EFFICACY OF NURSING STRATEGIES INTERVENTION (NSI) ON BIOLOGICAL PARAMETERS AMONG CHRONIC RENAL FAILURE (CRF) PATIENTS UNDERGOING HEMODIALYSIS.

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Abstract:

Introduction

In India, the prevalence of CRF has been steadily rising due to a combination of factors. Unhealthy lifestyles, including poor dietary habits, sedentary behavior, and a high prevalence of conditions like diabetes and hypertension, contribute to the increasing burden of kidney diseases. Diabetes and hypertension are two major risk factors for CRF, as they damage the blood vessels and structures of the kidneys, impairing their function over time. Additionally, genetic predisposition, environmental factors, and lack of access to healthcare services in certain regions further compound the problem.

Methods

The research design was pre experimental design with one group of repeated measurement pre and post-test control group design was adopted. The investigator had selected 60 samples of CRF patients who fulfilled the inclusive criteria. The samples were selected using purposive sampling technique. Following the sample selection. On day 1 base line assessment of biological parameters was done, which was followed by the Nursing strategies intervention post test one, post test two, post test three, post test four, post test five was conducted with interval of 7 days between each post test using the same tool.

Results

There was significant difference in potassium values among various observations (F=12.13, p<0.001). There was significant difference in urea values among various observations (F=9.15, p<0.001). There was significant difference in creatinine values among various observations (F=8.632, p<0.001). There was significant difference in sodium values among various observations (F=87.0, p<0.0001).

Conclusion

NSI was effective in maintaining the biological parameters of CRF patients undergoing hemodialysis, thus it might positively influence the CRF patients physical health. Hence NSI can be recommended for CRF patients undergoing hemodailyis for maintaining the biological parameters.

Keywords: Efficacy, Nursing Strategies Intervention, Biological parameters, Chronic Renal Failure, Hemodialysis,

Background

Chronic Renal Failure (CRF), also known as chronic kidney disease (CKD), is a progressive and irreversible condition characterized by a gradual loss of kidney function over time. The kidneys play a crucial role in maintaining the body's overall health by filtering waste products, excess fluids, and electrolytes from the bloodstream, and regulating blood pressure and red blood cell production. When the kidneys' capacity to perform these functions declines, it can lead to a cascade of physiological imbalances that affect various organ systems.[1-4]

The economic and social impact of CRF is substantial. Individuals with CRF often face a reduced quality of life, increased healthcare expenses, and a higher risk of hospitalization. The disease places a significant burden on healthcare systems due to the need for regular monitoring, medications, and potentially renal replacement therapies. Moreover, the psychological toll of CRF is not to be underestimated; patients often grapple with anxiety, depression, and feelings of uncertainty about their future.[5-8]

CRF is categorized into stages based on the estimated glomerular filtration rate (eGFR), which is a measure of kidney function. In the early stages, kidney damage may be present without significant symptoms, but as the disease progresses, symptoms such as fatigue, fluid retention, electrolyte imbalances, and elevated blood pressure may become apparent. If left untreated, CRF can advance to end-stage renal disease (ESRD), where the kidneys lose almost all their function, necessitating renal replacement therapies like dialysis or kidney transplantation to sustain life.[9-12]

Hemodialysis is a vital treatment modality for patients with advanced CRF, especially those in the later stages of the disease. It involves the removal of waste products, excess fluids, and electrolytes from the bloodstream through an artificial filtration process. During hemodialysis, blood is diverted from the patient's body through a dialysis machine, where it passes through a semipermeable membrane, known as a dialyzer or artificial kidney. On the other side of the membrane, a dialysate solution helps remove waste products and electrolytes from the blood.[13-16]

Nursing interventions for CRF patients are deeply rooted in a holistic approach that acknowledges the interconnectedness of physical, psychological, and social aspects of health. Unlike a purely medical model, nursing recognizes that CRF's impact goes beyond physiological imbalances. Psychological distress, altered quality of life, dietary adjustments, and medication regimens are among the multifaceted challenges patients face. Nursing interventions are designed to address these aspects comprehensively, recognizing that successful management requires a patient-centered and collaborative effort.[17-20]

One of the fundamental nursing interventions for CRF patients is patient education. Nurses educate patients about the disease, its progression, treatment options, and lifestyle modifications. By providing accurate and understandable information, nurses empower patients to actively participate in their care decisions. Patients who understand their condition are better equipped to make informed choices about their treatment plans, dietary restrictions, and self-care routines. Education also extends to teaching patients how to recognize and manage symptoms, ensuring early intervention and improved outcomes.[21-25]

CRF patients experience a range of symptoms that can significantly impact their daily lives. Nurses are instrumental in symptom management, providing strategies to alleviate discomfort and enhance patients' well-being. For example, nurses can offer guidance on managing fatigue, coping with nausea, and addressing skin itching. By tailoring interventions to individual patients' needs, nurses contribute to improving patients' overall comfort and minimizing the disruption caused by these symptoms.[26-30]

There is a substantial research gap exists concerning the exploration of holistic interventions such as Nursing Strategies Intervention (NSI) specifically tailored for Indian Chronic Renal Failure (CRF) patients undergoing hemodialysis. Despite the growing prevalence of CRF in India and the increasing utilization of hemodialysis as a primary treatment modality, a noticeable lack of studies delves into the comprehensive examination of the impact of holistic interventions on the overall well-being of these patients. This research gap underscores a critical area where the current understanding remains limited, impeding the potential for improved patient outcomes and elevated care standards.

The proposed study holds substantial potential for contributing to scientific knowledge, primarily by addressing gaps in existing literature and adding valuable insights to the understanding of Nursing Strategies Intervention (NSI) for Indian Chronic Renal Failure (CRF) patients undergoing hemodialysis. This contribution is not only significant on a local level but also extends to the global body of knowledge on nursing interventions for CRF patients.

Methods

Study Design

A pre experimental design was used in this study. It consists of one group of pretest and multiple post test was used.

Participants

The participants for the present study were sixty CRF patients who are undergoing hemodialysis and who fulfilled the inclusion criteria such as willing to participate in the study, diagnosed as Chronic Renal failure as per ICD 10, available during data collection, in the age group 30-80 years.

Sampling Technique

In this study Purposive sampling technique is used which samples are chosen by choice not by chance through the judgement made the researcher based on the knowledge about the population.

Instruments

Section A: Assessment of demographic profile of CRF patients

The demographic variables for CRF patients includes age, sex, religion, education, employment, income (per capita), marital status, diet pattern, body built, personal habit, total number of years in dialysis, associated disease conditions.

Section B: Assessment of Biological parameters

It consists of some biological parameters likePotassium,Urea, Creatinine, Sodium.

Validity of the tool

The content validity assessment of a biological parameters tool involved seven expert evaluators from the fields of pediatrics and nursing. These experts were carefully selected based on their job

titles, extensive qualifications, and substantial experience. To ensure a comprehensive evaluation, a content validity evaluation form was meticulously prepared, taking into account the criteria proposed by Yaghmaie.[31] The experts were asked to review and rate the items in the tool, considering their relevancy, clarity, simplicity, and ambiguity on a four-point relevance ordinal scale.

The results of the content validity revealed unanimous agreement among the experts, with all the items in the biological parameters tool receiving a perfect Item level Content Validity Index (I-CVI) of 1. This means that every item was considered highly relevant and appropriate by all the experts, with no modifications needed. Additionally, the Scale level Content Validity Index (S-CVI) was calculated using the Universal Agreement (UA) method, resulting in an impressive S-CVI/UA value of 1, indicating that the entire content of the tool was unanimously deemed essential by the panel of experts.

Reliability of the tool

Cohen Kappa was used to measure inter-rater reliability of the tool. It is generally thought to be a more robust measure than simple percent agreement calculation, as κ takes into account the possibility of the agreement occurring by chance. The inter-rater reliability showed the tool was stable with r value of 1. Reliability was calculated using Cohen's Kappa reliability formula which is given below.

$$K = \frac{Number\ of\ agreements}{Number\ of\ agreements + Number\ of\ disagreements}$$

Nursing Strategies Intervention

It consists of 5 parts which includes Knowledge regarding Chronic renal failure, Dialysis and haemodialysis, Diet Therapy , AV Fistula Exercise, Renal Exercise

Data Collection

Before starting data collection administrative permission and ethical clearance was obtained from Civil hospital, Sohana Fathehgarh Sahib city, Punjab was obtained. The investigator had selected 60 samples of CRF patients who fulfilled the inclusive criteria; The samples were selected using purposive sampling technique. A brief introduction about self and purpose of study was explained to the samples and written informed consent was obtained from them. Confidentiality regarding the data was assured to get cooperation throughout the procedure of data collection period.

On day 1 base line assessment of biological parameters was done, which was followed by the Nursing strategies intervention and post test one was conducted after 7 days of pretest using the same tool. After post test one Nursing Strategies intervention was administered to the experimental group. Similarly, post test two, post test three, post test four, post test five was conducted with interval of 7 days between each post test using the same tool.

Results

The data was double entered, coded clean, and then processed by using Statistical Package for Social Sciences (SPSS Version 26.0). The normality of the data entered was verified using testing it with the Wilk Shapiro Test. To summarize and describe the findings of the study. The average (SD) in continuous variables as well as frequencies (percentages) of categorical variables was

employed. To assess the effectiveness of Nursing Strategies intervention on biological parameters on CRF patient, the authors utilized repeated measure Anova.

Table 1: Demographic Profile

n=60

Demographic variables		f	%
Age (years)	a)　20-30	1	1.7
	b)　31-40	11	18.3
	c)　41-50	11	18.3
	d)　51-60	22	36.7
	e)　> 61	15	25.0
Sex	a)　Male	51	85.0
	b)　Female	9	15.0
Religion	a)　Sikhs	32	53.3
	b)　Hindu	14	23.3
	c)　Christian	11	18.3
	d)　Muslim	3	5.0
Education	a)　No formal education	0	0
	b)　Primary	3	5.0
	c)　High school	10	16.7
	d)　Higher secondary	23	38.3
	e)　College/Diploma	24	40.0
Employment	a)　Unemployment	2	3.3
	b)　Self employed	8	13.3
	c)　Government employee	6	10.0
	d)　Private employee	14	23.3
	e)　Daily wages/Coolie	30	50.0
Income (per capita)	a)　< 10,000 Rs	12	20.0
	b)　Rs10001- Rs15000	15	25.0
	c)　Rs15001-Rs20000	9	15.0
	d)　Rs 20001-Rs 25000	18	30.0
	e)　< Rs25000	6	10.0
Marital Status	a)　Single	1	1.7
	b)　Married	58	96.7
	c)　Separated	0	0.0
	d)　Divorced	1	1.7
	e)　Widow/widower	0	0.0

Diet pattern	a) Vegetarian	4	6.7	
	b) Non-Vegetarian	56	93.3	
Body built	a) Thin	14	23.3	
	b) Moderate built	39	65.0	
	c) Obese	7	11.7	
Personal habit	a) Smoking	21	35.0	
	b) Drinking	12	20.0	
	c) Smoking and Drinking	8	13.3	
	d) Tabaco chewing	0	0.0	
	e) Other	19	31.7	
Total number of years in Dialysis	a) < 1 year	20	33.3	
	b) 1.1 to 3 years	25	41.7	
	c) 3.1 to 5 years	13	21.7	
	d) > 5 years	2	3.3	
Associated disease conditions	a) Diabetes	16	26.7	
	b) Hypertension	26	43.3	
	c) Cardio-vascular disease	4	6.7	
	d) Cancer	1	1.7	
	e) Others	13	21.7	

Table 2: Description of Mean, SD of pre test and post test biological parameters among CRF patients undergoing hemodialysis.   n=60

Assessment		Potassium		Urea		Creatinine		Sodium	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD
Pre	O1	5.46	0.52	30.61	4.13	0.74	0.03	160	4.75
Post	O2	5.43	0.52	22.53	0.77	0.73	0.04	152	4.05
	O3	5.01	0.45	19.92	0.89	0.78	0.08	136	3.92
	O4	4.46	0.42	17.07	2.15	0.76	0.02	136	3.82
	O5	4.32	0.31	15.07	2.15	0.75	0.019	138	5.40
	O6	4.11	0.25	13.07	2.15	0.68	0.017	137	3.67

Table 2 shows description of pre and posttest distribution of mean, SD of biological parameters values in CRF patients undergoing hemodialysis. The potassium values of post-test five (O6) 4.11±0.25 is lesser than the pre-test mean potassium values (O1) 5.46 ± 0.52. The urea values of post-test five (O6) 13.07±2.15 is lesser than the pre-test mean urea values (O1) 30.61± 4.13.The creatinine values of post-test five (O6) 0.68±0.017 is lesser than the pre-test mean creatinine values

(O1) 0.74 ± 0.03.The sodium values of post-test five (O6) 137±3.67 is lesser than the pre-test mean sodium values (O1) 160 ± 4.75.

Table 3: Description of biological parameters values among CRF patients undergoing hemodialysisthrough Repeated Measure ANOVA.n=60

Biological Parameter	O2	O3	O4	O5	O6	F (p)
	M± SD	M± SD	M ±SD	M ±SD	M ±SD	
Potassium	5.43± 0.52	5.01± 0.45	4.46± 0.42	4.32± 0.31	4.11± 0.25	12.13 ** (<.001)
Urea	22.53± 0.77	19.92± 0.89	17.07± 2.15	15.07± 2.15	13.07± 2.15	9.15** (<.001)
Creatinine	0.73± 0.04	0.78± 0.08	0.76± 0.02	0.75± 0.13	0.68± 0.017	8.362** (<0.001)
Sodium	152± 4.05	136± 3.92	136± 3.82	138± 5.40	137± 3.67	87.00 (0.000)* **

The data presented in the above table 3 shows that the ANOVA for repeated measures for post – test (O2,O3,O4,O5,O6) biological parameter values among CRF patients undergoing hemodialysis. There was significant difference in potassium values among various observations (F=12.13, p<0.001). Hence nursing strategies intervention was effective in decreasing the potassium values. There was significant difference in urea values among various observations (F=9.15, p<0.001). Hence nursing strategies intervention was effective in decreasing the urea values. There was significant difference in creatinine values among various observations (F=8.632, p<0.001). Hence nursing strategies intervention was effective in decreasing the creatinine values. There was significant difference in sodium values among various observations (F=87.0, p<0.0001). Hence nursing strategies intervention was effective in decreasing the sodium values.

Discussion

This study was designed to investigate the impact of a efficacy of Nursing strategies interventionbiological parameters among CRF patients undergoing dialysis. The results of the study proved the positive effects of Nursing strategies interventionon biological parameters among CRF patients.

Our study findings shows thatNursing strategies intervention was effective in reducing thepotassium values among CRF patients undergoing hemodialysis. The present study findings were parallel to the study conducted by Simanjuntak (2023) who reported significant reduction in potassium values after health education.[32]

Our study findings shows thatNursing strategies intervention was effective in reducing theurea values among CRF patients undergoinghemodialysis. The present study findings also converge to

the study conducted by Uduagbamen and Kadiri (2021) who reported significant reduction in urea values after nursing intervention.[33]

Our study findings shows thatNursing strategies intervention was effective in reducing thecreatinine values among CRF patients undergoing hemodialysis. The present study findings also converge to the study conducted by Uduagbamen and Kadiri (2021) who reported significant creatinine values after nursing intervention.[33]

Our study findings shows thatNursing strategies intervention was effective in reducing thesodium values among CRF patients undergoing hemodialysis. The present study were parallel to the study conducted by Saher (2023) who reported significant reduction in sodium after health education to CRF patients.[34]

Conclusion

NSI was effective in maintaining the biological parameters of CRF patients undergoing hemodialysis, thus it might positively influence the CRF patients physicalhealth. Hence NSI can be recommended for CRF patients undergoing hemodailyis for maintaining the biological parameters.

Key words: Efficacy, Nursing Strategies Intervention, Biopsychological parameters, Chronic Renal Failure, Hemodialysis,

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