Research Article ISSN: 2833-0382

International Journal of Family Medicine & Healthcare

Counsellings on Exercise in Renal Patients

Anita L R Saldanha[1], Ana Paula Pantoja Margeotto[1], André Luis Valera Gasparoto[2], Rafaela Cristina Goebel Winter Gasparoto[1], Victoria Pantoja Margeotto[1] and Tania Leme da Rocha Martinez[1]*

[1]*Nephrology Department, BP - A Beneficência Portuguesa de São Paulo, São Paulo, Brazil.*

[2]*Intensive Care Unit, BP - A Beneficência Portuguesa de São Paulo, São Paulo, Brazil.*

***Correspondence:**

Tania Leme da Rocha Martinez, Rua Comandante Ismael Guilherme, 358 - Jardim Lusitânia 04031-120 - São Paulo – SP, Brazil, Phone: 55 11 98323-9863, Fax 55 11 3842-378.

Received: 02 Oct 2025; **Accepted:** 03 Nov 2025; **Published:** 13 Nov 2025

Citation: Saldanha ALR, Margeotto APP, Gasparoto ALV, et al. Counsellings on Exercise in Renal Patients. Int J Family Med Healthcare. 2025; 4(4): 1-3.

ABSTRACT

Exercise as a therapeutic intervention for patients with chronic kidney disease and end-stage renal disease is strongly supported by evidence but remains underused. Numerous studies and meta-analyses demonstrate that structured exercise programs - including aerobic, resistance, and combined modalities - significantly improve physical fitness, cardiovascular health, and quality of life. Aerobic training enhances peak oxygen consumption and walking capacity, while strength training produces marked gains in lower limb strength and health-related quality of life. Combined programs yield additional benefits for cardiovascular performance and exercise tolerance. Exercise also contributes to metabolic and nutritional improvements, increasing albumin and energy intake without worsening kidney function. Cardiovascular advantages include reductions in systolic and diastolic blood pressure and improved heart rate control-critical given the high prevalence of cardiovascular disease among chronic kidney disease patients. Implementation is feasible across settings: supervised outpatient programs, home-based exercises, and intradialytic training using bed ergometers have all proven safe and effective. Exercise during dialysis offers high adherence, while more intensive off-dialysis training maximizes fitness gains. Both pre-dialysis and dialysis patients show significant improvements in functional capacity and psychosocial well-being. Safety data indicate that exercise is well tolerated, with rare adverse events and risks far lower than those associated with inactivity. Current evidence and guidelines emphasize incorporating structured physical activity into routine renal care. Future research should refine optimal modalities, intensities, and durations, aiming to translate functional and quality-of-life improvements into reduced morbidity and mortality.

Keywords

Chronic kidney Disease, Exercise, Hemodialysis, Quality of life, Renal.

Abbreviations

CKD: Chronic Kidney Disease.

Introduction

Exercise as a therapeutic intervention for renal patients represents a critical but underutilized component of comprehensive care, with substantial evidence demonstrating significant benefits across multiple domains of health and function.

Background and Rationale

Exercise as a therapeutic tool for end-stage renal disease patients is not routinely applied, unlike in cardiac or respiratory patients, despite the clear need for such interventions [1]. Physical inactivity and its negative influence on health and quality of life is a particularly common problem in patients with chronic illness, especially those with end-stage renal disease [2]. The functional capacity of end-stage renal disease patients is dramatically impaired, with exercise tolerance consistently reported as low in this population [3]. The physical fitness in adults with chronic kidney disease (CKD) is so reduced that it impinges on their ability and capacity to perform activities in everyday life and occupational tasks [4].

Comprehensive evidence base

The study of exercise in the end-stage renal disease population dates back almost 30 years, with numerous interventions including aerobic training, resistance exercise training, and combined training programs reporting beneficial effects [5]. A comprehensive systematic review and meta-analysis including 45 studies with 1,863 participants provides robust evidence for the effectiveness of exercise interventions [4]. Additionally, focused reviews of hemodialysis patients have analyzed 16 studies involving 640 patients, examining aerobic, strength, and combined exercise programs using rigorous methodological quality assessment criteria [1].

Specific exercise modalities and outcomes

Aerobic exercise training: moderate evidence exists for positive effects of aerobic training on peak oxygen consumption, with standardized mean differences of 6.55 (95% CI: 4.31-8.78) in hemodialysis patients [1]. Meta-analysis of 24 studies involving 847 participants demonstrated significant improvements in aerobic capacity (SMD -0.56, 95% CI -0.70 to -0.42) and walking capacity across 7 studies with 191 participants (SMD -0.36, 95% CI -0.65 to -0.06) [4]. In controlled studies, aerobic exercise programs have shown remarkable improvements, with one study demonstrating a 43% increase in peak oxygen consumption, 37% improvement in anaerobic threshold, and 33% increase in exercise time [6].

Strength training: high evidence supports positive effects of strength training on health-related quality of life, with impressive standardized mean differences of 11.03 (95% CI: 5.63-16.43) [1]. Strength training specifically improves health-related quality of life, functional capacity, and lower limb strength [1]. Low intensity aerobic activity combined with gymnastics to increase strength, flexibility, and coordination, as well as relaxation techniques, proves very effective in rehabilitation programs [2].

Combined exercise programs: moderate evidence exists for positive effects of combined exercise on peak oxygen consumption, with standardized mean differences of 5.57 (95% CI: 2.52-8.61) [1]. Combined cardiovascular and resistance training programs have shown significant benefits, with one study demonstrating that patients completing a 6-month supervised outpatient program had superior outcomes compared to other modalities [6].

Cardiovascular and physiological benefits: exercise training significantly improves multiple cardiovascular dimensions in renal patients. Meta-analysis reveals significant reductions in resting diastolic blood pressure across 11 studies with 419 participants (MD 2.32 mm Hg, 95% CI 0.59 to 4.05) and resting systolic blood pressure in 9 studies with 347 participants (MD 6.08 mm Hg, 95% CI 2.15 to 10.12) [4]. Heart rate improvements were documented across 11 studies with 229 participants (MD 6 bpm, 95% CI 10 to 2) [4]. These cardiovascular benefits are particularly relevant given that patients with CKD have a high prevalence of cardiovascular disease associated with or exacerbated by inactivity [7].

Nutritional and metabolic improvements

Exercise interventions demonstrate significant effects on nutritional parameters, including improvements in albumin levels across 3 studies with 111 participants (MD -2.28 g/L, 95% CI -4.25 to -0.32) and pre-albumin levels (MD -44.02 mg/L, 95% CI -71.52 to -16.53) [4]. Energy intake improvements were documented across 4 studies with 97 participants (SMD -0.47, 95% CI -0.88 to -0.05) [4]. Although the current literature does not allow for definitive conclusions about whether exercise training slows the progression of kidney disease, importantly, no study has reported worsening of kidney function as a result of exercise training [8].

Implementation strategies and settings

Multiple implementation approaches have proven effective. Supervised outpatient programs in rehabilitation centers, home exercise rehabilitation programs, and exercise rehabilitation programs during the first hours of hemodialysis treatment using bed bicycle ergometers in renal units can all be successfully implemented [2]. Recently, interventions during hemodialysis sessions have become more popular and have been shown to be safe [5]. Exercise training during dialysis treatment may prove particularly beneficial in terms of compliance and supervision, addressing the persistent problem of compliance to regular exercise in hemodialysis patients [3].

Comparative effectiveness of different approaches

Research comparing three rehabilitation programs found that intense exercise training on non-dialysis days was the most effective approach, while exercise during hemodialysis was also effective and preferable from a compliance perspective [6]. The supervised outpatient group showed the highest improvements but also had a higher dropout rate (24%) compared to intradialytic (17%) and home-based programs (17%) [6]. An exercise program with only two sessions per week appears easy to implement in clinical practice with high attendance among participants, with one study achieving 74% attendance over 5 months [9].

Specific population benefits

Pre-dialysis CKD patients: a randomized controlled study of 119 adults with CKD stages 3 and 4 demonstrated that a 12-week renal rehabilitation exercise program consisting of guided exercise twice weekly for 24 sessions significantly improved physical capacity and quality of life [7]. Participants showed remarkable improvements in the 6-minute walk test (+210.4±266.0 ft, representing a 19% improvement), sit-to-stand test (+26.9±27% of age prediction, representing a 29% improvement), and multiple RAND-36 physical and mental health measures [7].

Hemodialysis patients: five months of physical exercise in hemodialysis patients resulted in significant increases in aerobic capacity, functional testing performance, and Physical Function and Physical Component Scale scores on the SF-36 [9]. The positive influence of individual regular exercise on health, quality of life, physical exercise capacity, endurance, muscle strength, and social, professional, and emotional status is particularly high in dialysis patients [2].

Safety considerations and risk assessment

The risks of exercise in the renal population have not been rigorously studied, but importantly, there have been no reports of serious injury as a result of participation in exercise training programs [5]. Side effects of exercise are very rare in this population [2]. Exercise appears to be safe in patients with CKD if begun at moderate intensity and increased gradually, and the evidence suggests that the risk of remaining inactive is actually higher than the risk of exercising [8]. The renal rehabilitation exercise regimen has been generally well tolerated across multiple studies [7].

Clinical implementation and guidelines

It is time to incorporate exercise into the routine care of patients on dialysis, though identification of optimal training regimens according to patient characteristics or needs is still needed to facilitate implementation of exercise programs [5]. In the National Kidney Foundation Disease Outcomes Quality Initiative guidelines, lifestyle issues such as physical activity are stressed as cornerstones of therapy [4]. In the absence of guidelines specific to the CKD population, recent guidelines developed for older individuals and patients with chronic disease should be applied to the CKD population [8].

Future research directions and limitations

Future studies should clarify which of the three exercise modalities (aerobic, strength, or combined) results in the highest benefits for hemodialysis patients [1]. Future randomized controlled trials should focus more on the effects of resistance training interventions or mixed cardiovascular and resistance training, as these exercise types have not been studied as extensively as cardiovascular exercise [4]. Longer follow-up studies are needed to determine if the demonstrated improvements in physical capacity and quality of life will translate into decreased mortality rates [7]. The design of exercise interventions significantly affects effect size and should be carefully considered when prescribing exercise with the aim of affecting specific outcomes [4].

Clinical Recommendations

Patients should be advised to increase their physical activity when possible and be referred to physical therapy or cardiac rehabilitation programs when appropriate [8]. Although significant improvements in maximal oxygen consumption have been reported following exercise training, there may be physiologic limitations to the attainable levels of aerobic capacity due to the multisystemic nature of the disease, but long-term exercise training may result in substantial medical benefits beyond aerobic capacity improvements [3]. The evidence overwhelmingly supports the integration of structured exercise programs into comprehensive renal care, with the potential for substantial improvements in patient outcomes across multiple domains of health and function.

References

1. Segura-Ortí E. Exercise in haemodyalisis patients: a literature systematic review. Nefrologia. 2010; 30: 236-246.
2. Knap B, Buturović-Ponikvar J, Ponikvar R, et al. Regular exercise as a part of treatment for patients with end-stage renal disease. Ther Apher Dial. 2005; 9: 211-213.
3. Painter P, Zimmerman SW. Exercise in end-stage renal disease. Am J Kidney Dis. 1986; 7: 386-394.
4. Heiwe S, Jacobson SH. Exercise training for adults with chronic kidney disease. Cochrane Database Syst Rev. 2011; 2011: CD003236.
5. Johansen KL. Exercise in the end-stage renal disease population. J Am Soc Nephrol. 2007; 18: 1845-1854.
6. Konstantinidou E, Koukouvou G, Kouidi E, et al. Exercise training in patients with end-stage renal disease on hemodialysis: comparison of three rehabilitation programs. J Rehabil Med. 2002; 34: 40-45.
7. Rossi AP, Burris DD, Lucas FL, et al. Effects of a renal rehabilitation exercise program in patients with CKD: a randomized, controlled trial. Clin J Am Soc Nephrol. 2014; 9: 2052-2058.
8. Johansen KL, Painter P. Exercise in individuals with CKD. Am J Kidney Dis. 2012; 59: 126-134.
9. Molsted S, Eidemak I, Sorensen HT, et al. Five months of physical exercise in hemodialysis patients: effects on aerobic capacity, physical function and self-rated health. Nephron Clin Pract. 2004; 96: 76-81.