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Motivations and barriers to exercise in chronic kidney disease: a qualitative study

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ORIGINAL ARTICLE

ABSTRACT

Background. Exercise has the potential to modulate a number of complications associated with chronic kidney disease (CKD). However, typically, CKD patients lead very sedentary lifestyles, the reasons for which are not fully known. The aim of this qualitative study was to gain an understanding of the motivators, barriers and beliefs held by CKD patients regarding exercise.

Methods. We conducted 3 focus groups and 22 semi-structured interviews. Data were collected from nephrology outpatient clinics in the United Kingdom. A total of 36 individuals with CKD stages 1–5 not requiring renal replacement therapy, aged 26–83 years participated in this study. This manuscript outlines the findings from patients with CKD stages 3–5. Focus groups and interviews were transcribed verbatim and analysed thematically.

Results. Positive attitudes to exercise reflected autonomous motivations including: exercising for health; enjoyment and social interaction. Family support and goal setting were seen as motivators for exercise and the accessibility of local facilities influenced activity levels. Barriers to exercise were poor health, fear of injury or aggravating their condition, a lack of guidance from healthcare professionals and a lack of facilities.

Conclusions. These findings are an important first stage in the development of a CKD-specific exercise behaviour change intervention. Interventions should operate at multiple levels, with a focus on improving patient autonomy and exercise self-efficacy, support networks and the physical environment (e.g. the accessibility of local facilities). In addition, strategies are required to ensure that the healthcare system is actively promoting and routinely supporting exercise for all patients with CKD.

Keywords: chronic kidney disease (CKD), exercise, focus group, qualitative research, semi-structured interview

INTRODUCTION

Chronic kidney disease (CKD) affects 8–16% of the population worldwide [1] and is associated with an increased risk of cardiovascular disease (CVD) [2], muscle wasting [3], decreased physical function [4] and overall poorer quality of life (QOL) [5]. Exercise is being increasingly recognized for its therapeutic benefits in patients with CKD, which include improved physical fitness, cardiovascular health and better QOL [6]. Most of the research regarding such benefits has been conducted in dialysis patients [7–9] but the potential of exercise to modulate a number of factors related to disease progression, as well as address co-morbidities, makes it a particularly interesting and theoretically important treatment for all patients with CKD [10, 11]. Current international guidelines recommend that CKD patients should engage in an exercise programme that is compatible with cardiovascular health for 30 min, 5 days of the week [12]. Despite this, CKD patients are known to lead insufficiently active lifestyles [13].

Identifying barriers and asking participants to strategize ways to overcome them is a popular technique used in behaviour change interventions [14]. However, little is known about the barriers and motivators CKD patients have towards exercise participation, although these have been explored more extensively in other target populations [15–17]. Commonly reported barriers from other cohorts include a lack of time, fear of pain/injury, health problems and poor weather. Nearly all of these studies identified enjoyment as a motivator for exercise participation, an intrinsic motivator associated with sustained exercise behaviours [18].

Understanding the barriers, motivators and beliefs towards exercise may allow us to tailor interventions and inform the delivery and development of CKD-specific

behaviour change programmes designed to promote exercise. Recent data have highlighted that behaviour modification in CKD patients is feasible and efficacious at increasing levels of exercise [19].

This qualitative study explored attitudes and perceptions towards exercise amongst patients with CKD not requiring renal replacement therapy to identify factors which act as barriers (to be addressed) and motivators (to be utilized) in future interventions. Social cognitive theory (SCT) is used as a conceptual framework to organize the data and to highlight the ways in which the findings could be used in the design of an appropriate intervention for this patient group.

MATERIALS AND METHODS

Study design

This study was conducted within the constructivist paradigm, enabling the researchers to theorize meaning and form assumptions around what was articulated within the data [20]. Data were elicited through a qualitative design utilizing focus groups and semi-structured interviews [21]. Focus groups were used to initially explore perceptions of exercise amongst this patient group in a dynamic and collaborative context as well as to identify topics for inclusion in the one-to-one interviews which followed [22]. In addition to focus groups, individual face-to-face interviews were conducted to explore individual patient accounts of exercise in more detail. All participants filled in a brief demographics questionnaire and the General Practitioner Physical Activity Questionnaire (GPPAQ) prior to attending a focus group or interview as part of an earlier stage of this research.

Sample and setting

A convenience sampling method was used to initially recruit participants who had expressed interest in the study via completion of a contact form whilst waiting in nephrology outpatient clinics. A purposive sampling method was then used to ensure that the sample included a diverse representation in terms of gender, age and ethnic origin. All interviews and focus groups were conducted in non-clinical areas of a UK hospital. Independent multilingual facilitators were used to conduct interviews with participants whose first language was not English in order to gain more diverse opinions. Informed consent was given by all participants. Patient recruitment details are illustrated in Figure 1.

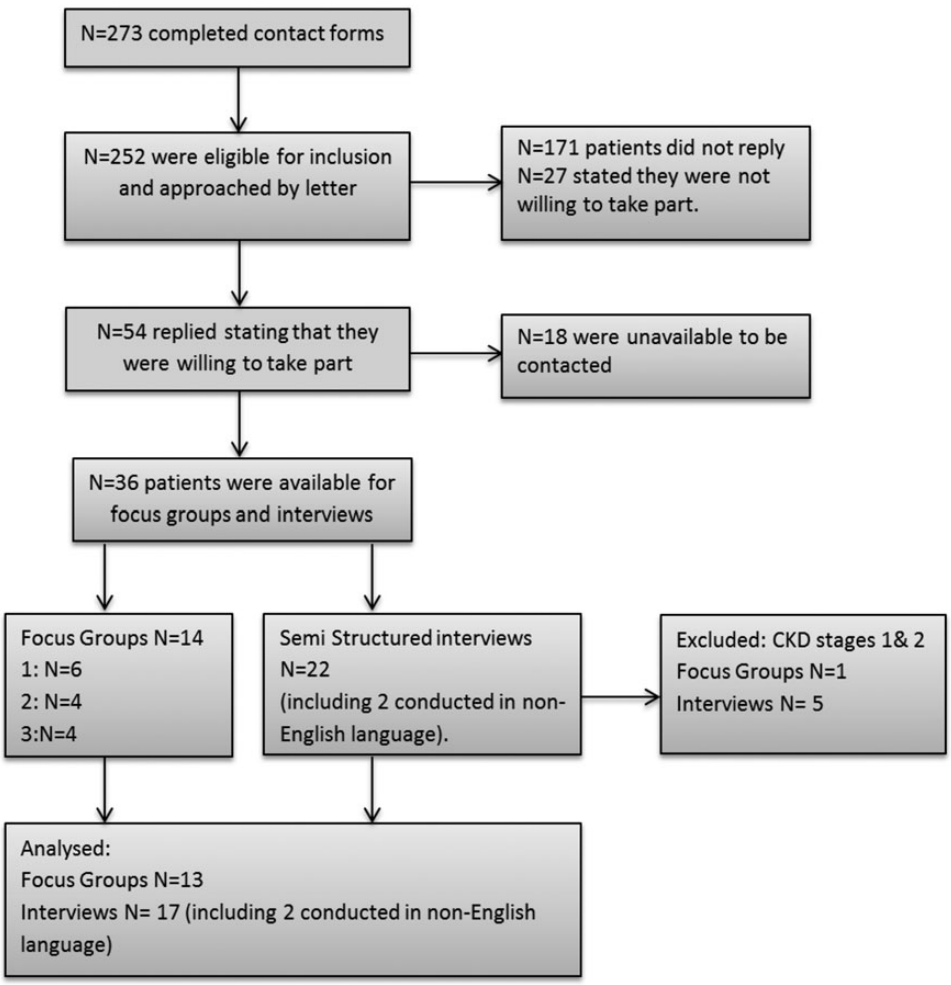

FIGURE 1: A consort diagram to show participant flow through study.

This study was approved by the NRES Committee East Midlands—Northampton on 13 June 2012.

Data collection

A patient and public involvement group convened for the study assisted with the development of the data collection tools. Focus groups and semi-structured interviews covered the following topics: the meaning of exercise; perceived benefits, advantages and disadvantages of exercise; sources of information about exercise; experiences of exercise; factors that influence personal decisions about exercise; focussing on group level perceptions and individual experiences respectively. Interview questions were informed by the early focus group data. Focus groups were conducted with 4–6 participants and lasted between 60–80 min. Individual interviews lasted between 30–85 min. All focus groups and interviews were digitally recorded, professionally transcribed verbatim, anonymized and translated where necessary. Transcripts were then entered into Nvivo 10.

Analytical approach

Data were analysed using inductive thematic analysis, identifying themes at a semantic level [20]. This approach is consistent with the applied objectives of health services research, whilst maintaining the potential to provide a rich and complex account of the studied phenomenon [20]. Analysis followed the steps provided by Braun & Clark [20]: familiarization with all data, initial coding, searching for themes, reviewing themes using the constant comparison method and finally defining themes for the final part of the analysis. For the purpose of this manuscript, patients with CKD stages 1 and 2 were omitted from the analysis. At this stage of disease progression, it was deemed unlikely that participants would be experiencing the effects of reduced renal function.

The analysis identified a number of themes compatible with health promotion from a SCT perspective. SCT provides a framework to understand how personal, behavioural and environmental factors interact to influence behaviour [23], and has been used to inform the analytical framework within this report. Themes were categorized according to personal (e.g. biological state, cognitive and affective), behavioural (e.g. self-regulation, enlisted incentives for personal change) and environmental (e.g. social and physical environment). These themes are presented below and featured in this account as both motivators and barriers to exercise.

RESULTS

These results describe the beliefs, motivations and barriers to exercise held by patients with CKD. Patient characteristics are illustrated in Table 1.

Personal factors

Exemplars for this theme are presented in Table 2.

Poor physical condition and exercise-related health concerns. Co-morbid conditions and symptom burden were described as the most prevalent barriers to exercise. Conditions included CVD; hypertension, respiratory disease; diabetes mellitus; musculoskeletal and mental health illnesses. Symptoms were perceived to be functionally limiting at all stages of disease progression and most commonly included fatigue, pain in joints and back and shortness of breath. Fatigue was described as the most prominent barrier, and made performing functional tasks such as walking around the house challenging. Symptoms were often linked to the negative effects of medication or normalized as part of the aging process with some participants accepting functional decline and fatigue with increasing age. Whereas others described how symptoms of fatigue and shortness of breath improved after receiving erythropoietin, which they perceived positively impacted on their level of activity.

Over half of participants expressed concerns about injury and aggravating their physical condition through exercise. Fears tended to be exacerbated by negative experiences of exercise, in particular patients with diabetes mellitus reported anxiety regarding exercise-induced hypoglycaemia: '… if I start walking … after about half a mile I can't guarantee what my sugar level will be … it is very dangerous to go on my own …' (Male, Age 69). Participants described a lack of confidence in recognizing performance limits, and felt *too much exercise could inhibit* [them] (Male, Age 73), a message that was occasionally reinforced by unsupportive communication from family members and healthcare professionals.

Benefits of exercise on health and well-being. Conversely, some participants described their previous exercise experiences

Table 1. Patient characteristics

	Focus group	Interviews
N	**13**	**17**
Sex		
Male:Female	07:06	11:06
Age (Years)	68.6 (48–83)	64.1 (26–78)
CKD stage: *n* (%)		
3	3 (23.1)	8 (47.0)
4	10 (76.9)	7 (41.2)
5	0 (0)	2 (11.8)
Ethnicity: *n* (%)		
White British	11 (84.6)	12 (70.6)
Any other white background	1 (7.7)	1 (5.8)
Any other black background	1 (7.7)	0 (0)
Asian or Asian British Indian	0 (0)	4 (23.5)
Co-morbidities: *n* (%)		
Hypertension	8 (61.5)	9 (60.0)
Cardiovascular disease/Stroke	5 (38.5)	6 (35.3)
Diabetes type 11	5 (38.5)	3 (17.6)
Musculoskeletal	3 (23.1)	3 (17.6)
Asthma/Chronic obstructive pulmonary disease	2 (15.4)	2 (11.8)
Mental health illness	2 (15.4)	2 (11.8)
Physical activity index: *n* (%)		
Active	1 (7.7)	3 (17.6)
Moderately active	2 (15.4)	2 (11.8)
Moderately inactive	2 (15.4)	2 (11.8)
Inactive	3 (23.1)	6 (35.3)
Missing	5 (38.5)	4 (23.5)

more positively, focussing on how exercise had improved certain health conditions. Similarly, the majority of participants felt that exercise had the potential to make them feel *a lot better* (Focus Group), and could help to maintain health by protecting against complications associated with older age and disease. For example, exercise was described as useful in pain management and regarded as a way of preserving mobility, muscle strength and cognitive function. Participants also specifically acknowledged the role of exercise in reducing cardiovascular risk factors, with the desire to manage weight and cholesterol levels being seen as an incentive to become active. Exercise was also perceived to positively impact mental well-being by helping patients to feel *happier* and *more confident* (Male, Age 58).

Behavioural factors

Exemplars for this theme are presented in Table 3.

Self-regulation and goal setting. Nearly all participants described setting specific goals relating to their functional aspirations. Participants expressed greater confidence on achieving exercise goals, which they perceived helped to sustain their motivation. Autonomy was reported to be an important factor in goal setting, but most participants wanted goals to be reviewed by professionals. Seeing clinical and functional improvements was perceived as motivation for sustained exercise participation and participants described self-monitoring devices such as pedometers as useful. Planning allowed participants to incorporate exercise into their daily routine so that their exercise was more task orientated as opposed to *just wandering aimlessly around* (Female, Age 64).

Self-incentives for personal change. Participants who appeared most confident in their ability to exercise regularly described how they felt motivated by an 'internal drive'. This motivation was described as being based on knowledge of the

Table 2. Exemplar quotations from kidney patients: *Personal Factors*

Major themes	Minor themes	Exemplar quotations from kidney patients
Poor physical condition and exercise-related health concerns	Other co-morbidities	I have got this respiratory problem that has probably changed my activity … more than the kidney' (Female, Age 58).' … you just feel like you are trying to walk through treacle … walking from one side of the house to the other … you think phew made it. (Male, Age 56).
	Fatigue	
	Aging process	'I probably don't swim as long as I used to because I am tired but I don't know if that's the kidney or … just my age as well' (Female, Age 58).
	Medication	'… since I've been on these injections which [raise] the blood oxygen, I have got more energy and I've got more stamina' (Male, Age 74).
	Reinforcement of fears	'No, she [wife] wanted me to pack up playing squash when I was in my early sixties … she said it's bad … you will die on court' (Male, Age 77).
Benefits of exercise on health and well-being	Previous exercise experience	'… I consciously joined the Pilates because; I had done a bit of it in Loughborough and thought this is good for my back …' (Female, Age 68).
	Health maintenance	'Well it [exercise] keeps me able to move about well and the more you do the more you are able to do …' (Female, Age 76).
		'It [exercise] keeps your mind active and everything you know …' (Focus Group).
	Cardiovascular risk factors	'… my blood pressure is bang on, cholesterol is bang on, I haven't had any trouble with my kidneys … overall exercise has done me the world of good' (Male, Age 56).
	Mental well-being	'My wife says you come back far brighter than when you go out and there isn't a mental answer to it it's just that you feel better' (Focus Group).

Table 3. Exemplar quotations from kidney patients: *Behavioural factors*

Major themes	Minor themes	Exemplar quotations from kidney patients
Self-regulation and goal setting	Achievement	'Yes it just makes you feel better … indirectly you achieve little goals … which builds up your confidence' (Male, Age 58).
	Seeing improvements	'If you can see an improvement every say two or three weeks that gives you an incentive to go on' (Male, Age 56).
	Self-monitoring	'Pedometer will make a difference … you will be eager to do more steps …' (Male, Age 66).
	Reviewed goals	'… a target distance every day you want to do it because somebody is keeping tabs on you, big brother is watching you!'(Male, Age 67).
Self-incentives for personal change	Internal drive	'It's just something that is there and I think if you have got that then you will do what you have to do' (Male, Age 77).
	Not giving up	'… I will feel guilty if I don't go to the [exercise] class!' (Male, Age 58).
	Maintaining normality	'… I am aware that this kidney problem is not going to go away … I need to exercise to keep things going' (Female, Age 58).
Individual preferences for activities	Activities	'Running, cycling and swimming I enjoyed them, and they are the three that I maintained, so I think that is proof in the pudding if you want' (Male, Age 26).

benefits, feelings of guilt over missed exercise sessions and a sense of optimism, where exercise was viewed by participants as a way of fighting their condition in order to maintain normality in their lives. For some participants, achieving normality meant remaining in employment, but for others this was about maintaining independence and the ability to walk: *'… as long as I can keep going on my legs, that's the part that worries me really I never want to get so I can't walk about'* (Female, Age 64). These participants desired more health benefits from exercise, reported fewer environmental barriers and perceived inactivity to be *a state of mind* resulting from a general lack of motivation for exercise as well as other aspects of life (Male, Age 74).

Individual preferences for activities. Participants believed that levels of participation in exercise could be enhanced if they *enjoyed doing it* (Female, Age 58). The enjoyment of specific activities was a strong determinant of perceived exercise maintenance, with the majority favouring walking. Gym-based exercise was described less positively, with one participant describing it as *soul destroying* (Focus Group) but exercise that was outdoors or in groups was viewed as more rewarding.

Environmental factors

Exemplars for this theme are presented in Table 4.

Social interaction and support. Enjoyment was regularly linked with social interaction; having someone to exercise with was encouraging and family support was highly valued. Exercise was also seen as a way to spend quality time with loved ones, and make new friends, which added a perceived responsibility to not let others down. However, a lack of social support was linked to periods of perceived inactivity. Participants described social support as encouraging but there was still a sense that *a lot of people don't understand anything about it [CKD], you can't see it* so *nobody takes much notice* (Female, Age 76). This perception was described as leading to amplified negative social comparisons when participants exercised with healthier or younger members of the community, which led to a reduction in perceived competence.

Group exercise and peer support. Participants felt *group exercise classes would be beneficial* if they were only for kidney patients (Male, Age 66). Being surrounded by peers of similar capabilities was perceived to be mutually supportive, educational and a way of improving confidence: 'I will have a chance to know about other participants' problems and I would be able to share my problem with others …' (Male, Age 66).

Informational support. Participants did not perceive exercise for CKD patients to be a priority of the health service. This led to some drawing distinctions between seeing the doctor for the *medical side of things* and lifestyle advice e.g. exercise (Male, Age 56). Despite this, healthcare professionals were viewed as important in supporting and encouraging exercise behaviours, although who ultimately delivered the information did not appear to be a key factor in influencing exercise attitudes. Participants desired individualized information, which would allow them to self-manage their condition through exercise. Specifically, participants wanted a greater understanding of the benefits of exercise, and the principles of exercise that are safe and appropriate for renal patients. Participants felt that exercising initially in a hospital environment would help them to build confidence and feel safe, but they also wanted *practical guidance to* help them access their local facilities (Male, Age 69).

Physical environment. Some participants described how bad weather interrupted planned outdoor exercise sessions, lowered motivation and exacerbated symptoms such as joint stiffness. Local exercise facilities were often unknown and many participants were discouraged by high membership costs. In general, local access to facilities was important so that exercise was convenient and could be incorporated into daily routines. This was essential for employed participants, as long working hours were perceived to make finding time and energy to exercise difficult.

Table 4. Exemplar quotations from kidney patients: Environmental factors

Major themes	Minor themes	Exemplar quotations from kidney patients
Social interaction and support	Family support	'… I am lucky really because my husband is a bit of a motivator; he will motivate me, come on then let's go [walking]'. (Female, Age 64)
	Social responsibility	'… if I promise you I am going to meet you there then I will make the effort to come out' (Male, Age 58).
	Social support	'I didn't do so much exercise then, for lack of somebody to do it with really' (Female, Age 68).
	Negative social comparisons	'I couldn't go into an aerobics class with a lot of teenage, early twenty, girls; because I knew I wouldn't be able to keep up with them' (Female, Age 58).
Informational support	Information needs	'… if a person has not done much physical exercise it's important someone explains to them the benefits …' (Female, Age 58).
	Professional support	'… if you have got the confidence in anybody that is advising you no matter what it is, but particularly a doctor, it makes a massive difference' (Male, Age 77).
	Practical advice	'… find out what … facilities they have to do exercises and help in that way.'(Male, Age 69).
Physical environment	Weather	'… in the cold and that I get arthritis anyway so that never helps.' (Male, Age 56).
	Accessibility	'Well I suppose it's accessibility, something which is there that I can get to' (Male, Age 74).
	Convenience	'It's convenient, it's on the way to work so you go there in the morning, work out … no hassle.' (Male, Age 58).
	Job role	'… the fact that I am sat at a desk all day … I almost feel guilty … it can't be good for me … So it is more the fact that I feel need it than any other reason' (Male, Age 26).

On the other hand, some participants were motivated to exercise because they were sedentary at work.

DISCUSSION

CKD patients experience impaired physical performance which is associated with an increased risk of all-cause mortality [24]. Despite the potential of exercise to positively impact upon this, a recent study indicated that only 6.9% of CKD patients meet recommended physical activity levels [25]. Currently, little research is available to inform the development of a CKD-specific exercise behaviour change intervention. This study identified perceived barriers towards exercise held by patients with CKD, and provided a greater understanding of the motivational processes required to increase levels of activity. SCT was used to inform the analytical framework, offering broader categories to aid understanding of the influences that impede or promote exercise behaviour in this patient group.

Poor physical condition as a result of both co-morbid conditions and CKD-related symptoms (fatigue; joint pain and shortness of breath) [5] was felt by participants to be the predominant barrier to exercise. Advancing age was linked to symptom experience, but as seen in other studies it was not clear if this barrier was a physiological or psychological limiting factor for exercise [26], as perceptions tended not to reflect biological age.

Perceived psychological barriers to exercise included fear of injury and concerns about CKD aggravation as a result of overdoing exercise. Such fears have also been identified in dialysis patients and kidney transplant recipients, as well as a number of other chronic diseases [16, 17, 27]. Painter *et al.* (1999) proposed that fear of exercise in transplant patients is partly due to the lack of information patients receive about the benefits of exercise from healthcare professionals [27]. Patients expressed a need for tailored advice and support from their healthcare professionals regarding the specific principles of exercise which are safe and appropriate for renal patients. This need for improved education and lifestyle self-management advice has recently been demonstrated in the 'Kidney Health: Delivering Excellence' report [28].

However, patients in this current study thought that exercise for patients with CKD is not prioritized by the health service, highlighting the need for healthcare professionals to ensure they regularly consult with patients about exercise habits. Furthermore, physical environmental factors such as bad weather and a lack of facilities were perceived to hinder exercise participation, as documented in the general population [29]. This is even more important for the CKD population as exercise provision and facilities are markedly less defined and less accessible in comparison to the services provided for cardiac and pulmonary patients [30]. As a result, patients with CKD lack the opportunity to develop peer support networks, which can significantly improve exercise adherence [31].

Family support and encouragement were highly valued and provided great motivation for exercise. However, the majority of participants felt they would benefit from the opportunity to attend a CKD-specific exercise class providing a safe environment with other patients experiencing similar difficulties, which would allow people to feel more comfortable and confident. Exercise that is socially supported or performed in an environment which offers a sense of belonging is fundamental to a number of psychological theories, including the SCT, Self-Determinism Theory (SDT) and Theory of Planned Behaviour [32–34].

Enjoyment, inherently linked to social interaction in this study, enhanced motivation for exercise and is regarded in SDT as 'intrinsic motivation'; the most internalized and self-determined form of motivation [35]. Other autonomous forms of motivation were also inferred: participants interpreted exercise as being integral to their identity (integrated regulation), or felt motivated to exercise because of the perceived health benefits (identified regulation) [36]. Patients often described their self-determined motivation as being innate to the self. However, SCT posits that behaviour is not driven solely by inner forces but an interaction between personal, behavioural and environmental factors. This is supported by a recent study where self-determined motivation was enhanced and maintained in patients who took part in structured exercise [37]. This suggests that extrinsic motivations for exercise can over time become more internalized, prompting maintenance. The Basic Needs Theory (a sub-theory within SDT) suggests that if basic psychological needs, e.g. autonomy, competency and relatedness, are fulfilled [38], then individuals are more likely to exhibit autonomous motivational profiles, which are related to sustained exercise [39].

Similarly, adherence is also affected by the use of self-regulation strategies [40]. These allow an individual greater control in influencing their own motivations for change and selecting behaviours that align with their preferences and competencies. Walking was the activity favoured by the majority of participants, as previously recognized both in CKD [41] and the general population [42]. Walking is particularly suited to engaging inactive participants of all competencies as it is deemed acceptable and accessible [43]. Evidence shows that just 30 min of walking, five times a week has major cardioprotective benefits [44] as well as positively impacting immune function and inflammation [45] in patients with CKD stages 3–4.

Self-monitoring and goal setting operationalize self-regulation practices. Participants tended to set goals that they felt could be achieved through exercise as previously described in other patient groups [26]. Goals are most effective when feedback is given regarding progress, as it provides the opportunity to react and change our behaviour respectively. Goal commitment is enhanced by greater self-efficacy [46] and seeing improvements can increase feelings of competence. Interventions encouraging individuals to self-monitor using pedometers have been shown to significantly increase levels of physical activity [47].

Implications for implementation

Based on the findings of this study, hospital-affiliated group-based rehabilitation programmes similar to those offered to UK cardiology and pulmonary patients could be an attractive option for CKD. This type of programme provides the opportunity for peer support and supervision, which could

potentially reduce fears and concerns and increase exercise self-efficacy. A structured hospital-affiliated programme would most likely benefit patients with little exercise experience, fewer personal commitments and requiring greater levels of support.

Alternatively, group-based interventions that foster self-management skills and promote free living physical activity may offer greater flexibility than traditional rehabilitation whilst still offering a supportive environment. Group-based interventions utilizing SCT components such as self-regulation, self-efficacy and barrier management have successfully increased physical activity levels in other cohorts [48]. Incorporating group dynamic strategies e.g. group goal setting, interaction and friendly competition, has been shown to increase self-directed exercise in a clinical setting [49] and may help to improve adherence and reduce attrition rates.

Limitations

This study had a relatively low response rate and due to the voluntary nature of participation it is possible that this was a self-selecting group that had an interest in exercise greater than that of the general CKD population. Although, the findings of the GPPAQ suggest that of those interviewed 60% would be eligible for a brief intervention in physical activity. Despite the limitations, this study offers a unique, detailed account of patient perceptions and attitudes towards exercise.

CONCLUSION

CKD patients reported more motivators than barriers to exercise. They described a positive attitude to exercise and would therefore potentially be receptive to a CKD-specific exercise behaviour change intervention. Such interventions need to be designed to accommodate multiple and complex psycho-social and environmental influences including information and content that meets the needs of individual patients as well as considering the wider social and structural context. Health services need to actively support exercise for CKD patients, offering routine exercise counselling and providing accessible services and facilities.

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CONFLICT OF INTEREST STATEMENT

The results presented in this paper have not been published previously in whole or part.

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