

Physical Activity in Sahara Moroccan Hemodialysis Patients

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Research note

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Abstract

Objective: The evaluation of physical activity for chronic hemodialysis patients is a new approach for the patient global care. The objective of this work is to evaluate the physical activity in chronic hemodialysis patients and identify the risk factors associated with reduced physical activity. This is a prospective study during 6 months including 150 chronic hemodialysis patients in the Guelmim-Oued Noun Region in Moroccan Sahara. We use Baecke's survey, translated and validated in Arabic local language. The socio-demographic, Clinical and biological data were completed during the interrogation and from the medical records of the patients.

Results: The mean age of our patients was 54.6 +/- 16.4 years, with male predominance (59%). Most patients have a low education level and 60% were illiterate. Hypertension was found in 54% of our patients, diabetes in 39% and cardiovascular disease in 10% of patients. Low Physical activity was associated with gender (OR=4.05), age (OR=1.03) and education level (OR=0.2). Our work has met the various pre-established objectives, however other more specific studies must be conducted to better characterize the profile of physical activity in chronic hemodialysis patients.

Introduction

The prevalence of end-stage renal disease (ESRD) treated with hemodialysis (HD) is increasing dramatically worldwide. In Morocco the number of hemodialysis patients was around 7000 patients in 2008 while in December 2018 this number reached 30,000 patients according to the Moroccan society of nephrology[1,2]. HD has completely transformed the course of chronic renal failure by improving patient quality of life and survival. However, HD still associated with high morbidity and mortality, including the reduction of autonomy and physical activity. In this context, several studies have shown the benefit of maintaining or resuming physical activity on health of chronic hemodialysis patients.

Physical activity is defined by world health organisation as any bodily movement produced by skeletal muscles that require energy expenditure [3]. Popular ways to be active are through walking, cycling, sports and recreation, and can be done at any level of skill and for enjoyment. This includes movements made while working, playing, doing household chores, moving around and during leisure activities. It is often reduced in HD patients. Baecke developed in the Netherlands a questionnaire for evaluating a person's physical activity and separating it into three representative indices: the work activity index, the sports activity index and the index leisure activity[4]. The Baecke's questionnaire was validated as a PA assessment tool by many authors [5].

The objective of our study was to analyze the level of physical activity chronic hemodialysis patients in Moroccan Sahara and to identify the risk factors for reduced physical activity in this area. The region Guelmim has 433,757 inhabitants, 65% of whom are urban with 9.4 inhabitants / km² of density and it contains four provinces: Guelmim, Sidi Ifni, Tan-Tan and Assa Zag,

Methods

It is a prospective descriptive analytical study spread over 6 months, from April 2019 to October 2019. This study involved a cohort of 150 hemodialysis patients in all hemodialysis centers in the Guelmim Oued Noun region:

- Hemodialysis Center of the Military Hospital at Guelmim (27 patients)
- Hemodialysis center of the Guelmim regional hospital (60 patients)
- Guelmim private hemodialysis center (32 patients)
- Sidi Ifni hemodialysis center (20 patients)
- Assa Hemodialysis Center (5 patients)
- Tan-Tan hemodialysis center (6 patients)
- **Inclusion criteria:** we included Patients on hemodialysis in the Guelmim Oued Noun region, On hemodialysis for more than six months, Clinically stable patients in Absence of a major handicap reducing mobility (limb amputation, paraplegic, or requiring a wheelchair to move)
- **Exclusion criteria:** we excluded Patient with hearing impairment, Acute renal failure and Patient not consenting.
- **Data collection:**

The parameters likely to influence physical activity (PA) in chronic hemodialysis patients were studied. Social - demographic data were completed during the interrogation and clinical – biological data of patients were collected from the patients' medical files: Demographic data, Socioprofessional categories, Clinical data, Biological parameters and Dialysis data.

- **Physical activity:**

We assessed the physical activity of our patients using the Baecke Questionnaire. Baecke's original questionnaire (1982) consists of 16 questions. It is self-administered, and allows in its initial form, to determine a work activity index (WAI, eight questions), a sport activity index (SAI, four questions), and a leisure activity index (LAI, four questions). An adaptation was made, which reduced the questionnaire to five questions. The answers to the first two questions determine the SAI: the combination of the intensity of the sport, its frequency of practice per week and over the year, makes it possible to calculate the SAI. The average of the answers to the other three questions on a five-point scale allows the calculation of the leisure activity index (WAI) [x]. In our study we studied the leisure activity of our patients (WAI). The development of the target questionnaire involved several stages in order to adapt it to our Moroccan cultural context. The adaptation methodology we followed can be summarized as follows:

- Independent translations (from French to Moroccan Dialectal), prior to the summary translation which was carried out by a group of professionals representing skills in different disciplines (Nephrologists, Professors of the French language...)

- Modification of the questionnaire according to the equivalence of the Arabic Dialectal version compared to the original questionnaire on the one hand, and according to the remarks and misunderstandings of the patients who participated in the pre-test on the other hand.
- Counter-translation into French.

The descriptive analysis of clinical, socio-demographic and biological data allowed the calculation of the absolute and relative frequencies for the qualitative variables, and the positioning and dispersion parameters for the quantitative variables (mean, standard deviation).

- **Statistical analysis:**

The normal distribution of variables was studied by the Kolmogorov-Smirnov test.

- In bivariate analysis, the comparison of continuous variables used the Student test, the Mann Whitney test, the ANOVA test and the Friedman test. In multivariate analysis we used binary logistic regression
- The significance threshold was retained for a $p < 0.05$
- The statistical analysis was performed using IBM SPSS version 20.0 software.

The study was conducted with respect for patient anonymity and the confidentiality of medical information.

Results

The 150 chronic hemodialysis patients who participated in our study are distributed as follows: Military Hospital of Guelmim: 27 patients (18%); Guelmim Regional Hospital: 60 patients (40%); Guelmim private hemodialysis center: 32 patients (21%); Sidi Ifni hemodialysis center: 20 patients (13%); Assa hemodialysis center: 05 patients (3%); Tan-Tan hemodialysis center: 06 patients (4%).

The average age of all of our patients was 54.6 +/- 16.4 years, with extremes ranging from 18 to 85 years, a male predominance was noted with a sex ratio of 89H / 61F. The demographics of our study population are summarized in Table 1.

Most patients have a low level of education and 38% of patients have no job. 65% of patients live at urban location, 30% are retired and 18% are students. The ministry of health payed hemodialysis for up 61% of patients and other were covered by a social security system (employees, military...)

- **Clinical data:**

12% of patients have an arteriopathy and 7% have a lower limb fracture. For comorbidities, we found hypertension in 54%, diabetes in 39% and cardiopathy in 10%

- **Physical activity:**

In order to assess the physical activity of our HD patients, we opted for the Baecke questionnaire that we adapted to our Moroccan socio-cultural context. This questionnaire was therefore administered orally by medical staff to consenting patients during HD sessions. Of all our HD patients, 19% of patients report having no physical activity. These are mainly patients assisted in their daily activities by a third person. 63% of cases report difficulty performing significant physical efforts (running, lifting a heavy object). Only 19% of patients report having regular physical and / or sporting activity (walking, football). Regarding the means of transport used to get to hemodialysis centers, most of our patients (88%) used a vehicle (car, motorbike, etc.) while only 11% came on foot.

The calculation of physical activity indices as part of the Baecke questionnaire revealed the following information: in patients who practice sports, the mean sports activity index (SAI) is: 0.79 ± 0.7 . Moreover, the average leisure activity index (LAI) is 2.45 ± 1.2 . The average of these 2 indices is equal to 1.62 ± 0.8 which corresponds to a limited physical activity, and this in the different aspects of the daily life of our HD patients.

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- **Low Physical activity risk factors:**

To search risk factors of low activity, we compare two groups: group A with low physical activity defined by a global activity index (GAI) less than 5 and group B with intermediate or high physical activity (table 2). In univariate analysis we found that low activity is associated to age, female, living in rural area, diabetes, 2 dialysis sessions by week, use of anti-hypertension drugs and car for coming at hemodialysis center. However, after including all factors in a multivariate model only three risk factors still significant: elderly patients (OR = 1,03), female (OR = 4,05) and low education level (illiterate and primary school).

Discussion

It is a prospective descriptive analytical study which required field work and a trip between all the centers in the GUELMIM-OUED NOUN region. The distance traveled during the completion of this work is estimated at 648 km. The distances between Guelmim and the different cities in the region are as follows: Guelmim - Assa: 106 km, Guelmim - Sidi Ifni: 88 km, Guelmim - Tan tan: 130 km.

The PA assessment was carried out using the Beack survey and has been the focus of several studies wick is considered to be one of the most reproducible [6,9].

The average age of hemodialysis patients differs from series to series. According to the series in the literature, the average age varies between 51.6 and 69 years. The results of our series showed an average

age of 54.6 years, with extremes ranging from 18 to 85 years [4,7]. Several series in the literature report a predominance of men, notably a local Moroccan study carried out by Karimi [10] at the Al Fârâbî hospital in Oujda with a sex ratio of 45H / 38F, that of Fiaccadorie [11] carried out in Italy with a percentage of 67% male, and that of Matsuzawa [12] in Japan had a male predominance of 55%. This joins our study where the male sex is predominant with a percentage of 60%.

During our study, it turned out that the majority of our patients had a low socioeconomic level, with a thatching rate of 38%. Although the illiterate rate has decreased in Morocco thanks to programs to combat illiteracy, our population was unfortunately the majority: 91 patients or 61%. The same results were reported by Karimi's study [10], where the majority of patients were unemployed and illiterate.

Diabetes, hypertension and cardiovascular disease are the most prevalent chronic diseases according to the data in the literature. They were also found in our patients (diabetes 39%, hypertension 54%). This is explained by the micro and macro angiopathic complications of these conditions. In particular, diabetes, which was the leading cause of chronic kidney disease (46%) in our patients, followed by hypertension (25%).

The mean duration of hemodialysis in our study was 65.41 months. The majority of our patients are on dialysis twice a week, joining the study by Karimi [10], where most of the patients were also dialyzed twice a week, with an average duration of hemodialysis of $102.4 \pm 41, 9$ months. In other studies, notably that of Panaye [7], 88% of the study population benefited from three sessions per week, while 5% had four sessions, while 0.6% had five sessions, with an average duration 36 month hemodialysis.

During our study, it turned out that only 19% of patients had regular physical activity. This is due to the following risk factors:

- Female: we found that females hemodialysis in Moroccan sahara are at high risk of low physical activity (OR 4.05). This result is supported by some studies showing that men are more active than women [13]. This can be explained by the sedentary style of life in sahari women and by lake of adherence to recommended physical activity wich is significantly more frequent in women as found by Hornick and al [14].
- Age: Our study shows us that the elderly subjects have a decreased AP compared to the youngest subjects, which joins Karimi's study. This can be explained by the lack of energy and fatigue reported by several elderly respondents, in addition to the chronic pain experienced by these patients. The impact of chronic pain on the quality of life of patients is currently proven by several authors [15]. Pain is responsible for discomfort in daily activity in 67% of cases [16]. This pain can be explained by amyloidosis b2 microglobin. The presence of amyloid deposits mainly in articular and para-articular tissues (synovial membranes, tendons, ligaments) and in bones, clinically causes the appearance of joint and peri-articular pain syndromes and ductal syndromes [17]
- Instruction level: The majority of our hemodialysis patients are illiterate (61%). The correlation of illiteracy with decreased PA can be explained in part by ignorance of the importance of regular

physical activity in these patients. The study by Capitanini [18] carried out in Italy in 2014, showed that the lack of specific advice concerning physical exercise in nephrology establishments, favored a sedentary lifestyle. This element should be taken into account especially when it comes to a low educated population.

Limitations

However, we use a subjective means to quantify the PA of patients and The lack of financial support did not allow us to buy pedometers to better quantify the PA of our patients. We therefore used the Baecke survey as a tool to assess PA. We also had Incomplete biological data in some files: During operation, KT / V was mentioned in only 32 files. Only 75 files were complete. In the 75 remaining files, the phosphocalcic balance was incomplete or completely absent.

Abbreviations

ESRD: end stage renal disease; **HD**: hemodialysis; **PA**: physical activity; **Hb**: haemoglobin; **PTH**: parathormone; **CRP**: C reactive protein; **WAI**: work activity index; **SAI**: Sport activity index; **LAI**: leisure activity index; **GAI**: Global activity index; **OR**: odds ratio

Declarations

Ethics approval and consent to participate:

The study was carried out with respect for patient anonymity and the confidentiality of medical information. The study was approved by the Moroccan ministry of health at September the 3rd 2019 with a written consent of all participants.

Consent for publication:

All co-autors consent for publication

Availability of data and material:

Data are available any time for control

Competing interests:

Authors declare no competing interest

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Authors' contributions:

- AB: writing and literature revue
- HL: data collection

- SB: data collection
- YZ: statistic analysis
- DE: manuscript correction
- NZ: conception of study and correction

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Tables

Table 1: characteristics of patients at inclusion

inclusion

N=150	
Characteristics	
Age (mean \pm Sd) years	54,6 \pm 16,4
Male n (%)	89 (59,3)
Co-morbidities	
· Hypertension	82 (54,7)
· Diabetes	59 (39,3)
· Arteriopathy	19 (12,7)
· Cardiopathy	15 (10)
· Low limb fracture	11 (7,3)
· Obesity	10 (6,7)
· Blind	6 (4)
· Depression	4 (2,7)
· Neoplasm	4 (2,7)
Educational status	
· Illiterate	91 (60,7)
· Primary school	22 (14,7)
· High school	33 (22)
· University	4 (2,7)
Treatment	
· Erythropoietin	74 (49,3)
· Antihypertensive drug	80 (53,3)
· Calcium	101 (67,3)
Dialysis data	
· Months on hemodialysis (median; quartiles)	48 [24 – 96]
· 2 Sessions per week	84 (56)
· KT/V	1,33 \pm 0,15
Biologic data:	
· Haemoglobin (mean \pm ET) g/dl	10,2 \pm 2

·	Calcium (mean ±ET) mg/l	87,8 ± 17,6
·	Phosphore (median; quartiles)	40 [17,9 - 51,8]
·	PTHi (median; quartiles) pg/ml	434 [240 - 675]
·	25-OH vit D2 (mean ±ET) ng/ml	39,8 ± 14,5
·	C Reactive Protein (median; quartiles) mg/l	2 [1 – 6,5]

Table 2: risk factors of low physical activity in univariate and multivariate analysis

Factor		Univariate analysis			Multivariate analysis		
		Low activity n=97	Others N=53	p	OR	IC	p
Age	(mean) years	59,6	45,4	< 0.001	1.03	1-1,06	0.019
Female	n(%)	46 (47,4)	15 (28,3)	0.025	4.05	1.36-12	0.012
Assurance	n(%)	44 (45,4)	14 (26,4)	0.024	4.8	0.27-84	0.27
Rural area	n(%)	38 (39,2)	30 (56,6)	0.017	0.32	0.07-1.38	0.12
Education ^a	n(%)	19 (19,6)	18 (34)	0.051	0.2	0.04-0.87	0.032
Hypertension	n(%)	54 (55,7)	28 (52,8)	0.8			
Diabetes	n(%)	48 (49,5)	11 (20,8)	0.001	1.82	0.63-5.18	0.26
BMI < 25		82 (84,5)	15 (28,3)	0.01	5.7	0.57-57	0.137
Months on HD		69,2	58,4	0.39			
2 sessions/ W	n(%)	46 (47,4)	38 (71,7)	0.004	0.15	0.01-2,14	0.16
KT/V		1,33	1,33	0,9			
AntiHT drugs	n(%)	58 (59,8)	22 (41,5)	0.04	1.71	0.61-4.77	0.3
Depression	n(%)	2 (2,1)	2 (3,8)	0.6			
Neoplasm	n(%)	3 (3,1)	1 (1,9)	0.6			
Erythropoietin	n(%)	48 (49,5)	26 (49,1)	0,9			
Iron drug	n(%)	57 (58,8)	22 (41,5)	0.06	1.67	0.64-4.35	0.28
Calcium	(mean) mg.l	89,9	83,9	0,07	1.02	0.99-1.05	0.07
Haemoglobin	(mean) g.dl	10,3	9,9	0.3			
Phosphore	(mean) mg.l	41,6	59	0.38			
PTHi	(mean) pg.ml	527	515	0.8			
25OH vitD		39,8	39,8	0,9			
CRP	(mean) mg.l	8,1	16,3	0,19			
Anemia	n(%)	61 (62,9)	36 (67,9)	0.14			
Car Use ^b	n(%)	93 (95,9)	40 (75,5)	<0.001	2.01	0.41-9.79	0.38

^a: Education defined by college level and upper; ^b: patients using car for going to hemodialysis unit