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Effect Of Motivational Interviewing Combined With Breathing Exercise On Functional Capacity And Quality Of Life In Chronic Kidney Disease Patients.

Vishvnath S. Pawadshetty[1], Ankita Toshniwal[1], Gauri Sorty[2], Sandesh Londhe[3], Nikhil R Dhoot[4], Akanksha A. Chauhan[5]

[1]Professor and Head, Department of Cardiovascular and Respiratory Physiotherapy, Maharashtra Institute of Physiotherapy, Latur. physiovish@gmail.com, 0000-0002-0196-0252

[2]Intern, Cardiovascular and Respiratory Physiotherapy Department, Maharashtra Institute of Physiotherapy, Latur. toshniwalankita74@gmail.com, 0009-0005-8796-9387

[3]Post Graduate, Department of Cardiovascular and Respiratory Physiotherapy, Maharashtra Institute of Physiotherapy, Latur. gaurisorty11@gmail.com, 0009-0006-4036-9410

[4]Professor, Cardiovascular and Respiratory Physiotherapy Department, Ojas College of Physiotherapy, Jalna. drsandeshlondhe@gmail.com, 0009-0008-3370-6081

[5]Associate Professor, Department of Neuro Physiotherapy, Vasantprabha College of Physiotherapy, Buldhana. dhootnikhil@gmail.com, 0009-0009-9435-4697

[6]Assistant Professor, Department of Cardiovascular and Respiratory Physiotherapy, SSJP'S Wellness College of Physiotherapy, Dharashiv. chauhanakanksha15@gmail.com, 0000-0002-4126-7970

***Corresponding Author**: Vishvnath S.Pawadshetty
physiovish@gmail.com

Abstract:

Background: *Functional capacity in haemodialysis patients is affected due to respiratory muscles impairment. Physical activity is an important predictor of mortality in chronic kidney disease patients. CKD patients undergoing haemodialysis & manifested inactivity compared to sedentary individuals without CKD. The study aimed to investigate the effect of motivational interviewing & breathing exercises on functional capacity & quality of life (QOL) in chronic kidney disease (CKD) patients.*

Materials & methodology*: This randomized clinical trial was conducted in patients on haemodialysis. A total of 70 patients participants randomized into two groups (35 in each group). The Experimental group (Group A) received motivational interviewing along with breathing exercises & Control group (Group B) received motivational interviewing. Functional capacity was assessed by 6MWT, while QOL was measured with SF - 36 Questionnaire scale. The study was conducted at the dialysis unit of Yashwantrao Chavhan Rural Hospital, Latur, for six weeks. Data were analysed by paired test to determine the effect of motivational interviewing & breathing exercise on functional capacity & QOL in CKD patients.*

Results: *Functional Capacity was assessed by using mean and SD of pre-test and post-test for the Experimental Group which were 168.88 (SD ±41.214) and 319.71 (SD ±50.38) & the Control Group, the mean were 162 (SD ±47.823) pre-test and 240.85 (SD ±43.949) post-test, For Quality of Life, the Experimental Group's mean scores before and after the intervention were 24.42 (SD ±5.591) and 75.09 (SD ±5.741). The Control Group showed pre-test and post-test mean scores of 27.66 (SD ±9.026) and 54.44 (SD ±7.132), respectively & After Motivational Interviewing, the mean score for Functional Capacity was 78.85 (SD ±34.194), and the mean Quality of Life score was 26.77 (SD ±10.1299). Both the Experimental Group (p=0.002) and Control Group (p=0.001) demonstrated significant effects on Functional Capacity and Quality of Life. However, the Experimental Group exhibited a more substantial effect, as indicated by a p-value of less than 0.05.*

Conclusion*: Motivational interviewing, along with Breathing exercises, in the daily routine of patients with chronic kidney disease undergoing haemodialysis is recommended. This combination can effectively reduce impairments in respiratory function and improve physical performance.*

Keywords*: chronic kidney disease, diaphragmatic breathing exercise, motivational interviewing, functional capacity, and quality of life (QOL).*

INTRODUCTION:

CKD is recognized as a global health problem, affecting approximately 11 – 13 % of the world's population, and is associated with high economic cost to healthcare systems [10]. Patients with CKD have a high risk of cardiovascular mortality [10].CKD is defined as an abnormality of the structure and function of the kidneys, present for longer than 3 months. CKD is characterized by slow, progressive, and irreversible loss of kidney

regulatory functions, which can be identified by the presence of a glomerular filtration rate (GFR) of less than 60 ml/min/1.73m.[14]CKD is characterised by changes in kidney structure & function that are present for longer than 3 months and classified into different stages, caused by glomerular filtration rate & albuminuria.[1]The disease is classified into five stages based on GFR: more than 90 mL/min per 1·73 m^2 (stage 1), 60–89 mL/min per 1·73 m^2 (stage 2), 30–59 mL/min per 1·73 m^2 (stage 3), 15–29 mL/min per 1·73 m^2 (stage 4), and less than 15 mL/min per 1·73 m^2 (stage 5). [9]CKD is a disease with a poor prognosis that causes the loss of renal function & progresses to the end stages of renal disease.[2]Permanent urine abnormalities, structural changes, or reduced kidney excretory function that may indicate the loss of functional nephrons are all signs of CKD.[3]Patients with CKD often present with symptoms of anxiety & depression.[2]Continuous hypertension, fatigue, dizziness, limb edema, shortness of breath, tachycardia, pericarditis, pericardial effusion, seizure, and restless leg syndrome are all symptoms of CKD.[2]CKD patients present a progressive functional deterioration, poor health-related quality of life, and low levels of physical activity compared to their healthy age-matched counterparts.[8]In CKD patients, the decrease in exercise tolerance and level of physical activity in daily life, and high mortality rate may be due to a reduction in functional capacity. [3]People with CKD commonly develop uraemic syndrome, which affects multiple systems, including the respiratory system, with complications such as pleural effusion, pulmonary hypertension, calcification of lung parenchyma a respiratory impairment, myopathy, and loss of muscle mass.[1]Chronic kidney disease is associated with an increased risk of cardiovascular disease (CVD) and mortality.[3]Exercise training, which improves functional capacity and quality of life (QOL) in CKD patients, [10] The 6-MWT, which measures functional exercise capacity, was performed in an enclosed 30-m corridor. The patients walked as fast as they could within 6 minutes. Patients performed the test twice and rested for at least 30 min between the tests [12]. The 6-MWT distance was expressed as actual values and as a percentage of expected values [12]. Dyspnea during activity was measured using the Modified Medical Research Council (MMRC) dyspnea scale [11]. Levels of dyspnea were graded 0–4. [11] The Short Form 36 (SF-36) questionnaire was used to assess QoL and includes both physical and mental components. The scores range from 0 to 100, with higher values indicating better health [13]. Motivational interviewing is a skilful method, a style of counselling that is widely used in medical settings to promote autonomy for self-direction based on patient goals and values.[8] Motivational interviewing reduces depression and anxiety levels, and there is also significant improvement in the HRQOL in CKD patients.[8]

MATERIAL AND METHODS:

Study population and sample:

The study was a randomized clinical trial. Ethical clearance was obtained from the institute's ethics committee at the Maharashtra Institute of Physiotherapy, and written consent was obtained from all patients at the time of study enrolment. We included 70 patients in the age group of 18 to 65 years, with a mean dialysis period of 6 months. The experimental study was conducted at the YCRH dialysis unit and the Deshpande hospital dialysis unit, Latur. Participants were selected according to inclusion and exclusion criteria. The aim, objectives, and method of study were explained to the participants. Inclusive criteria were: 1. Known case of chronic kidney disease (stage 3 - 5) 2. Age: 19 to 65 years. 3. Gender: Male and female. 4. Dyspnea score more than 2 (MMRC Scale) 5. Patients are willing to participate. Exclusive criteria were: 1. Unstable vitals. 2. Recent episode of cerebrovascular accidents & head injury .3. Musculoskeletal abnormalities. 4. Pulmonary disease (acute asthma, chronic obstructive lung illness). 5. Restless leg syndrome. 6. Acute coronary syndrome, CCF, pneumonia.

METHOD:

Motivational interviewing:

Participants received 2 sessions/week of motivational interviewing for 6 weeks. The session consisted of individualized conversations to motivate participants to increase their physical activity levels. The content of each session followed processes of engagement, focusing, evoking, and planning, with the time spent at each step. Information was provided about the guidelines for physical activity (i.e., recommendation to do 150 minutes/week of physical activity) and avoiding inactivity. Generally. The focus of motivational interviewing sessions was on increasing general movement before increasing the amount of moderate-intensity activity. Adherence to the number of sessions and the duration was recorded.

Breathing exercise:

The experimental group received (Group A) the Diaphragmatic breathing exercise by placing the participant in a semi-Fowler's position. The patient initiated the breathing pattern without using the accessory muscles of inspiration. The patient was asked to place his hands on the rectus abdominis just below the anterior costal margin & instructed to breathe in slowly and deeply through the nose and palpate the rectus abdominis muscle and feel the movement. The patient was then asked to relax and exhale slowly through the mouth for 3 to 4 times. Patient is not allowed to hyperventilate.

Statistical analysis:

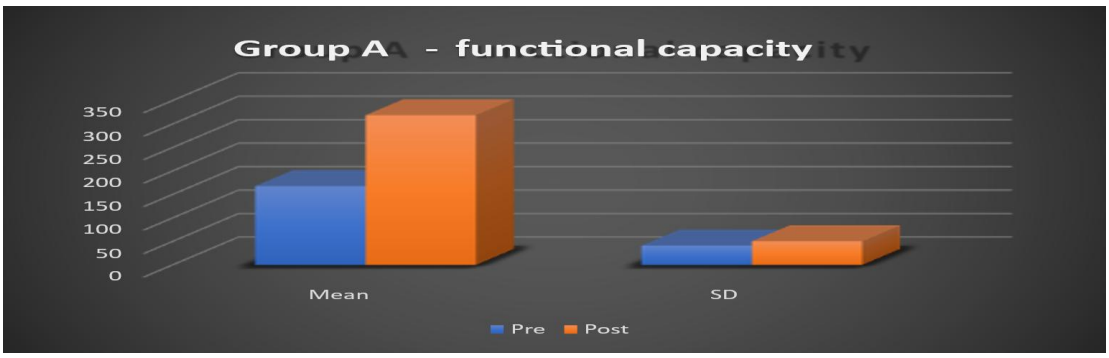
The data was collected using a structured proforma. Data entered in an MS Excel sheet and analysed by using SPSS 24.0 version. Quantitative data will be expressed in mean and standard deviation. Intergroup comparison of study parameters between both groups will be done using an unpaired T test, and intragroup comparison of study outcome parameters in each group before and after intervention will be done using a paired T test.

RESULT:

Findings related to Descriptive Statistics related to Functional capacity, along with quality of life before and after Intervention in the Experimental Group.

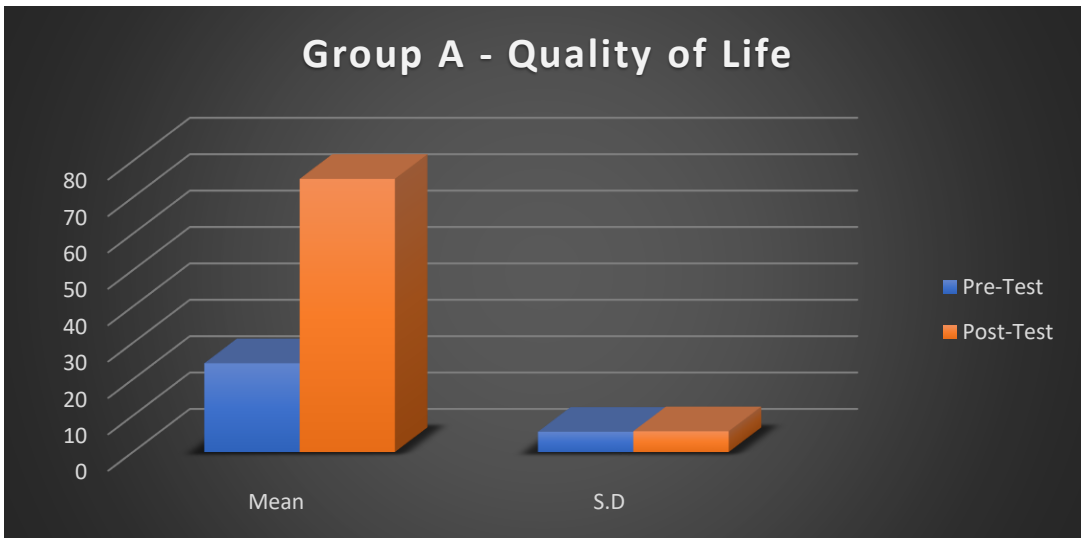
Table no. -1 N - 35

Group A							
Functional Capacity				Quality of Life			
Pre–test		Post-Test		Pre–test		Post-Test	
Mean	S.D	Mean	S.D	Mean	S.D	Mean	S.D
168.88	±41.214	319.71	±50.38	24.42	±5.591	75.090	±5.741



Graph – 1

The data presented in Table 1 and Graph 1 reveal that the Mean Pre-test and post-test scores among the Experimental Group before and after Intervention on Functional Capacity were 168.88 and 319.71, respectively, with Standard deviations of ±41.214 and ±50.38.



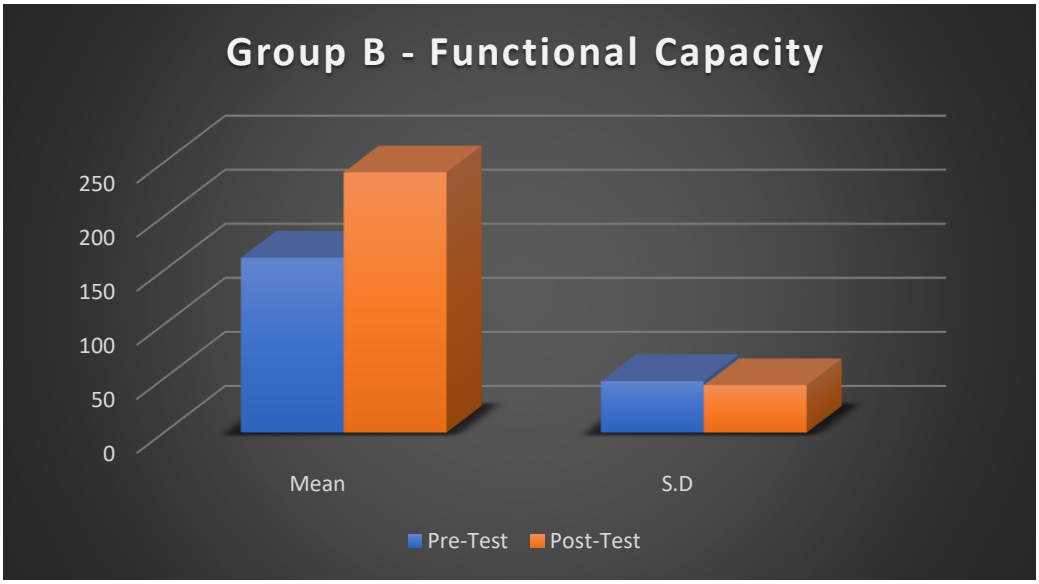
Graph – 2

The data presented in Table 1 and Graph 2 reveal that the Mean Pre-test and post-test scores of Quality of Life before and after Intervention among the Experimental Group were 24.42 and 75.09, respectively, with Standard deviations of ±5.591 and ±5.741.

Table no -2. Findings related to Descriptive Statistics related to Functional capacity and quality of life before and after Intervention in the Control group.

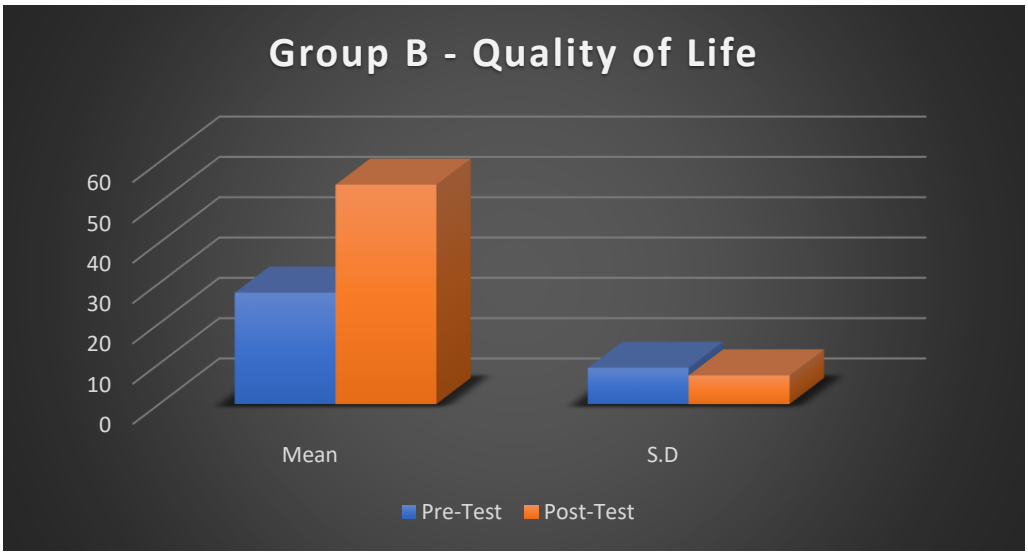
N = 35

Group B							
Functional Capacity				Quality of Life			
Pre–test		Post-Test		Pre–test		Post-Test	
Mean	S.D	Mean	S.D	Mean	S.D	Mean	S.D
162	±47.823	240.857	±43.949	27.66	±9.026	54.445	±7.132



Graph-3

The data presented in Table 2 and Graph 3 reveal that the Mean Pre-test and post-test scores of Functional ability before and after Intervention among the Control Group were 162 and 240.85, respectively, with Standard deviations of ±47.823 and ±43.949.



Graph - 4

The data presented in Table 2 and Graph 4 reveal that the Mean Pre-test and post-test scores of Quality of Life before and after Intervention among the Control group were 27.66 and 54.44, respectively, with Standard deviations of ±9.026 and ±7.132.

a) Findings related to the effect of Breathing exercise along with Motivational Interviewing on Functional capacity among chronic kidney disease patients.

Table no. – 03

N - 35

Breathing Exercise Intervention	Mean	Std. Deviation	Std. Error Mean	T	df	P-Value
Pre-test – Post-Test on Functional Capacity	150.8	±43.949	7.4288	20.307	34	0.001

b) Findings related to the effect of Breathing exercise along with Motivational Interviewing on Quality of life among chronic kidney disease.

Table no. – 04

N - 35

Breathing Exercise Intervention	Mean	Std.Deviation	Std. Error Mean	T	df	P-Value
Pre-test – Post-Test on Quality of Life	50.66	±7.984	1.349	37.539	34	0.001

c) . Findings related to the effect of Motivational interviewing on Functional capacity among chronic kidney disease

Table no. – 5

Breathing Exercise Intervention	Mean	Std.Deviation	Std. Error Mean	T	df	P-Value
Pre-test – Post-Test on Functional Capacity	78.85	±34.194	5.7798	13.643	34	0.001

d) Findings related to the effect of Motivational interviewing on Quality of life among chronic kidney disease patients.

Table no. – 06

N - 35

Motivational Interviewing Intervention	Mean	Std.Deviation	Std. Error Mean	T	df	P-Value
Pre-test – Post-Test on Quality of Life	26.77	±10.1299	1.7122	15.638	34	0.001

a) Findings related to the comparison between the Post-Interventional Experimental group and control group on Functional capacity among chronic kidney disease.

b) Findings related to the comparison between the Post-Interventional Experimental group and the control group on Quality of life among chronic kidney disease.

Table no.7

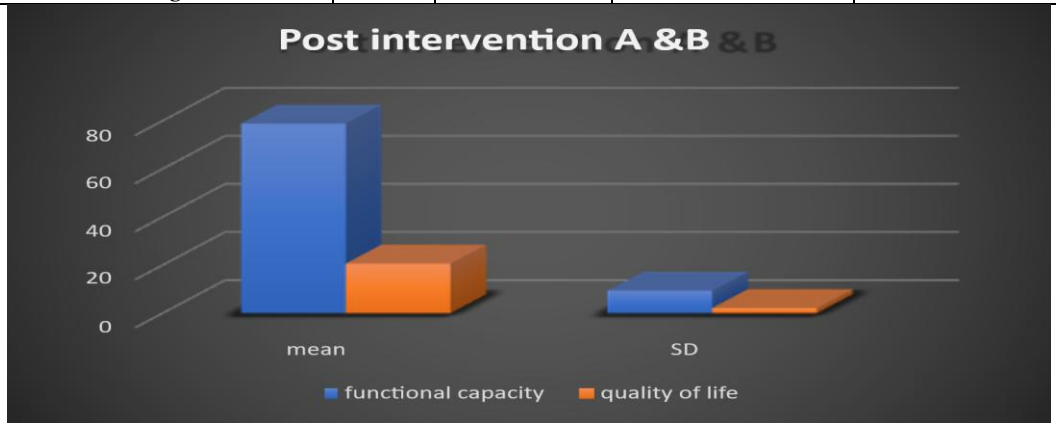
$n_1+n_2=70$

Post-Intervention's Functional Capacity	Mean	Mean difference	Standard Error Difference	Independent't' test	P-Value
Breathing Exercise along with Motivational Interviewing	319.71	78.85	9.4120	7.649	0.002
Motivational Interviewing	240.857				

Table no. - 8

$n_1+n_2=70$

Post Intervention's Quality of Life	Mean	Mean difference	Standard Error Difference	Independent't' test	P-Value
Breathing Exercise along with Motivational Interviewing	75.090	20.65	2.180	10.955	0.002
Motivational Interviewing	54.445				



DISCUSSION:

This study was designed to find out the effect of motivational interviewing and breathing exercise on functional capacity and quality of life in CKD patients. The study presents important information regarding motivational interviewing and breathing exercise on functional capacity in CKD patients. In this study, 70 people aged between > 18 to 65 years old with a mean dialysis period of 6 months completed this study. In the case of breathing exercise, it has a higher mean than motivational interviewing; hence, breathing exercise has a more pronounced effect on enhancing functional capacity as compared to motivational interviewing.

Anxiety and depression are common issues in CKD patients undergoing haemodialysis, often leading to continuous hypertension, fatigue, dizziness & decreased quality of life. Additionally, respiratory function can be compromised in this population due to shortness of breath, tachycardia, pericarditis, & pericardial effusion & other comorbidities. Another consecutive study by Zoha Badiuzzama Alvi et al conducted a study (2022) on "Evaluation of Functional Capacity and Rate of Perceived Exertion through Six Minute Walk Test in Pre and Post Haemodialysis Patients with Chronic Kidney Disease: A Prospective Observational Study" The study was to evaluate the difference in the functional capacity and rate of perceived exertion (RPE) in pre and post haemodialysis session on the same day. 73 patients were included in this prospective observational study according to the eligibility criteria. Gait speed, functional capacity, and RPE were assessed through the six-minute walk test and modified Borg scale before and after the haemodialysis session. Statistical analysis was done using a paired t-test and a one-way ANOVA test. The result of this study suggests that there is a significant reduction in the distance walked in post-dialysis, a significant increase in the rate of perceived exertion and fatigue level in the post-dialysis when compared to pre dialysis session.

Another consecutive study by Lucia Ortega-Perez Villar et al (2020). Conducted a study on "comparison of intradialytic versus home-based exercise program on physical functioning, physical activity level, adherence, and health-related quality of life: pilot study." The study was to compare the effects of 16 weeks of intradialytic exercises versus home home-based exercise program for haemodialysis patients. A total of 46 patients were randomly assigned to the intradialytic group (n=24) & home-based exercise program (n=22). They completed a 16-week combined exercise program three times per week. Outcome measures were physical activity level, physical functioning, depression level, and health-related quality of life at baseline and after 16 weeks. A significant time effect was found in both groups for the physical activity level (p=0.012). There was also a significant group time interaction effect for the one leg standing test (p= 0.049) and a significant time effect for the short physical performance Battery (p=0.013) timed Up
and go test (p=0.005) sit to stand test (p= 0.027) right- and left-hand grip (p=0.044) One heel left leg raise (p=0.019) and 6-minute walking (p=0.006), depression. HRQOL remains unchanged. They concluded that both interventions were associated with a positive change in the physical activity levels and physical function.

Another consecutive study by Helena Garcia-Llana et al. conducted a study (2014) on "motivational interviewing promotes adherence and improves well-being in pre-dialysis patients with advanced kidney disease". The study was conducted to evaluate the effectiveness of an individual, pre-dialysis intervention program in terms of adherence, emotional state, and health-related quality of life. 42 patients were evaluated and given a motivational interviewing programme. They concluded that after motivational interviewing, patients reported better adherence to the treatment (p-0.001).

Depression level significantly decreased from before (M=10.92) to after (M=8.86) the intervention, as did anxiety levels from (M=18.22) to (M=14.41). Related to HRQOL scores on the general health sub scale, increase significantly from (M=37.99) to (M=45.97).

The current study presents the analysis and interpretation of the data collected from 70 patients with CKD undergoing haemodialysis unit, breathing exercise, along with motivational interviewing vs motivational interviewing. The data presented in Table 1 and Graph 1 reveal that the Mean Pre-test and post-test scores among the Experimental Group before and after Intervention on Functional Capacity were 168.88 and 319.71, respectively, with Standard deviations of ±41.214 and ±50.38. The data presented in Table 1 and Graph 2 reveal that the Mean Pre-test and post-test scores of Quality of Life before and after Intervention among the Experimental Group were 24.42 and 75.09, respectively, with Standard deviations of ±5.591 and ±5.741.

The data presented in Table 2 and Graph 3 reveal that the Mean Pre-test and post-test scores of Functional ability before and after Intervention among the Control Group were 162 and 240.85, respectively, with Standard deviations of ±47.823 and ±43.949. The data presented in Table 2 and Graph 4 reveal that the Mean Pre-test and post-test scores of Quality of Life before and after Intervention among the Control group were 27.66 and 54.44, respectively, with Standard deviations of ±9.026 and ±7.132.

The data presented in table.no-03 shows the Mean Functional capacity before and after Intervention is 150.8 with standard deviation ±43.909 and Standard error of 7.4288 and the obtained value of Paired t test is `t`= 20.307 was found to be significant at 0.05 level of significance as the calculated value is higher than the table value, and P-Value is less than 0.05. Hence Breathing Exercise and Motivational Interviewing intervention was successful in enhancing Functional capacity among chronic kidney disease.
The data presented in table.no-04 shows the Mean Quality of Life before and after Intervention is 50.66 with standard deviation ±7.984 and Standard error Mean of 1.349 and the obtained value of Paired t test is `t`= 37.5309 was found to be significant at 0.05 level of significance as the calculated value is higher than the table value, and P-Value is less than 0.05. Hence Breathing Exercise and Motivational Interviewing intervention was successful in enhancing the Quality of Life among Chronic Kidney Disease patients.
The data presented in table.no-05 shows the Mean Functional capacity before and after Motivational Interviewing is 78.85 with standard deviation ±34.194 and Standard error of 5.7798 and the obtained value of Paired t test is `t`= 13.643 was found to be significant at 0.05 level of significance as the calculated value is higher than the table value, and P-Value is less than 0.05. Hence Motivational Interviewing intervention was successful in enhancing Functional capacity among chronic kidney disease.
The data presented in table.no-06 shows the Mean Quality of Life before and after Motivational Interviewing is 26.77 with standard deviation ±10.1299 and Standard error Mean of 1.7122 and the obtained value of Paired t test is `t`= 15.638 was found to be significant at 0.05 level of significance as the calculated value is higher than the table value, and P-Value is less than 0.05. Hence Motivational Interviewing intervention was successful in enhancing the Quality of Life among Chronic Kidney Disease.
The data presented in table.no-07 shows the Mean difference between Breathing Exercise along with Motivational Interviewing and Motivational Interviewing is 78.85, To find significant Mean difference for Functional capacity, Independent `t`-test was computed and obtained `t`(68) = 7.649 is found to be significant at 0.05 level of significance, as computed `t` value is higher than table Value (2.02) and P-Value is lower than 0.05, indicating Null Hypothesis is rejected and Alternative Hypothesis (H1a)is accepted implying there is significant difference between two interventions. As Breathing Exercise has a higher mean than Motivational interviewing. Hence, Breathing Exercise has a more pronounced effect on enhancing Functional Capacity when compared to Motivational interviewing among chronic kidney disease patients.
The data presented in Table No. -08 shows the Mean difference between Breathing Exercise along with Motivational Interviewing and Motivational Interviewing is 20.65, To find significant Mean difference for Quality of Life, Independent `t`-test was computed and obtained `t`(68) = 10.955 is found to be significant at 0.05 level of significance, as computed `t` value is higher than table Value (2.02) and P-Value is lower than 0.05, indicating Null Hypothesis is rejected and Alternative Hypothesis (H1b)is accepted implying there is significant difference between two interventions. As Breathing Exercise has a higher mean than Motivational interviewing. Hence, Breathing Exercise has a more pronounced effect on enhancing Quality of Life when compared to Motivational Interviewing among Chronic Kidney Disease.
Both experimental and control groups are effective. There is a significant effect of the experimental group (p=0.002) and the control group (p=0.001) on functional capacity and quality of life, but, experimental group has a more significant effect as compared with the control group, as to p-value is < 0.05. Motivational interviewing and breathing exercises can significantly impact functional capacity and quality of life in patients with chronic kidney disease.

CONCLUSION:

Motivational interviewing improves the quality of life. Diaphragmatic breathing exercise improves the functional capacity in chronic kidney disease patients on haemodialysis, while integration of motivational interviewing and breathing exercise has shown significant potential in enhancing functional capacity and quality of life in chronic kidney disease patients. Breathing exercise, along with motivational interviewing, should be recommended to be a part of the daily routine of patients with chronic kidney disease who are undergoing hemodialysis to decrease respiratory and physical function impairments.

Ethics committee Approval: The Study has been approved by the institutional ethics committee
Conflict of Interest: No conflict of interest among the authors

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