

Nurse Led Renal Rehabilitation Information Module on Quality of Life, Activity of Daily Living and Renal Function Among Hemodialysis Patients

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ABSTRACT

Introduction: Chronic kidney disease is a major cause of mortality and morbidity around the world. Patients with chronic kidney disease undergoing hemodialysis experiences poor quality of life and decreased activity level of daily living. To improve their health and enhance quality of life, rehabilitation of renal patients is important. Renal rehabilitation is a multifaceted, collaborative intervention aimed at enhancing a renal patient's bodily, psychological, and social functioning.

Methods: In this study a quasi-experimental design was adopted and 33 participants were selected who met the inclusion criteria by consecutive sampling technique. Before the study intervention, data were collected by using Demographic & Clinical variable, World Health Organization Quality of Life Instrument, Assessment of Activity of Daily Living, and Renal Function parameter inventory. After that participants were introduced & distributed the Nurse Led Renal Rehabilitation Information Module on the day of enrollment. After 4 weeks, post intervention data were collected with same research tools.

Result: In this study, results show that Nurse Led Renal Rehabilitation Information Module was found to be effective in improving quality of life ($p < 0.001$) and activity of daily living ($p < 0.001$) after study intervention ($p > 0.05$).

Conclusion: So, Nurse Led Renal Rehabilitation Information Module was found to be effective in improving quality of life & activity of daily living. Hence it may be implemented in the dialysis unit and nurses can rehabilitate the patients.

INTRODUCTION

Chronic kidney disease is a major global health problem after cardiovascular disease & is associated with increased risk of morbidity & premature death with serious impacts on quality of life.¹ Globally, the anticipated prevalence of chronic kidney disease in 2019 was 13.4 percent with 4.902 to 7.083 million people requiring renal replacement therapy.² In 2017, chronic kidney disease claimed the lives of 1.2 million people worldwide and shown to be prevalent in 9.1% of the world's population (697.5 million cases).³ A systematic review and meta-analysis of population level prevalence studies was done in South Asia (Afghanistan, Bangladesh, Bhutan, Maldives, Nepal, India, Pakistan, and Sri Lanka) which found that the pooled prevalence of chronic kidney disease in the general population was 14 percent in adult males and 13 percent in adult females.⁴ According to the 2010 Global Disease Burden Survey, chronic kidney disease was the 27th leading cause of death in the world in 2010.⁵ In India, Chronic Kidney Disease conducted a multicenter prospective cohort study to assess risk factors for the progression of chronic kidney disease in which outcomes based on gender, socio-demographic profile, quality of life and healthcare costs in chronic kidney disease population.⁶ Majority of patients with chronic kidney disease requires frequent hemodialysis to improve their quality of life but restricted access to renal replacement therapy, physical inaccessibility to medical facilities, economic and

cultural barriers to transplantation, high prevalence of infectious disease and a lack of infrastructure, all pose challenges to efficient chronic kidney disease management in developing nations like India, Nepal. Renal replacement treatment has drastically reduced morbidity and mortality, allowing patients to live longer.⁷ Rehabilitation improves physical activity, nutritional status, quality of life, and activity of daily living in hemodialysis patients.⁸⁻⁹⁻¹⁰⁻¹¹⁻¹²⁻¹³. Above data shows that prevalence rate of chronic kidney disease are higher & most patients on dialysis are inadequately rehabilitated & there is a need for renal rehabilitation which can improve performance, quality of life & activity of daily living in hemodialysis patients, hence there is a need to provide information regarding renal rehabilitation.

METHODS

In this study a quasi-experimental (one group pretest-posttest) research design was adopted. A non-probability consecutive sampling technique was used to select 33 participants who met the inclusion criteria which include patient coming to nephrology OPD/Ward, conscious, able to communicate well and can read as well as understand Hindi. The sample excluded are patients who were critically ill, pregnant women, having underlying cardiac disease, vascular access in a lower extremity & having any orthopedic problem. This study was conducted in nephrology OPD and Ward, King George's Medical University, Lucknow, U.P. Tools used for data collection were Demographic variable which consists of 8 items, Clinical variable which contains 3 items, World Health Organization Quality of Life Instrument which consists of 4 domains & 26 items, Assessment of Activity of Daily Living which 13 items & measurement of parameters of renal function tool which contains 6 items. Reliability of World Health Organization Quality of Life Instrument was calculated by using Cronbach's Alpha method which is 0.99 and Assessment of Activity of Daily Living tool by Karl Pearson test retest method which is 0.96. Data collection was done from March to April 2022. Prior to data collection, ethical clearance was obtained from the Institutional Ethical Committee of King George's Medical University with Ethical Registration No. 59/Ethics/2022 & administrative permission was taken from Head of Department of Nephrology. Written informed consent was taken from the participant & Nurse Led Renal Rehabilitation Information Module was introduced which consist of 5 domains- Exercise(Aerobics, Strengthening and stretching training & Daily weight lifting), Diet, Fluid management, Treatment regimen and Psychological support. This intervention was introduced, explained and demonstrated on the first day of data collection and pre intervention data was collected using research tools. After the session, Hindi version of the module was distributed to the participants and post intervention data was collected using same research tools after 4 weeks. SPSS 23 version was used as statistical analysis software. Descriptive statistics like frequency distribution and inferential statistics like Paired t-test, Karl Pearson's coefficient of correlation, Kruskal-Wallis test and Mann-Whitney test was used for analysis. The level of $p < 0.001$ was considered as the cutoff values or significance. The sample size is calculated at 90% Power and on the basis of variation in functional independence measure before and after NLRRIM using the formula,

$$n = k \frac{(z_{\alpha} + z_{\beta})^2 (\sigma_1^2 + \sigma_2^2)}{d^2}$$

Where $\sigma_1 = 26.9$, The SD of functional independence measure before NLRRIM

$\sigma_2 = 33.1$, The SD of functional independence measure after NLRRIM

(Ref. Misako ENDO.⁸ Rehabilitation improves prognosis and activities of daily living in hemodialysis patients with low activities of daily living)

$d = \min(\sigma_1, \sigma_2)$, the minimum difference considered to be clinically significant, $k = 1$, the design effect, Type I error $\alpha = 5\%$ corresponding to 95% confidence level, Type II error $\beta = 10\%$ for detecting results with 90% power of study. So, the required sample size, $n = 33$ participants.

RESULTS

In this study, majority 16 (48.5 %) of the participants were in the age group of 21-40 years, males 26 (78.8%), illiterate 11 (33.3%), married 29 (87.9%), unemployed 13 (39.4%), residing in urban area 19 (57.6%) and

maximum participant's falls in income range of 6,175-18,496. The clinical variable identified were that maximum participant 25 (75.8%) was having history of hypertension as a co-morbid illness and 32 (97.0%) patients underwent hemodialysis twice in a week.

The findings of the study also revealed that there was significant increase in scores of all the domains of quality of life after intervention, at $p < 0.001$ as mean & standard deviation score before intervention for physical health was (32.88 ± 4.70) improved to (39.30 ± 8.18) , for psychological health (15.88 ± 6.53) to (30.67 ± 10.12) , social relationships health (11.48 ± 11.92) to (27.12 ± 15.79) and environment health (12.67 ± 10.70) to (27.12 ± 12.21) .

Findings of this study also shows that there is a significant impact of Nurse Led Renal Rehabilitation Information Module on activity of daily living after study intervention as average activity of daily living after intervention was improved (22.48 ± 2.93) as compared to before intervention (17.27 ± 2.45) with $p < 0.001$.

The findings of the study show that there is significant impact of Nurse Led Renal Rehabilitation Information Module on Serum Creatinine and Serum Potassium with $p < 0.001$ but there is no impact on Serum Urea and Serum Sodium after study intervention.

DISCUSSION

The finding reveals that Nurse Led Renal Rehabilitation Information Module has significant impact on quality of life and activity of daily living among chronic kidney disease patients undergoing hemodialysis. Similar studies also support the finding like Impact of Teaching Guidelines on Quality of Life for Hemodialysis Patients, 14 Effectiveness of education and exercise on quality of life, 15 Effects of individualized exercise program on physical function, psychological dimensions, and health-related quality of life in patients with chronic kidney disease, 16 Impact of multidisciplinary rehabilitation on the quality of life of hemodialysis patients, 17 Quality of life in hemodialysis patients 18 & Rehabilitation improves prognosis and activities of daily living in hemodialysis patients with low activities of daily living. 8

CONCLUSIONS

Nurse Led Renal Rehabilitation Information Module was found to be effective in improving quality of life & activity of daily living. Patients were able to perform better, their quality of life has been improved and is moderately dependent on their family members for their activity of daily living but renal function has not improved much as predicted. Nurses posted in dialysis unit can educate the patient about effectiveness of renal rehabilitation modules & encourage them to strictly adhere to the renal rehabilitation module for better outcome. They can also develop and coordinate multidisciplinary team approach in the hemodialysis unit to assist patients in maintaining near normal life style at the highest possible level.

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Tables

Table 1: Comparison of quality of life before and after study intervention n=33

S. No	Quality of life	Pre intervention		Post intervention		*Wilcoxon test	
	Domains	Mean	SD	Mean	SD	z value	p value
1	I(Physical Health)	32.88	4.70	39.30	8.18	3.96	<0.001
2	II(Psychological)	15.88	6.53	30.67	10.12	4.72	<0.001



3	III(Social Relationships)	11.48	11.92	27.12	15.79	4.57	<0.001
4	IV(Environment)	12.67	10.70	27.97	12.21	4.96	<0.001

*Wilcoxon test, p value <0.001 SD- Standard Deviation

Table 2: Comparison of activity of daily living before and after study intervention n=33

S. No.	Activity of daily living	Mean	SD	*Wilcoxon test z-value	p value
1	Before intervention	17.27	2.45	5.04	<0.001
2	After intervention	22.48	2.93		

* Wilcoxon test, p value <0.001 SD- Standard Deviation

Table 3: Comparison of renal function before and after study intervention n=33

S.NO.	Renal function	Pre-intervention		Post- intervention		*Paired t test	
	Parameters	Mean	SD	Mean	SD	t-value	p value
1	Serum Urea	140.82	65.16	138.32	55.82	0.32	0.751
2	Serum Creatinine	11.21	3.27	10.04	2.98	5.20	<0.001
3	Serum Sodium	132.45	31.73	130.68	32.13	0.32	0.751
4	Serum Potassium	6.41	1.61	5.63	1.76	4.81	<0.001

*Paired t test at p<0.001 SD- Standard Deviation

Nurse Led Renal Rehabilitation Information Module (NLRRIM)

PREPARED BY:

Mrs. Preeti Singh

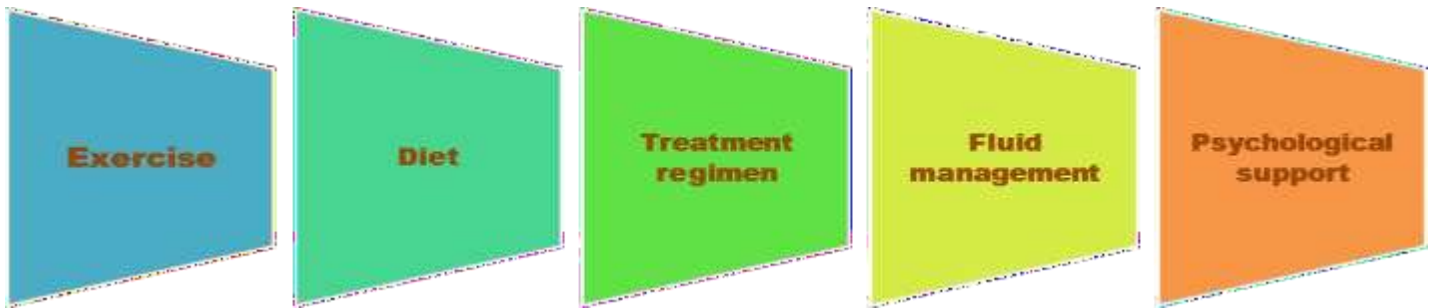
Dr. Suchana Roy Bhowmik

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Dr. Arvind Kumar

Dr. Shalini Srivastava

Renal rehabilitation module consists of following parameters



INSTRUCTIONS

- ☐ Researcher explained one by one each parameter in front of the participant in the OPD/Ward and demonstrated wherever required as in exercise
- ☐ Information module were given to the participant after the session by the researcher
- ☐ NLRRIM was followed by the participant for 4 weeks
- ☐ During 4 weeks, researcher assessed the adherence by telephonic conversation thrice a week on Monday, Wednesday and Friday.

1. EXERCISE

Instructions:

- ☐ Researcher will demonstrate the exercise under guidance of physiotherapist in front of the participants and they have to perform these exercises on non-dialysis day for 4 weeks.
- ☐ Participants should wear loose and comfortable cotton clothes.
- ☐ Wear breathable synthetic fabric that wick the sweat away.
- ☐ Wear comfortable and fit walking shoes.
- ☐ Stay hydrated and well balanced meals.
- ☐ Researcher will provide aerobic, stretching and strengthening exercise

1.1 Aerobic exercise: It includes:

1.1.1 Brisk walking for 30 minutes 3 times a week on non-dialysis day for 4 weeks.

1.1.1.1 Steps of brisk walking:

- ☐ Be cheerful and look ahead, not looking down.
- ☐ Relax your neck, shoulders, and back, but don't slouch or lean forward.
- ☐ Keep your back straight, and engage your abdominal muscles.
- ☐ Walk with a stable walk and roll your feet from heel to toe
- ☐ Shake your arm loosely or pump your arm slightly at each step

- When you go out, don't make your headphones or earplugs too big. Lying on your back on the exercise mat.

1.1.2 Air cycling for 5-10 repetitions, two times a day on non-dialysis day for 4 weeks

1.1.2.1 Steps of air cycling

- Lying on your back on the exercise mat. Rest your hands and gently support your neck
- Place your knees on your torso and lift your torso off the mat while keeping your legs parallel to the floor.
- -Enlarge your right leg instantly out without letting it contact the floor. Hold your left knee bent and your left leg parallel to the floor.
- Use your abdominal muscles to crunch left and right and secure your right elbow to your left knee.
- -Alternating elbows and knees, now amplify your left leg while bringing your proper knee towards your torso (just like riding a bicycle), and crunch sideways in order that your left elbow extends toward your right knee.
- Alternate knees and elbows.



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1.1.3 Gripping exercise with ball 10 squeezes of 3 sets daily for 4 weeks

1.1.3.1 Steps of gripping exercise

- Place a stress ball in your palm.
- Hold your little finger with your thumb. Press and hold for 35 seconds, then relax.
- Hold for 3-5 seconds, and then relax.
- Repeat 10 times, rest for 1 minute and repeat with the other hand.



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1.2 Strengthening and stretching training: It includes:

1.2.1 Straight leg rising (SLR) from 0- 60 degree, holding for 2 minutes, 3 times per day on non-dialysis day for 4 weeks

1.2.1.1 Steps for SLR

- Lie on your back, legs straight and together.
- Keep your feet straight and raise them up to 60 degrees towards the ceiling.
- Slowly lower your feet until they are slightly off the floor. -Raise your legs back up. Repeat.



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1.2.2 Pelvic bridging exercise for 10 repetitions on non-dialysis day for 4 weeks

1.2.2.1 Steps of pelvic bridging

- Lie on back with hands at sides
- Bend knees and feet flat on the floor
- Tighten the abdominal and the gluteal muscles by pushing deep into the floor.
- Raise your hips and hold for 2030 seconds.⁵⁸



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1.2.3 Spinal mobility exercises include back stretch, prone SLR, cat & cow stretch on non-dialysis day 10 repetitions for 4 week.

1.2.3.1 Steps of back stretch

- Bend your knees and lie on your back with your feet flat on the floor.
- Place your right ankle at the base of your left thigh.
- Then place your hand behind your left thigh and pull towards your chest until you feel a stretch.

- Hold this position for 30 seconds to 1 minute.⁵⁹



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1.2.3.2 Steps of prone SLR

- Lying down on the floor (prone).
- Gently tighten your core muscles by keeping your abdominal muscles engaged. You should still be able to breathe while doing this.
- Tighten your abdominal muscles, keep your knees straight, and slowly raise one leg back.
- Hold your straight legs in the air for 2 seconds, then slowly return them to the floor. Be careful not to rotate your back or pelvis when raising your legs.⁶⁰



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1.2.3.3 Steps of cow and cat pose

- Start on your hands and knees with your wrists directly under your shoulders, and your knees directly under your hips. Point your fingertips over the mat.. Place your shins and knees hip-width apart. Centre your head in a neutral position and soften your gaze downward.
- Start by moving to the cow pose. Inhale while hungry on the mat. Broaden across your shoulder blades and draw your shoulders away from your ears.
- Next, we will enter the cat pose. As you exhale, pull your abdomen toward your spine and curl your back toward the ceiling.
- Release the top of your head toward the floor, but do not force your chin toward your chest.
- Inhale, return to the cow pose, and exhale when returning to the cat pose.



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1.2.4 Daily weight lifting of 1-2 pounds or 458-950 grams, 15 repetitions in 3sets on non-dialysis day for 4 weeks.

1.2.4.1 Steps of daily weight lift

- ☐ Warm up for 5 to 10 minutes
- ☐ Start light, with just 1- or 2-pound weights like lifting 1kg salt packet
- ☐ Increase your weight gradually.
- ☐ Lift your weights using controlled movement.

2. DIET

Instructions:

- ☐ Researcher in consultation with dietician will plan the diet
- ☐ Provide diet chart to the participant on dialysis day in OPD as per the blood reports and will also modify it accordingly.
- ☐ Participants are instructed to avoid processed food high in sodium and phosphorus content.

2.1 Food items to be limited:

- ☐ Fast foods
- ☐ Processed foods
- ☐ Whole milk and milk
- ☐ Fruits: fruits rich in potassium are to be avoided such as banana, avocado, pomegranate
- ☐ Nuts, seeds and beans are to be avoided as they are rich in potassium
- ☐ Soft drinks and alcohol: carbonated beverages are to be avoided as they are rich in phosphorus.
- ☐ Organ meats to be avoided as they are rich in potassium
- ☐ Liquid intake overconsumption are to be avoided as they can lead to further edema and high blood pressure, it should be limited up to 1200ml/day
- ☐ Avoid high salty, fatty, smoked, frozen foods



2.2 Diet chart for CKD patients with Diabetes

Breakfast (7:00-8:00am)	Milk (1cup) + 1/4th turmeric + Roasted Makhana OR Chila/Porridge/Upma/Poha/2 piece Idli + Sambar (1 bowl) OR Paneer (30 g) / Egg White (1) OR Roti (1) + 1/2 bowl of vegetables (Gourd, Taroi, Parwal, Pumpkin, Tinda)
Midmorning (11:00am)	1/2 Guava, Papaya, Pear, Apple
Lunch (1:00pm)	Roti (2), 1/2 bowl of lentils (without peel), 1/2 bowl of vegetables (gourd, taroi, parwal, pumpkin, tinda), 1 bowl of rice, 1 bowl of salad (cucumber, onion, raddish) OR 1 bowl khichdi + 1 bowl salad (cucumber, onion, radish) + 1 bowl curd / matha / raita / plain buttermilk
Evening snacks (4:00-5:00pm)	1 cup milk tea + roasted Laiya / Makhana / 2 Idlis (semolina) + Sambar (1 bowl) OR 1/2 glass whey / buttermilk
Dinner (8pm-9pm)	Same as lunch
Bedtime (10pm)	Milk (1 cup) + 1/4th turmeric + Sattu (1 tsp)

2.3 Diet chart for CKD patients without Diabete

Breakfast (7:00-8:00am)	Milk (1 cup) + Mitthi Dalia / Upma / Poha / Cheela / 2 piece Idli + Sambar (1 bowl) OR Sooji Kheer / Sabudana Kheer / Rice Kheer OR Paneer (30g)/Egg White (1)/Soybean (50g)
Midmorning (11:00am)	1/2 guava, papaya, pear, apple, orange
Lunch (1:00pm)	Roti (2), 1/2 bowl of lentils (without peel), 1/2 bowl of vegetables (gourd, parwal, pumpkin, tinda), 1 bowl of rice, 1 bowl of salad (cucumber, onion, Raddish) OR 1 bowl nutri khichdi + 1 bowl salad (cucumber, onion, radish) + 1 bowl curd / mattha / raita / plain buttermilk
Evening snacks (4-5pm)	1 cup milk tea + 1 bowl Roasted Laiya / Makhana / 2 Idlis (Rice / Semolina) + Sambar (1 bowl)
Dinner (8pm-9pm)	Same as lunch
Bedtime (10pm)	Milk (1 cup) + 1/4th turmeric + Jaggery

3. FLUID MANAGEMENT

Instructions:

Researcher will encourage dialysis participants to adhere to a fluid restriction by following methods

- ☐ Tracking fluids by writing down only fluid intake in small notebook.
- ☐ Use a glass marked in milliliters (mL).
- ☐ Encourage to drink all sort of fluid intake taking the same glass.
- ☐ Maintain fluid goals by taking fluid as per the instructions.



- ☐ Managing thirst by sucking ice chips, frozen fruit and using spray bottles.

4. TREATMENT REGIMEN

Instructions:

- ☐ Researcher will advise the participants to follow the instruction
- ☐ Take the medications as per doctor prescription.
- ☐ Do not stop any medication without consultation.
- ☐ Avoid self-medication.
- ☐ If any problem occurs, contact physician immediately
- ☐ Advice pre and post renal function test including serum urea, serum creatinine, serum uric acid, serum sodium, serum potassium and serum chloride.

5. PSYCHOLOGICAL SUPPORT

Instructions:

- ☐ Researcher will provide interventions accordingly on dialysis day in OPD/Ward:
- ☐ Establish rapport with the participants make eye to eye contact and face to face interaction.
- ☐ Explore the problem by direct questioning about participants emotional well being
- ☐ Encourage participants to speak out and verbalize his/her feelings
- ☐ Focus on emotional perspective of the participants
- ☐ Communicate personal warmth and make the participants feel welcome valued as individual.
- ☐ Help consultant to identify participants with emotional problems
- ☐ Provide information for participants, pre-consultation to discuss issue with their consultant
- ☐ Give useful guidance on participants query
- ☐ Be genuine and friendly and help participants feel comfortable and confident.
- ☐ If any problem identified, refer to the counselor.