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EDITORIAL

EXPLORING UNTAPPED ASPECTS OF HEMODIALYSIS IN PHYSIOTHERAPY

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Chronic Kidney Disease is characterized as the presence of kidney damage and an estimated Glomerular Filtration Rate (eGFR) of less than <60 mL/min/1.73m^2, persisting for 3 months or more, irrespective of the cause. It is progressive and is associated with loss of kidney function, ultimately resulting in the need for Renal Replacement Therapy (RRT) such as, dialysis or Kidney transplantation.[1] Approximately 850 million people worldwide are estimated to have kidney disease, most of whom live in low-income and lower-middle-income countries (LICs and LMICs), and a large proportion of these individuals lack access to kidney disease diagnosis, prevention or treatment. Approximately 700 million people are estimated to have CKD worldwide.[2] The world Health Organization (WHO) has classified CKS as a major global health concern and included it in the assessment of the Global Burden of Disease (GBD). It is estimated that in November 2022, the global population has reached 8 billion, and by 2050, the global population will reach 9.7 billion.[3]

According to a 2012 report from the Indian CKD Registry, the most commonly identified causes of kidney failure were diabetes, hypertension, and Glomerulonephritis, whereas the cause was not discernible in about 16% of patients.[4,5] Hemodialysis (HD) is the most common RRT modality in India. The frequency, session length, and HD prescription is variable. Traditionally in India, it is done twice a week with a 3–4-hour long dialysis session.[5]

Muscle wasting, abnormalities in muscle function, low exercise capacity, and poor physical functioning are highly prevalent among patient with CKD. Protein energy wasting (PEW), a term to describe loss of body protein mass and fuel reserves condition, is frequently observed in patients with CKD and has been associated with chronic inflammation, metabolic acidosis, oxidative stress, accumulation of uremic toxins, malnutrition, and insulin resistance. CKD is related to comorbid conditions such as hypertension, diabetes mellitus, heart failure, arteriosclerosis, and the dialysis procedure per se which contributes to exacerbation of PEW.[6]

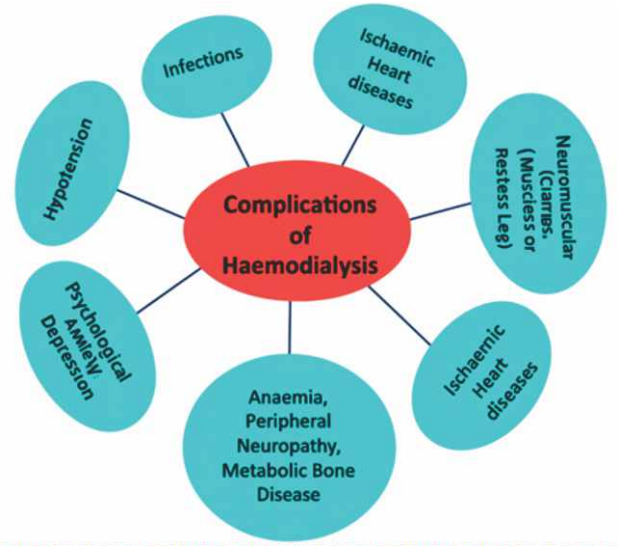

Figure 1: Complications of Haemodialysis

Physiotherapy Approach in Haemodialysis: Bridging the Gap

Objective assessment plays a pivotal role in identifying the functional limitations of individuals on HD. Commonly used outcome measures include the Six-Minute Walk Test for endurance, the 30-Second Sit-to-Stand Test for lower limb strength, and tools such as Bioelectrical Impedance Analysis (BIA) to monitor body composition, total body water, and indicators of PEW.

1. Resistance and Strength Training

Combined aerobic and resistance training programs—delivered either during dialysis or in separate sessions—are associated with significant improvements in total exercise capacity. Resistance exercises employing weight cuffs and therabands typically begin at an intensity of 60% of 1RM, progressing gradually as tolerated.

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Lower-limb strengthening, including isometric and eccentric exercises performed three times a week during dialysis, has shown measurable benefits in functional performance and muscle preservation.[7]

2. Aerobic Training

Aerobic exercise offers several advantages beyond improved cardiovascular endurance. Intradialytic cycle ergometry, performed 3–5 days per week, has demonstrated favourable effects on exercise tolerance and symptom burden. Importantly, aerobic training alleviates common dialysis-related symptoms such as muscle cramps, depressive features, fatigue, and restless legs syndrome. Monitoring the Rate of Perceived Exertion (modified Borg scale) ensures safe and individualized progression.8

3. Systemic Health Benefit

Exercise exerts anti-inflammatory and antioxidative effects by reducing levels of C-reactive protein, cytokines (IL-1β, IL-6, TNF-α), and markers associated with atherosclerotic progression. Regular moderate-intensity physical activity has also been linked to better weight regulation, improved lipid profiles (increasing HDL and lowering triglycerides), enhanced glycaemic control, and better blood pressure regulation—factors collectively vital for long-term survival in the CKD population.9

A Forward-Looking Perspective

As the burden of CKD continues to grow, the role of physiotherapy within dialysis units must evolve from optional to essential.

Physiotherapists are uniquely positioned to address functional decline, mitigate the effects of PEW, and improve the physical and psychological well-being of patients. There remains considerable scope to introduce innovative modalities such as neuromuscular electrical stimulation during HD, tele-rehabilitation for interdialytic days, and individualized exercise prescription guided by objective monitoring tools.

Strengthening interprofessional collaboration and developing standardized physiotherapy protocols for dialysis centres across India could significantly enhance patient outcomes. Embedding physiotherapy as a core component of RRT has the potential not only to improve quality of life but also to reduce hospitalization, support cardiovascular health, and enhance overall survival.

REFERENCES

1. Vaidya SR, Aeddula NR. Chronic Kidney Disease. 2024 Jul 31. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2025 Jan–. PMID: 30571025.

2. Francis A, Harhay MN, Ong AC, Tummalapalli SL, Ortiz A, Fogo AB, Fliser D, Roy-Chaudhury P, Fontana M, Nangaku M, Wanner C. Chronic kidney disease and the global public health agenda: an international consensus. Nature Reviews Nephrology. 2024 Jul;20(7):473-85.https://doi.org/10.1038/s41581-024-00820-6

3.Deng L, Guo S, Liu Y, Zhou Y, Liu Y, Zheng X, Yu X, Shuai P. Global, regional, and national burden of chronic kidney disease and its underlying etiologies from 1990 to 2021: a systematic analysis for the Global Burden of Disease Study 2021. BMC public health. 2025 Feb 17;25(1):636.

4. Bharati J, Jha V. Global Dialysis Perspective: India. Kidney360. 2020 Aug 19;1(10):1143-1147. doi: 10.34067/KID.0003982020. PMID: 35368789; PMCID: PMC8815477.

5. Rajapurkar MM, John GT, Kirpalani AL, Abraham G, Agarwal SK, Almeida AF, Gang S, Gupta A, Modi G, Pahari D, Pisharody R. What do we know about chronic kidney disease in India: first report of the Indian CKD registry. BMC nephrology. 2012 Mar 6;13(1):10.

6 Torres E, Aragoncillo I, Moreno J, Vega A, Abad S, García-Prieto A, Macias N, Hernandez A, Godino MT, Luño J. Exercise training during hemodialysis sessions: Physical and biochemical benefits. Therapeutic Apheresis and Dialysis. 2020 Dec;24(6):648-54..

7. Moraes C, Marinho S, Lobo JC, Stockler-Pinto MB, Barros AF, Jacobson LV, da Nobrega AC, Rosa ML, Denise M. Effects of resistance exercise training on acyl-ghrelin and obestatin levels in hemodialysis patients. Renal failure. 2015 May 28;37(5):851-7.

8. Anding-Rost K, von Gersdorff G, von Korn P, Ihorst G, Josef A, Kaufmann M, Huber M, Bär T, Zeißler S, Höfling S, Breuer C. Exercise during hemodialysis in patients with chronic kidney failure. NEJM evidence. 2023 Aug 22;2(9):EVIDoa2300057.

9. Deligiannis A, D'Alessandro C, Cupisti A. Exercise training in dialysis patients: impact on cardiovascular and skeletal muscle health. Clinical kidney journal. 2021 Apr 1;14(Supplement_2):ii25-33.