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Exercise among Dialysis Patients

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ABSTRACT

Physical inactivity is a strong predictor of mortality in patients with end-stage renal disease and is associated with poor physical functioning. Patients with end-stage renal disease are inactive even compared to sedentary individuals without kidney disease. We sought to analyze the level of physical activity in our chronic hemodialysis patients and to identify patient barriers to physical activity. Adult patients on hemodialysis in the Department of Renal Dialysis and Renal Transplantation at the Mohammed V Military Training Hospital in Rabat were recruited and asked to complete the update Baecke physical activity questionnaire in French named AQAP (Physical Activity Self-Questionnaire) A total of 52 patients participated in the study, the mean age of the patients was 50 years ± 16.55 with extremes ranging from 24 to 76 years, sex ratio (H / F) was 1.1. The majority of participants strongly agreed that a sedentary lifestyle was a health risk and that increasing exercise was a benefit. 23% report having no physical activity. 74% of patients report difficulty in performing significant physical exertion. 17 % of patients report having a regular physical activity and sport. However, 49% of participants reported at least one barrier to physical activity. The most commonly reported barriers were fatigue on dialysis days shortness of breath and depression. Exercise provides beneficial effects in end stage renal disease, our study identified a number of barriers to physical activity that can be addressed in studies aimed at increasing levels of physical activity.

Introduction

Physical exercise is known to have beneficial effects on healthy individuals, but there are insufficient data concerning the effects of physical exercise in chronic end-stage kidney failure patients on hemodialysis. Most dialysis patients believe they cannot exercise. The truth is most dialysis patients can exercise. Many renal patients describe regular exercise as the first activity that made them feel “normal” again after starting dialysis treatments [1].

Patients with chronic kidney disease are less active than sedentary individuals without chronic kidney disease [2,3]. O’Hare et al. [4] reported that sedentary dialysis patients had a higher risk of death within 1 year than those who reported at least some participation in physical activity. Physical inactivity is also a strong predictor of cardiovascular mortality in patients with earlier stages of chronic kidney disease [5] and represents a potentially modifiable risk factor. Given these strong associations between physical inactivity and mortality in dialysis patients and the potential improvements in physical functioning associated with increasing activity [6], it is unclear why patients with chronic kidney disease do not exercise. The aim of this study is to assess the level of physical activity in our chronic hemodialysis patients and to identify patient barriers to physical activity using questionnaire.

Patients and methods

Several questionnaires have been developed to assess the level of physical activity but very rarely in French: Baecke [7,8], Modifiable Activity Questionnaire (MAQ) [9], International Physical Activity Questionnaire (IPAQ) [10].

However, some preliminary testing has unveiled the limits of each one of them: Baecke questionnaire was validated about 20 years ago (1992) and since then, the behaviors of patients have greatly evolved. The MAQ was deemed too complex for people with a low level of education when self-administered. Finally, IPAQ only gives information relating to the past week, which can induce a statistical bias. Thus, we decided to use the update Baecke physical activity questionnaire in French named AQAP.

AQAP questionnaire (Physical Activity self Administered Questionnaire) evaluates the average physical activity(PA) level of an individual. It is made-up of 22 closed questions and divided into four parts according to the activity’s context: usual daily activities (eight questions), daily outings (one question), regular sport activities (seven questions) and leisure activities (six questions). Three indexes (usual daily activity, sport and leisure- related activity) are calculated (on a scale from 1 to 5). The fourth index assesses the global PA level and is in fact the sum of the three previous indexes (on a scale from 3 to 15). AQAP questionnaire is an updated version of the Baecke questionnaire and was written. This new version proposes level examples for activities of daily living and sport activities as well as more common activities (e.g. time spent in front of the TV) or new activities (e.g. sitting in front of a computer, using inline skating to go around)

We recruited 52 patients ≥18 years on in-center hemodialysis 3 times/week for at least 12 months. clinical parameters (age, sex, medical history, smoking and alcohol consumption, underlying renal disease, blood pressure,

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temperature, dry weight), biochemical (creatinine, urea, hemoglobin, fasting glucose, albumin C-reactive protein, calcemia, phosphatemia, and PTH 1-84) and dialytics (frequency and duration of the dialysis session, dry weight, interdialytic weight gain, mean Kt / v) were collected from the medical records of the patients.

After interview validation, descriptive and deductive statistical analyzes were performed with SPSS 18.0 software. The data were expressed as mean standard deviation or interquartile median interval or percentage according to their nature and distribution. The prevalence of each standard deviation has been estimated. The multivaried logistic regression analysis was used to identify the risk factors associated with the lack of physical activity; the difference is considered statistically significant for $p < 0.05$.

Results

A total of 52 dialysis patients were recruited to participate in the study, the mean age of patients was 50 years ± 16.55 years with extremes ranging from 24 to 76 years, the sex ratio (M/F) was 1.1. Mean dialysis vintage was 60 ± 16.5 months. Initial nephropathy was unknown in 48% of cases, glomerular in 21% of cases, tubulointerstitial in 12.8%, diabetic in 10.25% of cases and vascular in 8% of cases. We identify the clinical, biochemical and dialytic characteristics of patients (**Table 1)**

Table 1. Demographic, anthropometric, laboratory and dialysis characteristics of the population study.

	Results	Percentage
Age (years)	50 ans ±16,55	
Gender (% male)		52%
Initial nephropathy Glomérular vascular Diabétic Tubulo interstitial Unknown		 21% 8% 10,25% 12,8% 48%
Dialysis vintage (months)	60±16,5	
Body mass index (Kg/m2) 18,5 - 25 25 - 30 30 – 35		 22% 60% 15%
Dry Weight (kg)	53 ± 26.3	
Interdialytic weight gain (kg)	2,3±1,5	
Kt/v Kt/v> 1,2 Kt/v<1,2		 88% 12%
C-reactive protein (mg/l)	12±8,2	
Serum albumin (g/dl)	38±23	
Serum hemoglobin (g/dl)	9±10,1	
Phosphatemia(mg/l)	48±25	
Calcemia (mg/l)	77±31	

Patients were generally very sedentary, spending an average of 25 min/week in walking or other light activity. The majority of activity reported was walking, with 85% of individuals not reporting any other leisure activity. Only 17% of individuals performed moderate physical activity for >150 min/week. With the exception of age, clinical parameters were not associated with differences in physical activity level in univariate analysis. Patients >60 years were less active than their younger counterparts. The majority of participants agreed that sedentary life style was a health risk (90%) and that increasing exercise was a benefit (98%). 10% of participants were concerned about the risk of exercise among dialysis patients, while 84% agreed that physical activity was as important as other issues, 23% report having no physical activity These are essentially the patients assisted, in their daily activities by a third person. 60% of cases report difficulty in performing significant physical exertion (running, lifting a heavy object). Only 17% of patients report having regular physical activity.

Only 30 % of participants reported no barriers to physical activity. 49 % of participants who reported at least one barrier to physical activity, only 6% reported a single barrier, 40% endorsed 2–4 barriers, 28% endorsed 5-7 barriers. The most commonly reported barriers to physical activity were fatigue on dialysis days, shortness of breath and depression **(Table 2)**.

Table 2. Percent of participants barriers to exercise participation among dialysis patients.

	ACTIVE PARTICIPANTS (N = 9)	INACTIVE PARTICIPANTS (N = 43)	P-value
Fatigue on dialysis days	4	41	0,04
Shortness of breath	7	37	0,02
Pain on dialysis days	8	40	0,1
Lack of time on dialysis days	9	43	0,2
Pain on non dialysis days	3	32	0,4
Depression	4	28	0,03
Chest pain	2	29	0,34
Feeling too old	0	30	0,5
Ulcers on legs and feet	0	2	0,36
Fatigue on non dialysis days	0	31	0,23
Amputation	0	1	0,51

Discussion

Despite growing evidence on benefits of increased physical activity in hemodialysis (HD) patients and safety of intra-dialytic exercise, it is not part of standard clinical care, resulting in a missed opportunity to improve clinical outcomes in these patients. The National Kidney Foundation recommends physical activity for patients on dialysis with a goal toward reaching 30 min of moderate intensity activity on most days if not all [11]. Only a small number of individuals met moderate intensity activity criteria when confirmed by the 7-day recall. Similar to other hemodialysis cohorts [2]

The deficit in physical activity among patients on dialysis has been theorized to be due to a lack of motivation secondary to patient barriers, including socioeconomic, psychological and perceived physical disability [12].

Lack of energy due to the disease or the dialysis treatment it self may lead to low physical activity, which in turn may perpetuate fatigue and the vicious cycle of inactivity continues. Since the majority of dialysis patients value improvement in fatigue, even more than improvement in survival [13]

Exercise during HD has been advocated for its convenience as a time-efficient strategy to increase physical activity during a forced sedentary period [14]. However, concerns regarding its potential impact on hemodynamic instability have been a cause for concern for clinicians, despite a lack of evidence for these effects. Hemodialysis imparts a significant cardio vascular stress mainly due to the progressive loss of blood volume during treatment, and in theory, exercise may exacerbate these effects.

In our study, lack of time on dialysis days and lack of motivation were not significant factors associated with lack of

physical activity, we identify postdialysis fatigue on dialysis days, shortness of breath and depression as important barriers to exercise. We also assessed patient's attitudes toward physical activity, and the majority of participants strongly agreed that a sedentary lifestyle was a health risk and that increasing exercise was a benefit.

Conclusion

The decline in physical capacity in HD patient is noteworthy as it is associated with deconditioning and muscle wasting, declining kidney function and an increased risk of comorbidities such as cardiovascular disease. Thus a downward spiral between disease, disuse and deconditioning exists leading to a reduced quality of life, increased hospitalization rates and mortality. To develop a successful exercise program for HD patients, it is critical to understand patients, staff and nephrologists knowledge, barriers, motivators and preferences for patient exercise. Future research is needed to design such a program and evaluate its impact on patient outcomes.

Conflicts of Interest

The authors declare that they have no conflicts of interest in relation to this article.

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