Original Research Article

The effects of intradialytic exercises on quality of life of older hemodialysis patients

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Abstract

Aim: To study the effects of intradialytic exercises on quality of life of older hemodialysis patients. **Objectives:** To study the effects of intradialytic exercises on physical composite score and mental composite score of Kidney Disease Quality of Life Questionnaire (KDQOL). **Procedure:** 43 study patients with End Stage Renal Diseases, both the genders who consecutively is on hemodialysis treatment were selected according to inclusion and exclusion criteria. Their exercise Tolerance capacity was evaluated by 6 Minute Walk Test and the Quality Of Life was assessed and recorded by using KDQOL Questionnaire pre and post to the exercise intervention. The statistical tests used for analysis of results were paired t-test. Mean, standard deviation and p values was carried out for this study. **Result:** This study concludes that there is significant effect($p<0.05$) of intradialytic exercise on QOL of older hemodialysis patients.
Key Words: End Stage Renal Disease, 6 Minute Walk Test, Intradialytic exercises, KDQOL.

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Received Date: 20/04/2017 Revised Date: 15/05/2017 Accepted Date: 02/07/2017
DOI: https://doi.org/10.26611/1017312

Access this article online	
Quick Response Code:	Website: www.medpulse.in
	Accessed Date: 12 July 2017

INTRODUCTION

Dialysis is always regarded as the only supportive measure in those for whom kidney transplant would be in appropriate. Dialysis is used to provide an artificial replacement for kidney failure patients and by which these toxins in blood can be cleared away to a large extend. The largest growth in individuals requiring treatment for end stage renal disease [ESRD] is among older persons[1]. Older Hemodialysis (HD) patients have numerous co morbidities and complications from ESRD that limit exercise tolerance, reduce physical capacity and increase functional impairments[2]. In recent years, advancements in dialysis technology have enabled dialysis patients to receive long term treatment. Although the elderly population is increasing, the number of patients with chronic disease is declining. However, the number of elderly patients undergoing maintenance dialysis as well as the number of patients who require assistance with activities of daily living (ADL) due to a decline in physical function is increasing. Therefore, renal rehabilitation has been proposed as a new method to address these issues. Renal rehabilitation aims to alleviate symptoms, maintain/promote physical fitness and health, reduce mental burdens and improve the quality of life (QOL). This is implemented through exercise therapy, which has been shown to be effective in improving patient exercise tolerance and QOL Exercise training in young HD patients has been shown to result in improvements in exercise and functional capacity[3] and quality of life[4]. Despite the reported benefits of exercise, older HD patients tend to demonstrate low levels of participation or interest in exercise programs[5]. This study provides an evidence of positive effects of intradialytic exercise and improvement of QOL of older hemodialysis patient.

Procedure: 43 study patients with end stage renal disease, both the genders, who consecutively is on hemodialysis treatment satisfying the inclusion criteria and willing to participate in the study were selected using purposive sampling technique. This study was conducted at Asian Institute of Medical Sciences, Dombivali,

Mumbai in Dialyisis Department. Informed consent were taken from all the study patients, explanations and instructions regarding the procedure to be followed were given to the subjects. The consented patients were called for 6 minute walk test (MWT), Patients walked along the metered circuit (30 ms) instructed to cover as much distance as they can within 6 minute. The results of the 6 MWT across all age groups is seen that dialysis patients had lower performance across all age groups[6]. Blood pressure (BP), Heart rate (HR), and rate of perceived exertion (RPE) were assessed at pre and post 6 MWT. HR and RPE will be measured at every min of the test, as well as at 8 to 10 min to assess Heart rate recovery and blood pressure. In this study, elderly patients undergoing maintenance dialysis, who had difficulty in developing exercise habits, received exercise therapy during dialysis for 6 weeks. Their physical composite score and Mental composite score of QOL were evaluated before and after the intervention by using kidney disease quality of life questionnaire (KDQOL) and filled detail version of it, were taken and recorded.

MATERIAL AND METHODS

The dialysis patient's vital signs stabilized within 30 minutes to 2 hours after the initiation of dialysis to avoid hypertensive responses, it was necessary to limit the exercise period to the first half of each dialysis session[7]. The exercise therapy was initiated 1 hour after the start of a dialysis session and was followed by the assessment of systematic conditions. The duration of the exercises during each session were approximately 45 mins. (fig 1)

- Warm Up [5 Min]
- Lowerlimb Strengthening [10 min]
- Aerobic Exercise [20 min]
- Cool Down [5 min]

Figure 1: Protocol for exercise therapy during dialysis It has been reported that, in the case of patients with renal failure, the target Heart rate (HR) at the peak of exercise should be set at 75% of the estimated maximum HR for each age group or lower[8]. Therefore, the target heart rate was calculated using the karvonen's method with the following formula : (maximum HR – rest HR) x 0.6 + rest HR. Further more, the exercise intensity level based on the Borg scale were set between 11 and 13 for management. During exercise, the activities were performed following this order, warm up exercise (ankle plantar flexion/dorsi flexion and followed by heel slides); Lower limb muscle strength training using the weight cuffs (leg lifts, single leg raise, and hip abduction in bed for approximately 10 minutes); aerobic exercise (in- bed pedaling using pedocycle for 20 minutes) and cool down exercises (range of motion training, such as hip flexion, single leg raise, and ankle dorsiflexion/plantarflexion for approx 5 minute). Intradialytic exercise continued for 45 minutes approx if patient complaints of tiredness, then rest of 2 minutes was given with breathing exercise included diaphragmatic breathing exercise with pursed lip breathing (figure 3)

Materials used : B P Apparatus, Sthethoscope, Stop Watch, 2 cones for marking, chair (for rest in between), weight cuffs (1 kg and ½ kg), Pedocycle

RESULTS

Figure 1: Intradialytic Exercise

The statistical tests used for analysis for results were paired t-test, mean, standard deviation, and p values were carried out for study.

Table 1: Aage and Gender distribution of study patients

Age group	Male	Female
50-60	13	5
61-70	15	7
71 and above	03	0
Total	**31**	**12**

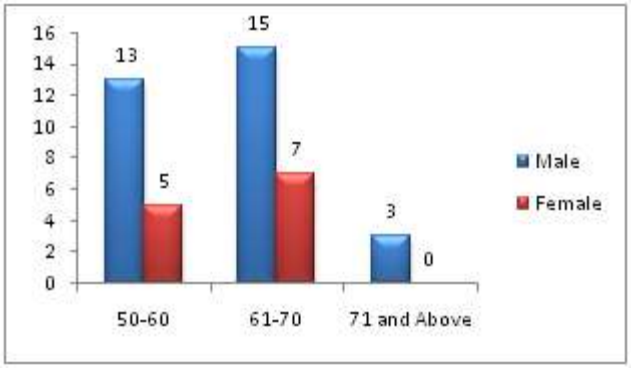

Figure 2: Age and Gender distribution of study patients.

Table 2: Distribution of scores obtained by study patients

Paired Samples Statistics				
		Mean	N	Std. Deviation
Pair 1	Pre KDQOL MENTAL SCORE	51.0930	43	8.02916
	Post KDQOL MENTAL SCORE	46.8140	43	6.38546
Pair 2	Pre KDQOL PHYSICAL SCORE	39.3721	43	7.51514
	Post KDQOL PHYSICAL SCORE	34.2558	43	6.16863

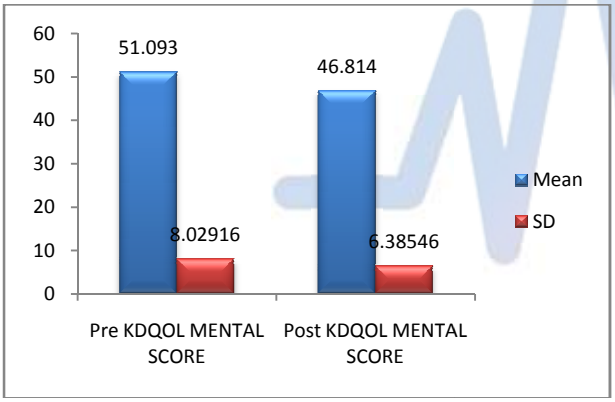

Figure 3: Distribution of scores obtained by study patients.

Table 3: Values significance table

	Paired Differences		t test	p value	Significance
	Mean	SD			
Pre KDQOL MENTAL SCORE - Post KDQOL MENTAL SCORE	4.27907	8.45528	3.319	.002	Highly Significant
Pre KDQOL PHYSICAL SCORE - Post KDQOL PHYSICAL SCORE	5.11628	9.04804	3.708	.001	Highly Significant

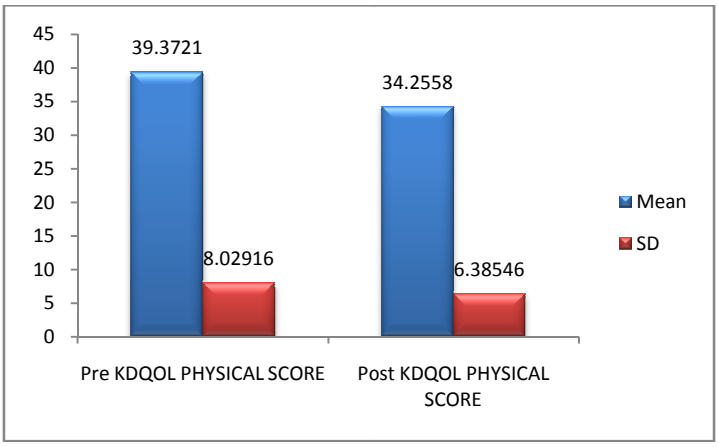

Figure 4: Values significance graph

45 patients were assessed for study eligibility. 43 were enrolled and 2 were withdrawn for toothache, headache prior to the initiation of the program. The mean age of the 43 participants was 61.5 years. (18 aged 50-60; 19 aged 61-65; 3 aged 66-70; 3 aged 71-75); 31 were male and 12 were female. Participation and cooperation in the patients for exercise program was high. The reasons for not exercising were symptoms prior to with initiation of exercise (eg. Leg cramps, nausea, shivering with cold, unstable blood pressure. There were significant difference noted pre and post treatment on mental health of the study patients who underwent intradialytic exercise via KDQOL score at $p<0.05$ as depicted in table 3 and Figure 4 There was significant difference noted pre and post treatment on physical health of the study patients who underwent intradialytic exercise via KDQOL score at $p<0.05$ as depicted in table 3 and Figure 4

DISCUSSION

Currently, the number of elderly patients undergoing maintenance dialysis is increasing, and issues involving the maintenance of motor functions, ADL ability, and QOL need to be addressed. This study examined the potential of exercise therapy during dialysis, which were performed by physical therapist. Participant in the in-hospital exercise program were high; patients exercised during all of their 12 physiotherapy sessions. The high level of participation in intradialytic exercise in our study may be attributed to the following : our program supported the formal incorporation of exercise into the overall dialysis plan, signaling to patients and families that exercise is an important part of treatment; the exercise was individualized, supervised and incorporated patient's wishes and preferences; special equipment was provided that enabled patients to exercise in a reclined or supine position during HD, and exercise during dialysis provided a productive activity that did not require extra time[9,10]. Similar to our study, pianta and kutner[11] piloted

an individualized exercise program with 25 older, low functioning patients. Only 48% of their patients regularly attended the exercise sessions. Their exercise program included physical therapy sessions outside patients HD sessions. This may have contributed to their lower participation level compared to our study that had patients exercise during their HD sessions. The quality of life has been reported to improve through intervention[12]. In this study, the QOL markedly varied between before and after intervention, indicating a favourable outcome. The values for the KDQOL components of physical health and mental health were significantly higher after intervention. These improvements may have been the result of patients developing a positive attitude toward physical activities. It is important to note that dialysis patients who perform daily physical activities have a lower death risk compared with those who rarely exercise[13]. The Kt/v values have also been reported to improve through exercise during dialysis[14]. In previous studies, exercises for patients with renal diseases or those requiring dialysis improved their exercise tolerance without negatively influencing their renal function, thereby enhancing dialysis efficacy[15]. Furthermore, the prognosis is more favorable for dialysis patients who habitually perform exercises compared with those who do not[16]. Based on this findings, dialysis patients are now being encouraged to actively exercise. While the rate of continued exercise therapy is highest when performed during dialysis, training on non dialysis days under supervision has been reported to be the most effective for dialysis patients[17]. Therefore in the future, it may be necessary to develop programs to perform exercise therapy only on such days. In addition, as the elderly are subject to marked decline in antigravity muscle strength due to prolonged bedridden condition, the incorporation of muscle strength training in a standing position should be considered.

CONCLUSION

After statistical analysis, this study concludes there is significant positive effects of intradialytic exercise on both physical and mental component of Quality of life of older hemodialysis patients.

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Source of Support: None Declared
Conflict of Interest: None Declared