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Effectiveness of a breathing exercise on respiratory function in patient undergoing hemodialysis among chronic renal failure patient

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Abstract
Background: Chronic kidney disease, a growing concern worldwide, is characterized by irreversible nephron destruction. Although hemodialysis alleviates some CKD complications, pulmonary dysfunction is a common complication that causes serious problems in hemodialysis patients. Therefore, this study was designed to determine the effectiveness of respiratory exercise on respiratory function in hemodialysis patients.
Objectives
1. Assess the pretest level of pulmonary function in hemodialysis patients.
2. Evaluation of the effect of respiratory exercise on respiratory function.
3. Comparison of pretest and posttest levels of respiratory exercise for respiratory function in patients undergoing hemodialysis.
4. To find the relationship between posttest respiratory exercise level and respiratory function in hemodialysis patients.

Methodology: Quasi-experimental design using purposive sampling techniques. A total of 30 samples were selected based on inclusion criteria. A quasi-experimental pre- and post-trial design including a control group was chosen to analyze the efficacy of respiratory training in patients with chronic renal failure in hemodialysis patients with SMCH. Respiratory parameters were assessed pre-exercise and 20 min of interventional breathing exercise was administered after respiratory parameters were assessed.
Result: Most of them he was 20-30 year old group, but 66.6% were Hindu, 76.7% went to primary school and most of them were coolie workers. During the posttest, 18 (60%) of the dialysis patients had moderate difficulty and 12 (40%) had mild difficulty. The pretest mean was 21.53 with a standard deviation of 5.34 and the posttest mean for dyspnea was 17.83 with a standard deviation of 3.96. The calculated paired't' test value of t=3.022 was found to be statistically significant at $p<1$. 0.01 level found.
Conclusion: The results of the study breathing exercises are effective in reducing dyspnea in patients undergoing hemodialysis.

Keywords: Effectiveness, breathing exercises, respiratory function, haemodialysis, chronic renal failure

Introduction
The kidney is one of the most important vital organs. The proper functioning of the urinary system is important. Kidney-related diseases are now the leading cause of death worldwide Country [1]. The kidney is a major organ of the urinary system and its main functions are: Regulates the amount and composition of extracellular fluid (ECF) and expels waste products from the body. The kidney also has several non-secretory metabolic and endocrine functions. Blood pressure regulation, erythropoietin production, insulin degradation, Synthesis of prostaglandins, regulation of calcium and phosphorus, and metabolism of vitamin D [2].
The kidney balances urinary excretion and internal accumulation of substances the body by ingestion or production. Kidney Dysfunction Affects Body Functions Ability to maintain fluid, electrolyte and acid-base balance [3]. The nephron is liver. When nephrons are damaged, the glomerular filtration rate (GFR) decreases (Normally her GFR is about 85-135 mL/min), the rate at which blood is filtered through the glomerular glomeruli.

Rapid decline in renal function overloads functioning nephrons, can lead to kidney failure in which the kidneys cannot properly filter waste products from blood [4]. Renal failure is divided into two parts. They are acute and chronic renal failure. Acute renal failure (ARF) is the sudden loss of kidney function lasting hours to an hour. Decreased glomerular filtration rate (GFR), increased serum creatinine, Increased blood urea nitrogen (BUN). Acute renal failure can lead to CRF [5]. A CRF is defined as Kidney injury with moderate to severe reduction in glomerular filtration rate (GFR) from59-15 Milliliters/minute CKD is classified into stages of chronic kidney disease (CKD). Including CNEs progressive, irreversible loss of renal function. It is defined as the presence of a kidney Injury or GFR <60 mL/min for >3 months [6]. Chronic or irreversible renal failure the gradual loss of functioning kidney tissue until the remaining kidney mass is no longer usable [7]. To maintain the body environment longer. CKD can develop unnoticed over years, alternatively, it may be due to an ARF episode from which the client has not recovered patients requires treatment dialysis. Haemodialysis is used to support dysfunctional kidneys (Lydia *et al*., 2016) [8]. For renal failure, haemodialysis is done to remove waste products and toxic substances, including crystalline substances, from the blood pass through a semi-permeable membrane. First developed by Thomas Graham in 1884 Dr. William Coffe (Lydia Anthony *et al*., 2016) [9]. Majority 90% of patients requiring long-term renal replacement therapy are turned on chronic haemodialysis. Dialysis is a demanding treatment that also requires considerable personal discipline. Nursing has an important role for dialysis patients, including assisting with daily living. Hydration, Medication, 2 Skin Care, Stress Management. Most CKD patients [10]. They are being cared for at home and need the support of family and friends to cope CKD. According to the 2010 Global Burden of Disease survey, chronic Kidney disease was the 27th leading cause of death worldwide in 1990, but is on the rise. 18th in 2010. More than 2 million people worldwide are receiving renal replacement therapy.

Materials and Methods

A quasi-experimental pre- and post-test design with a control group and purposive sampling with 30 sample was chosen to analyze the efficacy of respiratory exercise on respiratory function in hemodialysis patients with chronic renal failure in SMCH. The patients was selected based on inclusion criteria intervention was for breathing exercises. Information about the study and informed consent were obtained. Demographic data were collected and dsypnea was assessed by Nijmegen questionnaire. Confidentiality was maintained throughout the study. Collected data were analyzed using descriptive and inferential statistics. The project was approved by the Institutional Ethics Committee

Results and Discussions

Section A: Description of the demographic variables

Table 1: Frequency and percentage distribution of demographic variables N = 30

Demographic Variables	Frequency(f)	Percentage (%)
Age		
15-20 years	2	6.7
20-30 years	12	40.0
30-40 years	5	16.7
Above 40 years	11	36.6
Religion		
Hindu	20	66.6
Muslim	3	10.0
Christian	7	23.3
Educational Qualification		
Primary school	23	76.6
Higher secondary school	5	16.7
Above high school	2	6.7
Illiterate	-	-
Occupation		
Housewife	2	6.7
Coolie	13	43.3
Private job	7	23.3
Government job	8	26.7
Monthly Income in Rupees		
<5000	14	46.7
5001-10000	3	10.0
10001-15000	10	33.3
Above 15000	3	10.0
Type of Family		
Nuclear	15	50.0
Joint	15	50.0
Area of Residential		
Urban	29	96.7
Rural	1	3.3

Most of them were in the 20-30 year old group, but 66.6% were Hindus, 76.7% attended primary school and most were coolie workers. 46.6% were earning less 5000 per month, 50% in nuclear family and 96.7% were residing in urban areas.

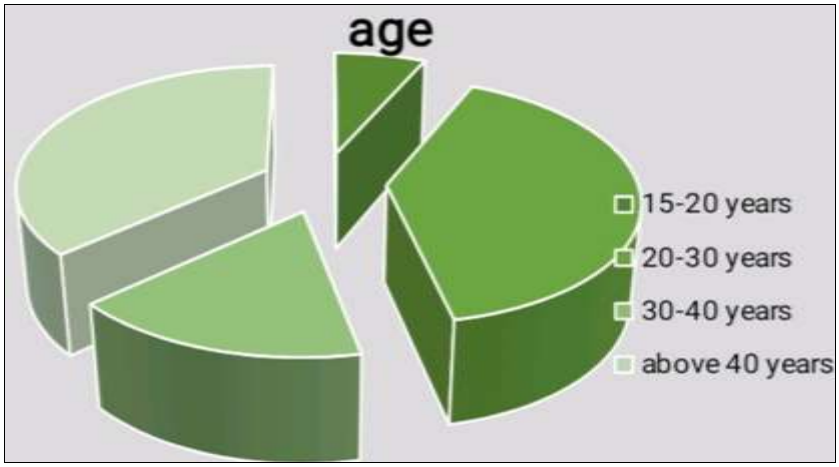

Fig 1: Percentage distribution of age

Section B: Assessment of level of breathing difficulty among dialysis clients

Table 2: Frequency and percentage distribution of level of breathing difficulty among dialysis clients

Variables	Mild Difficulty		Moderate Difficulty		Severe Difficulty	
	No.	%	No.	%	No.	%
Pretest	6	20.0	16	53.33	8	26.67
Post Test	12	40.0	18	60.0	0	0

Table above shows that in the pretest, 16 people (53.33%) had moderate difficulty, 8 people (26.67%) had severe difficulty, and 6 people (20%) had slight difficulty. indicates that At posttest, 18 (60%) of dialysis patients had moderate difficulty and 12 (40%) had mild difficulty.

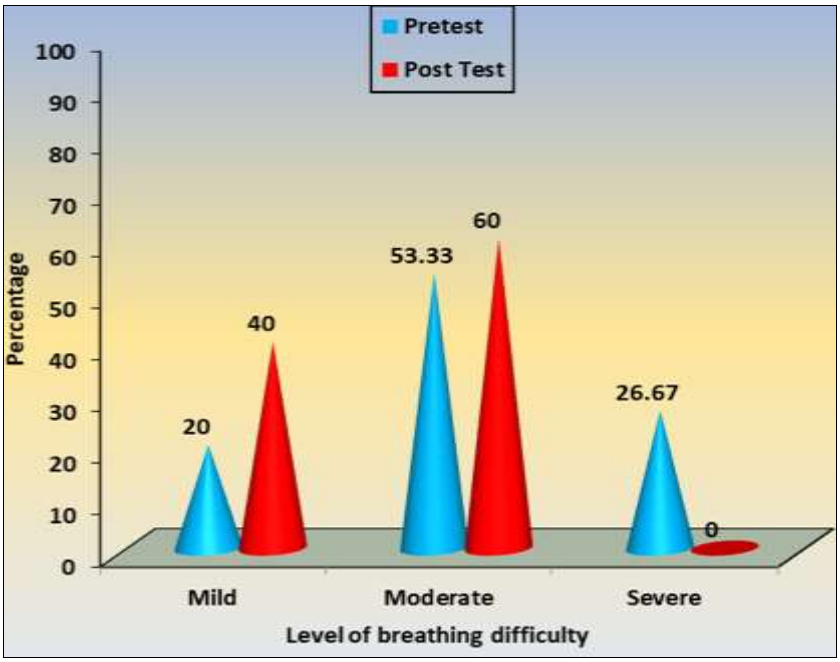

Fig 2: Percentage distribution of level of breathing difficulty

This work was supported by Hsin-Yi Huang, Kuo-Sheng Hung [10]. Study of respiration-based leg movements during hemodialysis improves quality of life: A randomized controlled trial in 86 patients with end-stage renal disease She was recruited for hemodialysis and randomly assigned to her ExBr or control group or Breath-based leg exercise program included abdominal breathing and low-intensity leg Exercises including leg raises, quadriceps contractions, knee flexion, and continuation 15 minutes per session, 3 times per week for 12 weeks. Data was collected using World Quality of Life Assessment for Health Organizations - Short Physiological Heart Rate Signal Recorder Variability and Hemodialysis-Related Fatigue Scales. The study concluded that breathing-based leg movements can be continued during hemodialysis Improve quality of life for end-stage renal disease patients for at least 12 weeks did not affect the stability of vital functions [11].

Section C: Effectiveness of breathing exercise on breathing difficulty

Table 3: Comparison of pretest and post-test level of breathing difficulty N= 30

Variables	Set of tests	Mean	S.D	Paired 't' test Value
Breathing difficulty	Pretest	21.53	5.34	t = 3.022
	Post Test	17.83	3.96	p = 0.005 S**

***p*<0.01, S – Significant

Table shows that the pre-test mean was 21.53 with a standard deviation of 5.34 and the post-test mean for dyspnea was 17.83 with a standard deviation of 3.96. The calculated paired't' test value of t=3.022 was found to be statistically significant at *p*<1. 0.01 level found.

This study was supported by Tajmohammad Arazi *et al*. (2021) [1] Effect of respiratory exercise on respiratory function and study of 6-minute walking distance Patients on Hemodialysis: A Randomized Controlled Trial Two Groups Homogeneous with respect to respiratory function parameters, 6 MW intervals, and demographic characteristics properties first. The forced expiratory volume in 1 second and the forced vital capacity are After 2 months, significantly improved in the experimental group compared to the control group intervention. There was no significant difference in the 6 MW interval between groups on day 2.

Test after 1 month. Two months of breathing exercises effectively improved lung function the following patient parameters (forced vital capacity, forced expiratory volume in 1 second) hemodialysis [12].

Section D: Association of post-test level of breathing difficulty with selected demographic variables.

Table 4: Association of post-test level of breathing difficulty with their selected demographic variables. N= 30

Demographic Variables	Mild		Moderate		Severe		Chi-Square Test
	No.	%	No.	%	No.	%	
Age							χ^2=0.158 d.f=3 p = 0.984 N.S
15-20 years	1	3.3	1	3.3	-	-	
20-30 years	5	16.7	7	23.3	-	-	
30-40 years	2	6.7	3	10.0	-	-	
Above 40 years	4	13.3	7	23.3	-	-	
Religion							χ^2=8.148 d.f=3 p = 0.043 S*
Hindu	8	26.7	10	33.3	-	-	
Muslim	0	0	5	16.7	-	-	
Christian	4	13.3	3	10.0	-	-	
Educational Qualification							χ^2=1.178 d.f=2 p = 0.555 N.S
Primary school	8	26.7	15	50.0	-	-	
Higher secondary school	3	10.0	2	6.7	-	-	
Above high school	1	3.3	1	3.3	-	-	
Illiterate	-	-	-	-	-	-	
Occupation							χ^2=2.550 d.f=3 p = 0.466 N.S
Housewife	1	3.3	1	3.3	-	-	
Coolie	6	20.0	7	23.3	-	-	
Private job	1	3.3	6	20.0	-	-	
Government job	4	13.3	4	13.3	-	-	
Monthly income in Rupees							χ^2=3.146 d.f=2 p = 0.207 N.S
<5000	5	16.7	9	30.0	-	-	
5001-10000	0	0	3	10.0	-	-	
10001-15000	7	23.3	6	20.0	-	-	
Above 15000	-	-	-	-	-	-	
Type of Family							χ^2=2.746 d.f=2 p = 0.253 N.S
Nuclear	9	30.0	8	26.6	-	-	
Joint	3	10.0	10	33.3	-	-	
Area of Residential							χ^2=0.690 d.f=1 p = 0.406 N.S
Urban	12	40.0	17	56.7	-	-	
Rural	0	0	1	3.3	-	-	

**p*<0.05, S – Significant, N.S – Not Significant

Current research shows that demographic variables such as religion were showing statistically significant correlation with degree of post-test respiratory distress at the level of *p*<1. 0.05. or No other demographic variable showed a statistically significant association with posttest levels from dyspnea

Conclusion

The findings of the study are breathing exercise is effective in reducing dysnea among patients undergoing hemodialysis.

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Authors Contribution

All the authors actively participate in the work of study. All the authors read and approved the final manuscript.

Conflict of interest

The authors declare no conflict of interest.

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