

## Evaluation of Physical Activity in Chronic Hemodialysis Patients

Nassima Hissein Abdelaziz<sup>1</sup>, Inass Alfirdaous<sup>1</sup>, Jean Claude Manirakiza<sup>1\*</sup>, S. El Khayat<sup>1</sup>, N. Mtioui<sup>1</sup>, M. Zamd<sup>1</sup>, G. Medkouri<sup>1</sup>, M. Benghanem<sup>1</sup>

<sup>1</sup>Department of Nephrology, Hemodialysis and Transplantation, Ibn Rochd University Hospital, Casablanca, Morocco

DOI: <https://doi.org/10.36347/sjmcr.2026.v14i02.022> | Received: 02.01.2026 | Accepted: 17.02.2026 | Published: 21.02.2026

\*Corresponding author: Jean Claude Manirakiza

Department of Nephrology, Hemodialysis and Transplantation, Ibn Rochd University Hospital, Casablanca, Morocco

### Abstract

### Original Research Article

**Introduction:** Physical activity is most often impaired in patients with end-stage chronic renal failure undergoing haemodialysis. The aim of our study is to assess the level of physical activity in these patients and to identify the factors associated with reduced physical activity. **Methodology:** This was a single-centre descriptive analytical study of 36 chronic haemodialysis patients conducted in July 2025 at our haemodialysis centre at the Ibn Rochd University Hospital in Casablanca. We used the WHO GPAQ questionnaire to assess our patients' physical activity. This questionnaire assesses three parameters: work and home activity, travel and leisure activity. It also assesses the intensity of the activity by calculating metabolic equivalents (METs). **Results and discussion:** Our study included 36 chronic haemodialysis patients. The average age was 40.48±20.63 years [18 years – 75 years], with a sex ratio of 1.75. Concerning physical activity, 29 (80.5%) reported having no work activity and 7 patients (19.5%) reported having work activity. 60.6% of cases reported difficulties in performing significant physical exercise. 75% reported low daily activity, of which 60% lasted less than 30 minutes and 40% lasted between 30 and 150 minutes per day. 39.4% reported moderate weekly physical activity lasting between 30 and 150 minutes per week. The average metabolic equivalent (MET) in our patients was 1912.5 MET-min +/- 1685.35 MET-min per week. The factors associated with reduced physical activity are: advanced age (p=0.004), the presence of heart disease (p=0.026), predialysis uraemia greater than 1.5g/l (p=0.05) and anaemia (p=0.007). However, no significant correlation was found between reduced physical activity and gender, diabetes, BMI or length of time on haemodialysis. **Conclusion:** Our results highlighted a marked sedentary lifestyle among hemodialysis patients, with overall low levels of physical activity in most cases. This situation is influenced by several factors, some of which are potentially modifiable. It is therefore essential not only to optimize medical management but also to promote and support adapted physical activity in order to improve patients' quality of life and prognosis.

**Keywords:** End-stage renal disease, hemodialysis, physical activity.

Copyright © 2026 The Author(s): This is an open-access article distributed under the terms of the Creative Commons Attribution 4.0 International License (CC BY-NC 4.0) which permits unrestricted use, distribution, and reproduction in any medium for non-commercial use provided the original author and source are credited.

## INTRODUCTION

End-stage chronic kidney disease (ESKD) represents a major public health issue in Morocco. Its incidence continues to rise, as shown by the Magredial registry, which records 162 new patients per million inhabitants [1].

The course of chronic kidney disease (CKD) has been profoundly reshaped by the advent of hemodialysis. This advance has brought notable changes to treatment approaches, improving patient comfort and extending life expectancy. However, as a palliative measure, hemodialysis is perceived as a life-sustaining necessity but also represents a considerable burden. Indeed, patients must cope with changes - sometimes abrupt and difficult to accept - affecting their bodies, as

well as their personal, family, and socio-professional lives [2].

Muscle weakness and excessive fatigue are among the most concerning complications in patients with CKD, particularly those undergoing dialysis. These conditions lead to reduced physical activity, which can have serious consequences. Moreover, physical inactivity, recognized as a classic risk factor for cardiovascular disease, is associated with an increased risk of excess mortality in the dialysis population [3].

Several studies have demonstrated an inverse relationship between the level of physical activity and obstructive coronary artery disease, which is the leading cause of morbidity and mortality among chronic hemodialysis patients [4]. These studies have thus

**Citation:** Nassima Hissein Abdelaziz, Inass Alfirdaous, Jean Claude Manirakiza, S. El Khayat, N. Mtioui, M. Zamd, G. Medkouri, M. Benghanem. Evaluation of Physical Activity in Chronic Hemodialysis Patients. Sch J Med Case Rep, 2026 Feb 14(2): 268-273.

highlighted the benefits of maintaining or resuming physical activity on the health status and quality of life of dialysis patients.

Physical activity is generally impaired in chronic hemodialysis patients. These patients are often exposed to multiple factors that negatively influence their level of physical activity, such as catabolic disorders that can lead to loss of muscle mass and result in sarcopenia [4], as well as concomitant conditions including diabetes, anemia, bone and mineral disorders, protein-energy malnutrition, and obesity [5–7].

The objective of our study was to assess physical activity in chronic hemodialysis patients and to determine the risk factors associated with a reduction in this physical activity.

## MATERIALS AND METHODS

This was a single-center descriptive and analytical study conducted in July 2025 at the hemodialysis center of Ibn Rochd University Hospital in Casablanca. A total of 36 hemodialysis patients aged 18 years and older were included, with a minimum hemodialysis duration of at least 6 months and who agreed to participate in the study.

Patients excluded from the study were those under 18 years of age and/or with a hemodialysis duration of less than 6 months, as well as patients who did not provide consent. Data were collected using an anonymous data collection form.

### The variables studied were as follows:

- Sociodemographic: age, sex, level of education.
- Clinical: presence of comorbidities (hypertension and/or diabetes, heart disease, neoplasia), body mass index (BMI), ongoing treatments: antihypertensive drugs, erythropoietin (EPO), iron, calcium, vitamin D.
- Biological: hemoglobin level, intact parathyroid hormone (iPTH), serum calcium, phosphate, magnesium, and C-reactive protein (CRP).

Physical activity was assessed using the World Health Organization's Global Physical Activity Questionnaire (GPAQ) [8]. This is a self-administered

questionnaire consisting of 16 items that assess physical activity in three main domains: work and household activities, transportation, and leisure-time physical activity. The questionnaire also evaluates activity intensity by calculating metabolic equivalents (METs), which represent the energy expenditure relative to rest [5–7, 8]. The questionnaires were translated into Arabic before being administered to the patients.

Statistical analysis was performed using Epi Info 6.0 software. Quantitative variables are expressed as mean  $\pm$  standard deviation, and qualitative variables as percentages. A  $p$ -value  $< 0.05$  was considered statistically significant. Results are presented in the form of table and figure

## RESULTS

- Sociodemographic, clinical, biological, and dialysis-related data:

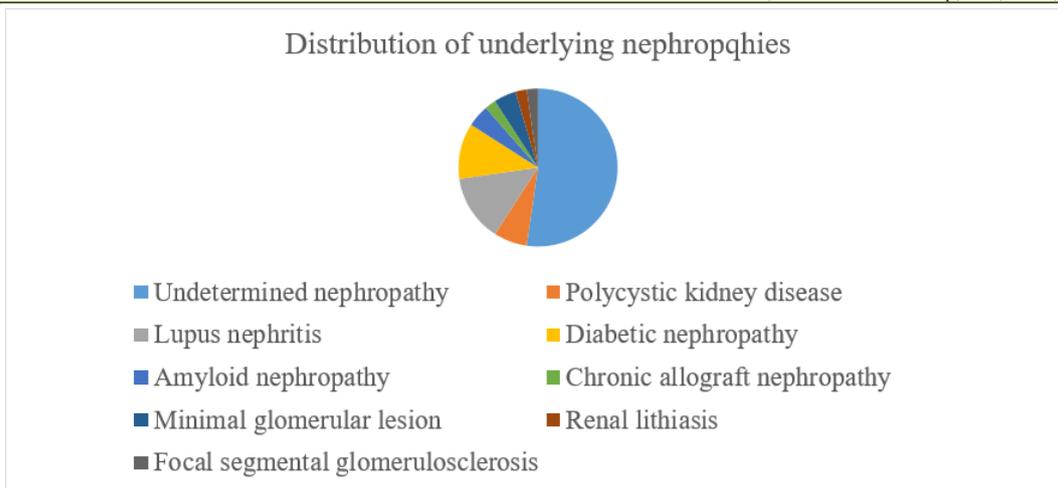
Our study included 36 chronic hemodialysis patients from our center who met the inclusion criteria. The mean age of the patients was  $40.48 \pm 20.63$  years (range: 18–75 years), with a sex ratio of 1.75. Regarding educational level, 24 patients were illiterate (66.6%) and 12 patients were educated (33.4%). The underlying nephropathy was diabetic in 11.4% of cases, glomerular in 22.22%, and undetermined in 52.3% (Figure 1). Cardiac disease was present in 27.3% of patients. Body mass index (BMI) was less than or equal to  $18 \text{ kg/m}^2$  in 9 patients (24.24%).

From a biological standpoint, the mean hemoglobin level was  $9.05 \pm 2.1 \text{ g/dL}$ , and the mean intact PTH (1–84) level was  $622.61 \pm 485.22 \text{ pg/mL}$  (Table 1). Therapeutically, 41.6% ( $n = 15$ ) of patients were receiving antihypertensive treatment, and all patients were treated with erythropoiesis-stimulating agents (ESAs). Alfacalcidol was prescribed in 11 patients (30.3%).

Regarding dialysis-related data, the mean dialysis vintage was  $4.10 \pm 16.41$  years, with extremes ranging from 6 months to 22 years. The duration and frequency of dialysis were 4 hours per session, three times per week, for all patients. Vascular access consisted of an arteriovenous fistula in 20 patients (55.5%) and a tunneled catheter in 16 patients (44.5%).

**Table 1: Biological parameters**

Parameters	Average	Standard deviation
Hemoglobin	09.05	02.10
Ferritinemia	593.88	422.35
Parathormone	622.61	485.22
Calcemia	92.93	12.65
Phosphate	38.51	20.15
Alkaline phosphatase	285.83	198.67



**Figure 1: Distribution of underlying nephropathies**

**Physical activity:**

In order to assess physical activity among our chronic hemodialysis patients, we chose the WHO Global Physical Activity Questionnaire (GPAQ), which we adapted to the Moroccan socio-cultural context. The questionnaire was administered to consenting patients and, when necessary, assistance was provided by medical staff during hemodialysis sessions. Among all patients, 29 (80.5%) reported having no occupational activity, while 7 patients (19.5%) reported having an occupational activity.

A total of 60.6% of cases reported difficulties in performing strenuous physical efforts (running, lifting heavy objects). Seventy-five percent (n = 27) reported low daily physical activity (such as slow walking, washing dishes), of whom 60% (n = 16/27) performed this activity for less than 30 minutes per day and 40% (n = 11/27) for a duration between 30 and 150 minutes per day.

Furthermore, 39.4% (n = 14) reported engaging in moderate weekly physical activity lasting between 30 and 150 minutes per week (brisk walking, playing

football, cycling). The mean metabolic equivalent (MET) value (Table 2) among our patients was 1912.5 MET-min ± 1685.35 MET-min per week.

**Risk factors for reduced physical activity:**

We examined the relationship between decreased physical activity and various demographic, clinical, and biological parameters (Table 2).

Univariate analysis showed that reduced physical activity was significantly correlated with advanced age (p = 0.004), the presence of heart disease—particularly left ventricular hypertrophy (LVH), with or without left ventricular dilatation (p = 0.026)—vascular access type, including arteriovenous fistula (p = 0.02) or central hemodialysis catheter (p = 0.04), pre-dialysis uremia greater than 1.5 g/L (p = 0.007), and anemia (p = 0.007).

In contrast, no significant correlation was found between reduced physical activity and sex, diabetes, body mass index (BMI), duration on hemodialysis, or dialysis vintage in our results.

**Table 2: Correlation between physical activity and clinico-biological parameters**

	Low physical activity N = 18		Moderate physical activity N = 15		p
	N	%	N	%	
Age	47.833 ± 16.95		31.66 ± 13.59		0.004
Average ± Standard deviation	18-75		18-65		
Sex					0.74
F	7	38.88%	6	35.29%	
M	12	61.11%	11	64.70%	
Duration of dialysis treatment					0.06
< 1 years	4	22.22%	8	40%	
1-5 years	9	44.44%	7	35%	
> 5 years	3	16.66%	5	25%	0.80
BMI					0.76
< 18 kg/m <sup>2</sup>	4	25%	4	26.66%	

18-24 kg/m2	7	43.75%	7	46.66%	0.65
> 24 kg/m2	4	31.25%	4	26.66%	0.76
Underlying nephropathies					
Polycystic kidney disease	2	11.11%	-	0	0.18
Lupus nephritis	2	11.11%	2	13.33%	0.84
Diabetic nephropathy	4	22.22%	1	6.66%	0.21
Amyloid Nephropathy	0	0	1	6.66%	0.26
Chronic allograft nephropathy	0	0	1	6.66%	0.26
Minimal glomerular lesion	1	5.55%	1	6.66%	0.89
Renal lithiasis	1	5.55%	0	0	0.35
Focal segmental glomerulosclerosis	0	0	1	6.66%	0.26
Undetermined nephropathy	8	44.44%	8	53.33%	0.61
Transthoracic ultrasound					
Hypokinetic cardiopathy with altered ejection fraction	1	5.55%	0	0	0.35
Stented ischemic cardiopathy	1	5.55%	0	0	0.35
LVH + LV dilation	2	11.11%	0	0	0.18
LVH + preserved ejection fraction	4	22.22%	0	0	0.05
Normale	10	55.55%	12	80%	0.13
LVH+ left ventricular dilation +	0	0	1	6.66%	0.26
LVH + Heart failure	0	0	1	6.66%	0.026
Dilated cardiomyopathy + Altered ejection fraction	0	0	1	6.66%	0.26
Parathormone					
Low	1	5%	1	6.25%	0.89
High	14	70%	12	75%	0.87
Normal	5	25%	3	18.75%	0.79
Dialysis quality					
Urea > 1.5	8	44.44%	2	13.33%	0.005
Arterio-veinous fistula	7	35%	10	62.50%	0.02
Hemodialysis Catheter	13	65%	6	37.50%	0.04
Medication use	9	50%	11	73.33%	0.17
Anemia					
Yes	18	100%	13	72.22%	0.007
Aim	-		5	27.77%	
Nutritional status					
Ferritin					
low	9	47.36%	9	52.94%	0.56
Aim	8	42.10%	6	35.29%	0.51
Normal	2	10.53%	2	11.76%	0.89
CRP					
<5	12	60%	11	68.75%	0.51
>5	8	40%	5	41.25%	1.11
Albumin					
Low	12	63.15%	9	52.94%	0.69
Normal	7	36.84%	8	47.05%	
Serum iron					
Low	10	55.55%	11	61.11%	0.89
Aim	0	0	1	5.55%	0.26
Normal	8	44.44%	6	33.33%	0.79
Predialysis urea > 1.5g/l					
Yes	20	100%	10	62.5%	0.007
Non	0	0	6	37.5%	

## DISCUSSION

The present study made it possible to assess the level of physical activity in a population of 36 chronic hemodialysis patients at our center, while examining its relationship with clinical, biological, and socio-

demographic data. Our patients had a relatively young mean age ( $40.48 \pm 20.63$  years), which differs markedly from international cohorts where the mean age often exceeds 60 years. This particularity may be explained by local epidemiological factors, notably the high

proportion of nephropathies of undetermined etiology (48.5%). The high rate of illiteracy (66.66%) represents an additional barrier to therapeutic education and to the promotion of healthy behaviors, such as regular physical activity.

From a clinical perspective, the majority of patients presented with significant comorbidities: anemia (80%), secondary hyperparathyroidism (78.8%), cardiovascular disease (27.3%), and malnutrition (BMI < 18 kg/m<sup>2</sup> in 24.24%). These conditions are well known to limit functional capacity in hemodialysis patients. Anemia, for instance, is strongly associated with chronic fatigue that hinders physical effort, as highlighted by Johansen *et al.*, in a study on physical activity in hemodialysis patients [9]. Hyperparathyroidism, often responsible for osteoarticular pain, and malnutrition, a major contributor to sarcopenia, also represent significant barriers to mobility.

Physical activity was assessed using the WHO Global Physical Activity Questionnaire (GPAQ), adapted to the Moroccan sociocultural context. The results revealed a particularly low level of physical activity: 80.5% of patients had no occupational activity, and 75% reported low daily physical activity, often limited to light household tasks, with a duration of less than 30 minutes per day in 60% of cases. Only 39.4% of patients reported engaging in moderate weekly physical activity lasting between 30 and 150 minutes. Taken together, these three indicators reflect a limited level of physical activity across different aspects of daily life in our chronic hemodialysis patients. The mean energy expenditure, estimated at  $1912.5 \pm 1685.35$  MET-min/week, remains below international recommendations, which suggest moderate-to-vigorous physical activity equivalent to at least 600 MET-min/week spread over several days [8]. These findings are consistent with data from the literature showing that hemodialysis patients are among the most sedentary populations, with a significant impact on quality of life and prognosis [10].

Univariate analysis of factors associated with reduced physical activity identified several statistically significant correlations. Advanced age ( $p = 0.004$ ) emerged as a determining factor, related to decreased muscle mass, increased fatigue, and loss of autonomy. The presence of cardiovascular disease, particularly left ventricular hypertrophy ( $p = 0.026$ ), was also associated with reduced exercise capacity. The type of vascular access (arteriovenous fistula or catheter) was correlated with decreased activity ( $p = 0.02$  and  $p = 0.04$ , respectively), likely reflecting greater patient frailty and fear of damaging or losing the vascular access. Elevated pre-dialysis uremia ( $>1.5$  g/L;  $p = 0.05$ ) and anemia ( $p = 0.007$ ) were also identified as limiting factors, in relation to the patient's impaired general condition. In contrast, no significant association was found between physical activity level and sex, diabetes, BMI, or dialysis vintage,

which may be explained by the limited sample size or the relative homogeneity of certain parameters.

These findings highlight the need to integrate a comprehensive rehabilitation approach into the management of hemodialysis patients. The introduction of intradialytic exercise programs has demonstrated effectiveness in several studies in improving functional capacity, reducing cardiovascular morbidity and mortality, and enhancing quality of life [11, 12]. Furthermore, strengthening therapeutic education, adapted to patients' educational level, could play a key role in promoting active behaviors. Finally, optimization of the treatment of anemia, hyperparathyroidism, and nutritional status should be an integral part of this global strategy to restore, as much as possible, the physical and functional capacities of this vulnerable population.

## CONCLUSION

This study demonstrated an overall low level of physical activity among chronic hemodialysis patients, despite a relatively young mean age. Several factors, including advanced age, cardiovascular comorbidities, anemia, poor nutritional status, and certain biological parameters, were associated with this sedentary behavior, reflecting a state of global frailty. These functional limitations have a direct impact on patients' quality of life. A multidisciplinary approach is therefore required, combining medical optimization, adapted physical exercise programs, and targeted therapeutic education, in order to improve autonomy and long-term functional prognosis.

## Conflict of Interest

The authors declare no conflicts of interest.

## REFERENCES

1. M. Benghanem Gharbi. Chronic kidney disease, hypertension, diabetes, and obesity in the adult population of Morocco: how to avoid "over"- and "under"-diagnosis of CKD Kidney Int (2016)
2. Avesani CM, Trolonge S, Deléaval P. Physical activity and energy expenditure in haemodialysis patients: an international survey. *Nephrol Dial Transplant* 2012; 27: 2430–2434 [PubMed] [Google Scholar].
3. Crow RS, Rautaharju PM, Prineas RJ, Connett JE, *et al.*, Risk factors, exercise fitness and electrocardiographic response to exercise in 12 866 men at high risk of symptomatic coronary heart disease. *Am J Cardiol.* 1986 May 1;57(13):1075–82. doi: 10.1016/0002-9149(86)90677-6. [DOI] [PubMed] [Google Scholar]
4. Bristol: UK Renal Registry; 2006. UK Renal Registry: 9th Annual Report 2006. [Google Scholar]
5. O'Hare AM, Tawney K, Bacchetti P, Johansen KL. Decreased survival among sedentary patients undergoing dialysis: Results from the dialysis morbidity and mortality study. *Am J Kidney Dis.*

- 2003 Feb;41(2):447–54. doi: 10.1053/ajkd.2003.50055. [DOI] [PubMed] [Google Scholar]
6. Bigard AX, Duforez F. Détermination de l'activité physique par questionnaire de Baecke validation du questionnaire autoadministrable de Baecke. *Science & Sports*. 1992 ;7(4) :215–221. [Google Scholar]
  7. Trivel D, Léger L, Calmels P. Fitness assessment by questionnaire. *Science & Sports*. 2006; 21 :121–130. [Google Scholar]
  8. OMS. Global Physical Activity Questionnaire (GPAQ): Analysis Guide, 2012. [PubMed] [Google Scholar]
  9. Johansen KL *et al*., Physical activity levels in patients on hemodialysis and healthy sedentary controls. *CJASN*. 2010. [PubMed] [Google Scholar]
  10. Tentori F *et al*., Physical activity among patients on hemodialysis: associations with hospitalization and mortality. *Kidney Int*. 2010. [PubMed] [Google Scholar]
  11. Smart NA *et al*., Exercise training in dialysis patients: a systematic review and meta-analysis. *Am J Kidney Dis*. 2013. [PubMed] [Google Scholar]
  12. Azzouz L *et al*., Evaluation de l'activité physique chez les hémodialysés marocains. *Nephrol Ther*. 2015. [PubMed] [Google Scholar]