kidney and dialysis

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Editorial

The Importance of Lifestyle Interventions in the Prevention and Treatment of Chronic Kidney Disease

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Chronic kidney disease (CKD) is a global health problem, with a prevalence of approximately 13.4% worldwide [1]. Not only is CKD an independent risk factor for Cardiovascular disease (CVD) [2], it is associated with global mortality and morbidity [3]. Whilst the detection and treatment of CKD has improved over recent years, there is a strong need for preventative care [3]. Over the last few decades, strategies to prevent and treat CKD have largely focused on pharmacological interventions. However, while this approach has provided answers for individual disease settings, the general problem of CKD remains. Non-pharmacological treatments, such as Lifestyle interventions (including dietary recommendations and physical exercise) have been shown to harbour potential for beneficial effects on kidney health and the resulting co-morbidities [4]. The aim of the Special Issue on "Lifestyle interventions in Kidney Health and Disease" was to provide an overview on the current knowledge in this field and an outlook towards new research questions. Increasing awareness of lifestyle interventions and creating a setting in which these can be efficiently studied in clinical trials could facilitate future implementation into clinical practice and improvement in outcomes for people living with CKD. This Special Issue included 14 peer-reviewed publications reviewing dietary, exercise, and other non-pharmacological interventions in people living with CKD. The work received a lot of attention, as indicated by three publications being among the top read publications in *Kidney & Dialysis* in November 2022 (https://www.mdpi.com/journal/kidneydial/announcements/4717 accessed on 10 March 2023). The key messages from this Special Issue will be summarised below.

In ADPKD, animal experiments have shown potential of ketogenic dietary interventions ameliorating disease progression [5] and first data in humans point towards potential translatability of this approach [6,7]. In this Special Issue, Bruen et al. [8] provide a first insight into a potential tailored dietary intervention that may enable the implementation of ketogenic dietary interventions in real life in the future. This aspect is complemented by recent evidence on the role of weight reduction in ADPKD. Steele and Nowak [9] facilitate further exploration by providing an overview of available data, adding insight into potential mechanisms, and offering suggestions for future research. Ramos et al. [10] explore the evidence regarding the pathophysiology, assessment and treatment of constipation in people living with CKD.

Metabolic abnormalities associated with CKD including inflammation, dyslipidaemia, and oxidative stress, and are considered major factors contributing to disease progression and cardiovascular comorbidity. The review by Ertuglu and Ikizler [11] provides a summary of the current knowledge regarding how diet and exercise may impact on metabolic endpoints in CKD and suggests future interventions that may improve CKD-associated outcomes. The commentary by Artemis Simopoulos [12] extends on these thoughts by

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elaborating on the role of healthy dietary patterns in preventing inflammation. Such dietary patterns, including DASH- and Mediterranean diets, may become important to prevent loss of kidney function and further research is warranted.

Physical activity and exercise are recommended for people across all stages of CKD [13,14]. To facilitate tailored exercise interventions, the correct assessment tools are required. In this Special Issue, Koufaki [15] suggests physical function outcomes that are key for assessment and implementation into clinical practice for people living with CKD. There is a growing need and interest for patient-reported outcomes, such as the Participant's Activation Measure (PAM) [16]. Lightfoot et al. [17] provide a review of patient activation and self-management, their interactions, and the importance of these concepts for self-management interventions for people living with CKD.

Frailty is an emerging area of research in CKD [18]. Mayes et al. [19] provide a review of the evidence addressing the assessment of frailty in people living with CKD, and the non-pharmacological management strategies to address frailty.

A recent systematic review and practice guideline suggests exercise in pre-dialysis candidates may contribute to improvements in blood pressure, physical function and capacity, functional limitations, and health-related quality of life [14]. Davies et al. [20] summarize and explore the evidence regarding exercising training and delaying kidney function and decline in individuals with CKD who are non-dialysis dependant. The pathophysiology, potential risk factors, how exercise may play a role in kidney function, and the need for future research are presented [20]. However, the authors acknowledge that there is no known harm associated with exercise in pre-dialysis candidates, the importance of individualised exercise prescription and the potential benefits of exercise on other health outcomes, such as quality of life [20].

Recent evidence regarding intra-dialytic cycling (IDC) has sparked debate within the CKD community [21–23]. In this Special Issue, King et al. [24] provide an up-to-date summary of the evidence reviewing IDC for those receiving haemodialysis (HD) and explore the concerns and benefits of this treatment approach. The authors urge the renal community to consider IDC not as an individual intervention, but as a component within a comprehensive patient-centred intervention [24].

Recent international guidelines for physical activity for people receiving Peritoneal dialysis (PD) have been published [13]. Despite the guidelines, and feasibility studies suggesting exercise can be safe in people receiving PD, there is low uptake [25]. The review by Lyasere et al. [25] further explores exercise for people living with PD by reviewing the benefits and limitations of the current evidence, providing clinician and patient insights, and potential steps for future research.

Evidence suggests exercise and access to weight management support should be recommended for people following a kidney transplant [14,26]. Whilst weight gain is a significant issue for new kidney transplant recipients, there is no recommended intervention designed to prevent adverse weight gain from occurring [27]. The systematic review and meta-analysis by Castle et al. [28] explore the effects of exercise interventions, dietary interventions and combined interventions on body weight and body mass index in people following a kidney transplant.

Behavioural change techniques are recommended to facilitate physical activity and dietary interventions [29]. In this Special Issue, Leunis et al. [30] explore physical activity behaviour in solid organ transplant recipients. The authors draw on the Behaviour Change Wheel [31] to propose physical activity behaviour change interventions for solid organ transplant candidates [30].

The perspective statement contributed by Tess Harris [32] provides the crucial patient perspective and clearly underlines the lack of lifestyle counselling in routine clinical care. This shortcoming, together with a lack of focus on patient-relevant outcomes, and the need for tools measuring these outcomes, will be topics requiring special attention in the future.

Conclusions

Lifestyle interventions to optimise diet, physical activity, exercise, and non-pharmacological interventions are crucial in the prevention and treatment of CKD. The challenge remains in how to deliver these potential kidney-specific solutions without a trained workforce in place. Novel ways to implement lifestyle interventions at scale, and pragmatically deliver them in routine clinical practice, should be the focus of further research and implementation projects. This will require coherent stakeholder engagement (e.g., patients, healthcare providers, researchers, and policy-makers) and a commitment from research funding schemes to support real-world implementation studies in this field.

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