oliguria, poor appetite, vomiting, muscle cramp, joint pain, breathlessness, mouth ulcer, itching and irritability) among experimental group subjects in post-test 2. Whereas the control group subjects have shown decline in post test scores of 6 health problems (oliguria, poor appetite, vomiting, muscle cramp, joint pain, breathlessness) which statistically verifies that 'Nursing Intervention Strategies' were effective in improving the health problems of the subjects in experimental group.

Based on the results of study, 1st research hypothesis ($H_{1.1}$): There is a significant decrease in health problems after implementation of 'Nursing intervention strategies' among patients with chronic kidney disease in experimental group than in control group at (0.05 level of significance) is accepted.

Table 3.Assessment and Comparison of pre-test and post-test (Mean and SD) scores of Biochemical parameters of subjects with CKD between experimental and control group

(N=200)

S. No.	Biochemical Parameters (normal values)	Experimental group (n_1 =100)				Control group (n_2 =100)			
		Pre-test	Post-test 1	Post-test 2	p-value	Pre-test	Post-test 1	Post-test 2	p-value
		Mean ±SD	Mean$_1$ ±SD$_1$	Mean$_2$ ±SD$_2$		Mean ±SD	Mean$_1$ ±SD$_1$	Mean$_2$ ±SD$_2$	
1.	Serum levels of: Fasting glucose (60-110 mg/dl)	125.05$^{\#\#\#}$ ±32.90	94.06$^{\#}$ ±27.50	75.68$^{\#}$ ±6.18	<0.001*	148.3$^{\#\#\#}$ ± 68.93	141.3$^{\#\#\#}$ ±60.03	137.21$^{\#\#\#}$ ±52.57	0.002*
2.	Urea (15-45 mg/dl)	122.92$^{\#\#\#}$ ±36.50	122.09 ±32.9	122.98 ±31.94	0.810 NS	123.32 ±36.99	122.7 2 ±36.12	122.87 ±36.18	0.201 NS
3.	Creatinine (0.5-1.5 mg/dl)	8.30$^{\#\#\#}$ ±3.55	8.90 ±3.99	8.70 ±2.09	0.486 NS	8.46 ±3.45	8.24 ±3.31	8.11 ±3.09	0.486 NS
4.	Cholesterol (150-200 mg/dl)	161.27 ±64.41	157.4 ±60.9	150.6 ±48.17	<0.001*	153.14 ±68.4	147.42 ±60.03	146.15 ±58.67	0.043*
5.	Triglycerides (100-200 mg/dl)	133.6 ±54.81	128.16 ±51.24	125.05 ±48.00	<0.001*	131.57 ±55.29	130.97 ±55.92	128.40 ±40.02	0.021*
6.	HDL (30-60 mg/dl)	76.90$^{\#\#\#}$ ±18.11	72.63 ±17.45	67.99 ±15.49	<0.001*	76.12$^{\#\#\#}$ ±21.23	76.43 ±21.90	76.60 ±21.45	0.141 NS
7.	LDL (100-150 mg/dl)	90.82 ±30.10	84.76 ±24.9	82.76 ±24.69	<0.001*	73.52 ±29.3	71.41 ±25.26	71.0 ±25.26	0.852 NS
8.	Total Sr. protein (5.5-8.5 g/dl)	7.14 ±1.52	7.79 ±1.33	7.88 ±0.84	0.14 NS	6.96 ±1.51	6.78 ±1.337	6.71 ±1.206	0.832 NS
9.	Albumin (3.5-5.5 g/dl)	3.67 ±0.85	3.80 ±0.71	3.79 ±0.67	0.604 NS	3.63 ±0.91	3.68 ±0.843	3.70 ±0.728	0.301 NS
10.	Sodium (135-145 m. eq /l)	136.75 ±7.596	136.37 ±6.26	137.09 ±5.35	0.091 NS	136.04 ±7.55	136.21 ± 6.837	136.53 ±7.318	0. 270 NS
11.	Calcium (8-10mg/dl)	7.03$^{\#\#}$ ±1.01	7.86 ±0.96	8.91$^{\#}$ ±0.89	<0.001*	7.04$^{\#\#}$ ±0.93	7.45 ±0.941	8.18$^{\#}$ ±1.18	0.055*
12.	Phosphorus (3.5-4.5 mg/dl)	4.96$^{\#\#\#}$ ±0.99	4.46 ±0.84	3.20$^{\#}$ ±0.65	<0.001*	4.97 ±1.04	4.95 ±1.017	4.50 ±0.86	0.041*
13.	Potassium (3.5-5.5 mg/l)	7.74$^{\#\#\#}$ ±0.97	6.81 ±0.23	6.03 ±0.03	<0.001*	7.40$^{\#\#\#}$ ±1.06	7.37 ±0.96	7.27 ± 0.83	0.204 NS
14.	Chlorides (97 to107 m.eq /l)	64.30$^{\#\#}$ ±20.31	66.52 ±15.4	79.12 ±15.07	<0.001*	65.07 ±20.13	64.90 ±21.51	64. ±20.84	0.106 NS

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15.	Bicarbonates (22 to 30 meq/l)	22.86 ±4.63	22.67 ±3.68	23.41 ±3.73	0.244 NS	22.52 ±4.57	22.42 ±4.31	22.32 ±4.57	0.302 NS
16.	Haematocrit (PCV 37to54%)	32.49## ±9.37	38.543 ±7.854	48.90# ±8.35	0.043*	32.73## ±8.71	36.13 ±8.98	36.80## ± 9.13	0.601 NS
17.	Platelet (15000 to300000)	120.04## ±19.61	125.80 ±22.04	130.51 ±25.77	<0.001*	118.37## ±17.24	120.36 ±16.57	122.39 ±15.01	0.0975 NS
18.	Urinary Volume (1500- 3000ml)	582.30 ±256.2##	586.00 ±196.0##	580.0± 196.0##	0.220 NS	573.74 ±191.7##	580.0± 174.23##	580.0 ±174.23##	0.133 NS
19.	Urinary protein (0-1.5gm/24hrs)	1.902 ±0.41###	1.93 0 ±0.020###	1.943 ±0.05###	0.331 NS	1.815 ±0.30###	2.01 ±0.10###	1.89 ±0.62###	0.231 NS
20.	Urinary Creatinine (0-2.7gm/24hrs.)	1.52 ±1.12###	1. 43 ±0.49###	1. 321± 0.45###	0.071 NS	1.65 ±0.78###	1.74± 0.623###	1.69 ±0.10###	0.082 NS
21.	GFR(125ml/min /1.73m^2)	14.69 ±4.12##	15.02 ±4.36##	15.13 ±4.84	0.342 NS	15.06 ±4.13##	16.11 ± 3.92##	16.20 ±3.96##	0.392 NS

Significant (p value ≤ 0. 05 ;< 0.001); NS (Non-significant; p value > 0.05) (#Normal; ## below normal; ### above normal).

While assessing and comparing the pre-test and post-test Mean and SD scores of all 21 biochemical parameters of CKD subjects in both the groups, as shown in findings (table:3) it can be emphasized that Mean and SD scores of 11 biochemical parameters have shown a significant improvement (p <0.001*) in experimental group subjects. A remarkable reduction in abnormally higher levels of serum fasting glucose, HDL, phosphorus and potassium and significant increase (p<0.001*) in the below normal levels of calcium, chloride, hematocrit and platelets and also decrease in levels of cholesterol, triglycerides and LDL was reported in experimental group subjects, whereas in control group, the significant improvement (p<0.05) was reported in only 5 biochemical parameters such as: fasting serum glucose, cholesterol, triglycerides, calcium and phosphorus which indicates that 'Nursing intervention strategies' were effective in regulating the levels of various biochemical parameters in experimental group subjects.

Table 4.Assessment and Comparison of pre-test and post-test (Mean and SD) scores of physiological parameters of subjects with CKD between experimental and control group

(N=200)

S. No.	Physiological Parameters	Experimental Group (n_1 =100)				Control Group (n_2 =100)			
		Pre-test	Post-test 1	Post-test 2	p-value	Pre-test	Post-test 1	Post-test 2	p-value
		Mean ±SD	Mean$_1$ ±SD$_1$	Mean$_2$ ±SD$_2$		Mean ±SD	Mean$_1$ ±SD$_1$	Mean$_2$ ±SD$_2$	
1.	Hypertension								
1.1	Systolic Blood pressure	160.10 ±10.62	158.9 ±9.53	155.42 ± 9.21	0.001*	158.48 ±11·72	155.0 ±9.07	152.88 ±8.65	0.002*
1.2	Diastolic Blood pressure	99.50 ±6.03	98.30 ±5.37	98.76 ±5.83	0.608NS	98.60 ±6·63	97.78 ±7.05	97.14 ±6.44	0.703NS
2.	Anemia: (Hemoglobin mg/ dl)	7.39 ±0.33	7.46 ±0.40	7.66 ±0.60	0.121NS	7.60 ±1.27	7.68 ±1.09	7.36 ±0.98	0.931NS
3.	Edema of feet	3.35 ±1.07	2.92 ±0·73	2.34 ±0.15	0.030*	3.12 ±0·83	3.09 ±0.80	3.78 ±1.37	0.571NS
4.	Insomnia	14.70 ±1.84	10.59 ±1.22	9.33 ±0.96	0.041*	14.99 ±2·33	11.51 ±2.14	11.01 ±1.85	0.042*
5.	Fatigue	24.54 ±3.27	14.48 ±2.63	10.52 ±1.77	0.001*	24.02 ±2·15	17.99 ±2.82	17.24 ±2.18	0.032*
6	Restless leg syndrome	11.70 ±2.35	7.70 ±1.24	6.77 ±0.90	0.001*	11.02 ±1·93	10.01 ±1.20	9.81 ±1.03	0.201NS

*Significant (p value ≤ 0.05; <0.001); NS (Non-significant; p value >0.05).

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Hence the Research Hypothesis: 1 ($H_{1.2}$) There is a significant change in biochemical parameters after implementation of 'Nursing intervention strategies'among patients with chronic kidney disease in experimental group than in control group (at 0.05 level of significance) is partially accepted.

Comparatively Meanand SD scores of physiological parameters of CKD subjects as shown in (table 4) have revealed a highly significant decrease (p<0.001) during post-test 2 in 5 physiological parameters such as: hypertension (systolic blood pressure only), edema of feet, insomnia, fatigue and restless leg syndrome in experimental group who received 'Nursing Intervention Strategies' than the subjects in control group who received routine care have shown significant decrease (p≤0.05) in only 3 physiological parameters such as: hypertension (systolic blood pressure only), insomnia and fatigue which proved that 'Nursing Intervention Strategies' were effective in reducing physiological parameters among chronic kidney disease patients.

Hence Research Hypothesis: 1 ($H_{1.3}$) There is a significant decrease in physiological parameters after implementation of 'Nursing intervention strategies' among patients with chronic kidney disease in experimental group than in control group. (at 0.05 level of significance) is accepted for all physiological parameters except 2 parameters: diastolic blood pressure and anemia.

Hence research hypothesis: 1 ($H_{1.4}$): There is a significant decrease in psychosocial parameters among patients with chronic kidney disease after implementation of 'Nursing intervention strategies' in experimental group than in control group at (0.05 level of significance) is accepted.

Findings Related to 3rd Objective:

The association between demographic characteristicsand physiological and psychosocial parameters was calculated by Pearson Chi-Square test (π^2) and Fisher's Exact test (F) tests. Most of the demographic characteristics were associated withphysiological and psychosocial parameters. Age was found significantly associated (p≤ 0.05) with hypertension ($\varkappa^2$= 0.325); insomnia ($\varkappa^2$= 0.223) and fatigue ($\varkappa^2$= 0.204). Gender was found to be associated with anemia (F= 0.031); hypertension (F= 0.007); fatigue (F=0.072) and restless leg syndrome (F=0.067). Monthly family income was found to be associated with anemia ($\varkappa^2$=0.136); hypertension ($\varkappa^2$= 0.221) and insomnia ($\varkappa^2$= 0.193); Co-morbidity with fatigue ($\varkappa^2$=0.138), insomnia ($\varkappa^2$=0.245); anemia ($\varkappa^2$=0.191)and hypertension ($\varkappa^2$=0.012).Similarly anxiety was found to be associated with gender(F= 0.023) ; occupation ($\varkappa^2$=0.186) ; monthly family income ($\varkappa^2$=0.176) and co-morbidity ($\varkappa^2$= 0.335) and low self- with gender ($\varkappa^2$=0.116); occupation ($\varkappa^2$=0.166); monthly family income ($\varkappa^2$=0.142) and co-morbidity ($\varkappa^2$=0.349) at 0.05 level of significance. It can be inferred that majority of demographic characteristics in all

Table 5.Assessment and Comparison of pre-test and post-test (Mean and SD) scores of psychosocial parameters of subjects with CKD between experimental and control group

(N= 200)

S. No.	Psycho-social parameters	Experimental Group (n_1 =100)				Control Group (n_2 =100)			
		Pre-test	Post-test1	Post-test 2		Pre-test	Post-test 1	Post-test 2	
		Mean ± SD	Mean$_1$ ±SD$_1$	Mean$_2$ ±SD$_2$	p value	Mean ±SD	Mean$_1$ ±SD$_1$	Mean$_2$ ±SD$_2$	p-value
1.	Anxiety	34.86 ±6.30	26.53 ±5.54	24.96 ± 4.51	<0.001*	31.18 ±8.87	28.23 ±3.85	28.01 ±3.68	0.701 NS
2.	Low-self esteem	16.19 ±3.68	12.64 ±2.82	11.05 ±1.772	<0.001*	18.19 ±3.68	16.64 ±2.82	16.32 ±2.42	0.901 NS

Significant (p value ≤ 0.05; <0.001); NS (Non-significant; p value > 0.05).

It has been observed that CKD subjects in experimental group have shown (table:5) a highly significant (p-value <0.001*) in Mean and SD scores of anxiety and low self-esteem during post-test 1 and post-test 2 than in control group subjects who have reported an insignificant change in both the parameters (p-value > 0.05).

Therefore it can be inferred that the significant decline in post test scores of psychosocial parameters among experimental group subjects would have been likely due to the novel intervention received by them which proves the efficacy of 'Nursing intervention strategies' in reducing the magnitude of psychosocial problems in experimental group.

200 CKD subjects have shown a significant association (≤ 0.05) with majority of physiological problems.

Hence Research hypothesis: 2 (H_2): There is a significant association between selected demographic characteristics and selected physiological and psychosocial parameters among patients with chronic kidney disease (at 0.05 level of significance) is accepted.

Discussion

It was assumed that the CKD patients who were subjected to "nursing intervention strategies such as: dietary advice, progressive muscle relaxation, deep breathing exercises, leg

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massaging, leg elevation therapy and talk therapy would report improvement in health problems and biochemical parameters as well as reduction in physiological and psychosocial problems than those subjects who were on routine care.

The findings of the study revealed that 'nursing intervention were effective in reducing health problems, improving biochemical parameters and minimizing physiological and psychosocial problems among chronic kidney patients.

In experimental group subjects a significant change ($p \leq 0.05$) was observed due to improvement in 9 health problems (oliguria, poor appetite, vomiting, joint pain, breathlessness, muscle cramp, mouth ulcer, itching and irritability); 11 biochemical parameters (fasting serum glucose, cholesterol, triglycerides, HDL, LDL, calcium, phosphorus, potassium, chlorides, hematocrit and platelet); 5 physiological parameters (systolic blood pressure, edema of feet, insomnia, fatigue and restless leg syndrome) and psychosocial parameters (anxiety and low self-esteem). Conversely in control group subjects significant improvement ($p \leq 0.05$) was reported in only 6 health problems viz: oliguria, poor appetite, vomiting, joint pain, breathlessness and muscle cramp; 5 biochemical parameters viz: serum levels of fasting glucose, cholesterol, triglycerides, calcium and phosphorus and 3 physiological parameters viz: systolic blood pressure, insomnia and fatigue except psychosocial parameters which have shown no improvement.

The similar results have been reported by Baraz[3] in an experimental study to determine the effect of self–care educational package program on problems and quality of life of CKD patients in various hospitals of medical science universities in Tehran. The findings have revealed a significant decrease in serum glucose ($p=0.020$) and serum potassium ($p<0.001$) and increase in serum calcium ($p<0.001$); significant decrease in systolic blood pressure ($p=0.045$), diastolic blood pressure ($p=0.004$) and edema ($p<0.001$) and also the improvement in the quality of life of patients ($p = 0.030$) among subjects in treatment group as compared to the control group.

Kuroki[2] in hisstudy reported that strategies like sodium and potassium restriction, controlling diabetes, anemia and antihypertensive therapy were significantly ($p<0.05$) effective in reducing physical distress related problems such as: vomiting, muscle cramps, mouth ulceration, itching and irritability.

Russell[8] in a single case study to examine the effect of leg massage therapy (focusing on hamstring muscles) for 45-minutes duration twice a week for 3 weeks on a 35-year-old woman with restless legs syndrome reported a significant decrease ($p \leq 0.05$) in intensity of RLS and nocturnal sleep disturbances, anxiety and low self-esteem.

Campbell et al.[4] in an interventional study group of pre dialysis patients with chronic kidney disease (CKD: stages 4 and 5) who were subjected to individualized dietary counseling with regular follow-up to achieve an intake of 0.8 to 1.0 g/kg of protein and > 125 kJ/kg of energy reported a significant change i.e. greater increase in energy intake and greater improvement ($p<0.01$) in fatigue in interventional (study group) than in control group which received written material only.

In another quasi experimental study conducted by Chaiopanont[5] in 2008 at Wat Khae Nok primary health center in Nonthaburi, Thailandon 50 chronic kidney disease patients with type 2 diabetic have shown a significant ($p <0.001$) postprandial hypoglycemic effect among patients after deep breathing exercises.

While comparing the metabolic effects of two protein diets with different protein content (0.55 vs 0.80 g/kg/day) between two groups in a randomized controlled trial study on CKD patients with stages 4-5, Cianciaruso et al[6] in 2009, reported serum urea nitrogen significantly ($p<0.05$) higher in the 0.80-Group than 0.55-Group. The other biochemical parameters viz: 24 hours urinary urea nitrogen, serum creatinine, sodium, bicarbonate and phosphate levels were significantly ($p<0.05$) decreased after the first 3 months in 0.55 Group than in 0.80 Group. The findings of this study has shown that in CKD patients, a protein intake of 0.55 g/kg/day as compared to 0.80 g/kg/day, guarantees a better metabolic control and a reduced need of drugs, without a substantial risk of malnutrition.

Shi et.al[7] in a randomized trial study on nurse-led intensive educational program on chronic kidney disease patients with hyper phosphatemia reported significant decline ($p \leq 0.05$) in serum phosphorus level in experimental group who received individualized teaching and educational sessions about diet and medicine regimen in addition to routine guidance as compared to control group who received exclusively routine guidance.

Kauric[9] in a randomized controlled study conducted on 118 end stage renal disease participants in the year 2012 to assess the impact of the supportive educational nursing intervention, reported a significant decrease ($p<0.05$) in both systolic and diastolic blood pressures, reduced fatigue and anxiety in the treatment group.

The demographic characteristics such as age, place of domicile, education, occupation, monthly family income, body mass index, co-morbidity and CKD stage were significantly associated ($p \leq 0.05$) with anemia, hypertension, edema of feet, insomnia, fatigue, restless leg syndrome, anxiety and low self-esteem.

Similar findings have been reported by various researchers. These studies have shown a higher prevalence of CKD in

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elderly people having strong association (p<0.05) with hypertension, fatigue and sleep disturbances.[10,11]

In another study Novak et al[12] reported 8 to 10 CKD stage-5 patients with Restless Leg Syndrome (RLS). These patients have shown a strong association (p<0.05) with elderly people, female gender and obesity.

Fishbane et al.[13] reported prevalence of anemia in adult women as 69.9% to 72.8% and 57.8% to 58.8% in men with CKD stages 3-5, comparatively being higher (p=0.004) in females than in the males.

Nursing Implication

Implications for Nursing Practice: It is evident from the findings of the study that chronic kidney disease patients are victimized with adverse complications of decreased kidney function which can be delayed and curtailed in intensity by regular practiceof 'Nursing Intervention Strategies' (developed by the investigator). Most patients with stage 1 to 3 chronic kidney disease are under the care of primary care providers or specialists other than nephrologists. Nurses being primary health care givers can teach and demonstrate 'Nursing Intervention Strategies' to these patients and ensure their daily practice for delaying disease process.

Implications for Nursing Administration: A nurse administrator can develop a protocol for conducting awareness programs by nephro nurses on 'risk factors of CKD and its preventive measures for care givers in wards/ OPDs. The 'Nursing intervention strategies' so developed by investigator can be utilized for establishing guidelines for providing systematic care thereby improving quality of life among CKD patients.

Implications for Nursing Education: Students are the great source for providing education to the community. They can educate the general as well as chronic kidney disease population about various aspects of renal disease such as: prevention, early detection, treatment and rehabilitation.

Implications for Nursing Research: An extensive research is needed to explore significant barriers in early detection and management of chronic kidney disease in the country such as: socio-economic factors, lack of awareness regarding available resources, paucity of specific infrastructure and facilities at the community level to be provided to these patients.

Recommendation

The following recommendations are offered for future research on the basis of findings of the study:

- For measuring the outcome of each interventional strategy, a longer duration, probably 3 months or 6 months can be elicited out while using a longitudinal study design.
- A comparative study can be conducted between the normal and chronic kidney disease population to explore the risk factors of chronic kidney disease.
- The findings also call the attention of Govt. Health care sector for the tremendous need of providing the most appropriate, highly adequate, easily accessible, cost effective and efficient nephro treatment and care facilities to all sections of CKD population and also to provide an aggressive approach towards the prevention, early detection and management of increasing risk of chronic kidney disease in order to control the increasing morbidity and mortality rates.

Conclusion

Based on the study findings it can be concluded that 'Nursing interventional strategies were effective in reducing the magnitude of 7 health problems, 11 biochemical parameters, 5 physiological parameters and both of 2 psychosocial parameters among chronic kidney disease patients and have shown better functional and emotional well-being. However the long term efficacy of these strategies need to be investigated individually on these patients to find out which one was more effective in reducing the intensity of the physiological problems.

Conflicts of Interest: None

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