



Research Article

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Exercise for Diabetic Nephropathy Individuals During Covid-19



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Abstract

The COVID-19 pandemic imposes several health-related threats on individuals because of being confined within close indoors. This short communication article highlights the possible role of an exercise-based rehabilitation program to prove to be beneficial for those individuals with type 2 diabetes mellitus and nephropathy during the COVID-19 period.

Keywords: Renal rehabilitation, Diabetic Nephropathy, Exercise intervention, Preventive Rehabilitation, COVID-19

Abbreviations: ACE: Angiotensin converting enzyme; ARB: Angiotensin receptor blocker; CAF: Cardiac autonomic function; CFS: Chronic fatigue syndrome; CKD: Chronic kidney disease; COVID-19: Coronavirus disease 2019; CVD: Cardiovascular disease; DN: Diabetic nephropathy; ESRD: End Stage Renal Disease; Influenza A (H1N1): Influenza A virus subtype H1N1; MERS-CoV: Middle East respiratory syndrome coronavirus; RF: Renal failure; SARS-CoV: Severe acute respiratory syndrome coronavirus; SARS-CoV2: Severe acute respiratory syndrome coronavirus 2

Background

The global coronavirus disease 2019 (COVID-19) pandemic, which demanded prolonged confinement with safe indoors, has raised several clinical concerns on its impact among individuals with underlying cardiovascular disease (CVD) risk factors leaving no exception to the diabetic nephropathy (DN) group. With the escalation of kidney function deterioration among DN individuals there exists a fast progression to serious kidney complications such as chronic kidney disease (CKD), end-stage renal disease (ESRD), and renal failure (RF). Thus, early screening and identification remain imperative along with the need to develop effective strategies that either delay or cease the physiological trajectory of renal function deterioration both during and after COVID-19 through exercise-based rehabilitation [1].

COVID-19 & Diabetic Nephropathy: The past viral pandemic outbreaks of influenza A (H1N1), SARS-CoV (Severe acute respiratory syndrome coronavirus), and MERS-CoV (Middle East respiratory syndrome coronavirus) have suggested diabetic

individuals be highly vulnerable to such infections due to persistent chronic systemic inflammation resulting in an immune-compromised state [2]. Although the multi-organ involvement of COVID-19 continues to gain clarity with over months of the pandemic outbreak now, the damage to kidneys remains unclear with shreds of evidence suggestive of cytokine storm syndrome through sepsis and damage to renal tubular cells [3]. The acute effects on kidneys among hospitalized COVID-19 affected individuals have been linked with destruction to the endothelial layer lining in the presence of macro-albuminuria or proteinuria and or hematuria [4] with elevated blood urea and creatinine levels. The pharmacological management of angiotensin-converting enzyme (ACE) inhibitors or angiotensin receptor blockers (ARB) agents among diabetic, hypertensive, and proteinuric individuals remains controversial as the mechanism of action of COVID-19 infection on human kidney cells links with angiotensin-converting enzyme-2 receptors [5]. The research community looks forward to verifying this inconclusive evidence as to how diabetes alone

might produce health consequences through the mobilization of pro-inflammatory monocytes and increased platelet reactivity due to altered glycaemic levels and thereby pose a health risk for those with pre-existing co-morbidities [6].

Role of Exercise-based rehabilitation program for Diabetic Nephropathy: The likelihood of this pandemic to drift the DN individuals into CKD or ESRD groups may largely alter their overall physical functioning. Furthermore, the possibility of clinical manifestations such as chronic fatigue syndrome (CFS), physical inactivity, reduction in skeletal muscle mass, the decline in physical functioning and performance, reduction in cardiorespiratory fitness levels, changes in appetite, sleep, and energy levels among DN may urge healthcare providers towards immediate recognition of such symptoms and promptly address them using a detailed assessment/evaluation followed by prescription of an exercise-based rehabilitation program delivered through qualified physical therapists.

The anti-inflammatory, anti-oxidative [7], anti-glycaemic, anti-sedative, and cardio-reno-protective effects obtained from exercise-based rehabilitation program may result in optimal energy expenditure, with improved health-related outcomes and enhance synthesis and utilization of vitamin D [8] whose low levels have also been linked to acquiring COVID-19. Moreover, benefits obtained from an exercise training program may reduce the excessive cardiac autonomic function activity (CAF) produced through sympathetic overstimulation among them.

Practice recommendations

i. Early testing and diagnosis of kidney dysfunction among

type 2 diabetes mellitus individuals with nephropathy by the Nephrologists.

ii. Engaging the patient as a critical member in the decision-making process of the multidisciplinary team approach of “Exercise-based rehabilitation” through addressing patient queries, patient education, lifestyle & dietary modifications, and inclusion for exercise.

iii. Identifying changes in the physical and mental health function of an individual through a detailed evaluation and assessment process by a physiotherapist.

iv. Initiating health promotion strategies through the delivery of rehabilitation services provided by the physiotherapist.

v. Encouraging a team-based approach for decision making to facilitate improved patient health-related outcomes.

vi. Feasibility, safety, and effectiveness of such exercise-based rehabilitation programs need to be determined through future studies.

vii. Conclusion: The new normal world after the pandemic involving kidney dysfunction will largely be impacted by the unraveling effects of an exercise-based rehabilitation program (Figure 1) for an independent healthy life free of symptoms, with improved survival rates, and reduced mortality rate through the overall enhancement of quality of life among DN group. For the successful implementation of such exercise-based rehabilitation programs, the synergistic efforts from the team of nephrologists/physician, physiotherapist along with diet and nutrition specialists would be indispensable.

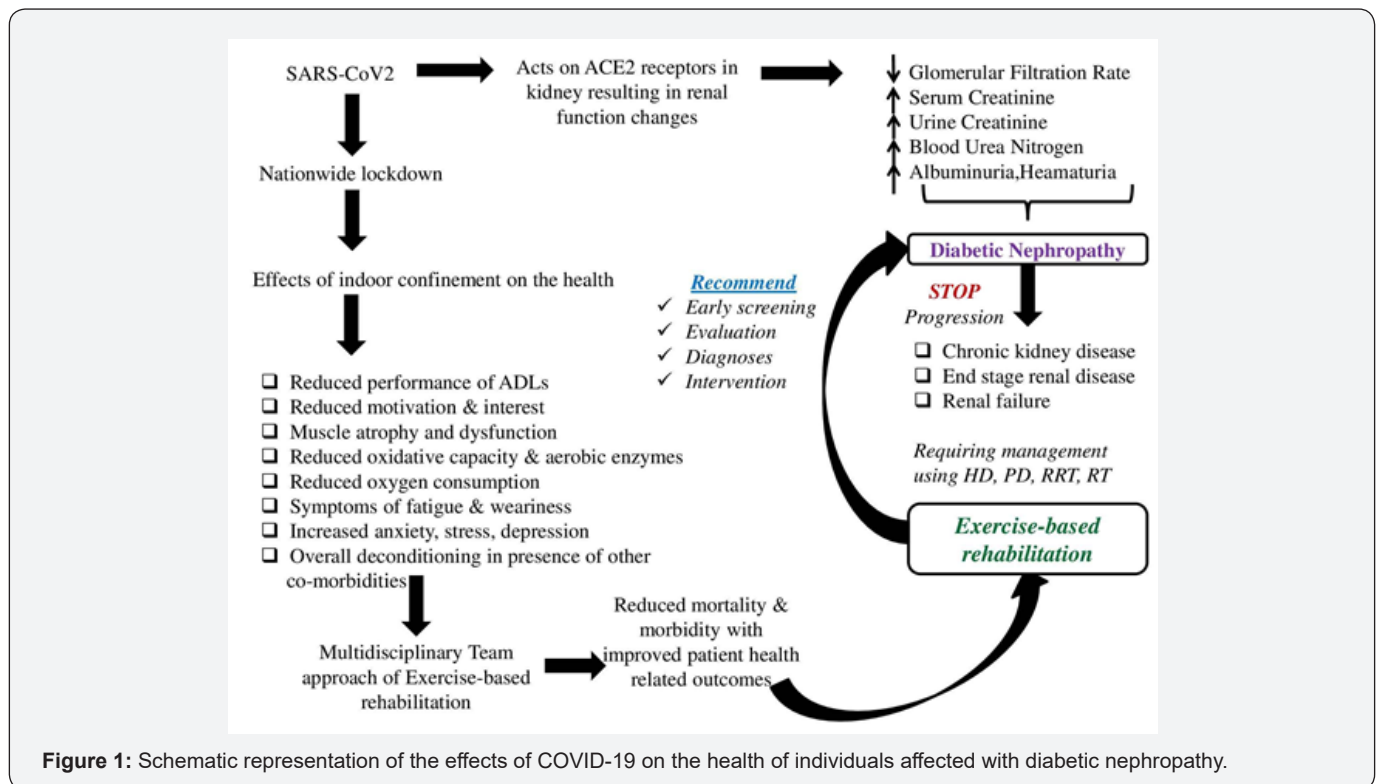


Figure 1: Schematic representation of the effects of COVID-19 on the health of individuals affected with diabetic nephropathy.

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References

1. Yamagata K, Hoshino J, Sugiyama H, Hanafusa N, Shibagaki Y, Komatsu Y et al. (2019) Clinical practice guideline for renal rehabilitation: systematic reviews and recommendations of exercise therapies in patients with kidney diseases. *Renal Replacement Therapy* 5(1).
2. D'Marco L, Puchades MJ, Romero-Parra M, Gorriz JL (2020) Diabetic Kidney Disease and COVID-19: The Crash of Two Pandemics. *Front Med (Lausanne)* 7:199.
3. Naicker S, Yang CW, Hwang SJ, Liu BC, Chen JH, et al. (2020) The Novel Coronavirus 2019 epidemic and kidneys. *Kidney Int.* 97(5): 824-828.
4. Li Z, Wu M, Yao J, Guo J, Liao X, et al. Caution on kidney dysfunctions of COVID-19 patients.
5. Kalantar-Zadeh K, Moore LW (2020) Impact of Nutrition and Diet on COVID-19 Infection and Implications for Kidney Health and Kidney Disease Management. *J Ren Nutr* 30(3): 179-181.
6. Li B, Yang J, Zhao F, Zhi L, Wang X, et al. (2020) Prevalence and impact of cardiovascular metabolic diseases on COVID-19 in China. *Clin Res Cardiol.* 109(5): 531-538.
7. Dong L, Li J, Lian Y, Tang ZX, Zen Z, et al. (2019) Long-Term Intensive Lifestyle Intervention Promotes Improvement of Stage III Diabetic Nephropathy. *Med Sci Monit.* 25: 3061-3068.
8. Biesalski H (2020) Vitamin D deficiency and co-morbidities in COVID-19 patients – A fatal relationship? *NFS Journal* 20: 10-21.



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