

The evaluation of physical activity levels in Turkish dialysis patients

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Abstr

Aim: Physical inactivity is associated with the increased incidence of hospitalizations, increased risk of mortality due to heart diseases in hemodialysis patients. The aim of study was to evaluate the functional and physical activity levels of chronic renal failure patients receiving hemodialysis treatment.

Material and Methods: 96 of whom were hemodialysis patients (63,22 ± 12,84 years) and 107 (51,07 ± 8,33 years) healthy people, participated to the study. The functional activity level was assessed with the Human Activity Profile. The level of physical activity was determined with the Turkish version of the International Physical Activity Questionnaire Short Form.

Results: When the hemodialysis patients and the control group were compared in terms of the functional activity and physical activity level after controlled the age variable, Maximum Activity Score (MAS) and the Adjusted Activity Score (AAS) values and Turkish version of the International Physical Activity Questionnaire (IPAQ) levels of the hemodialysis group were significantly lower ($p < 0.05$). When the activity levels of the hemodialysis group were compared by gender, the Adjusted Activity Score values of females were significantly lower ($p < 0.05$), and the Turkish version of the International Physical Activity Questionnaire Short Form daily activity levels and Maximum Activity Score values were similar ($p > 0.05$).

Conclusion: The functional and physical activity levels of chronic renal patients receiving hemodialysis treatment were significantly lower. We believe that the results of our study give a small idea of the possible functional limitations and physical inactivity of the dialysis patients in our country.

Keywords: Functional Activity Level; Physical Activity Level; Turkish Dialysis Patients.

INTRODUCTION

Chronic renal failure is defined as regulating the fluid-solute balance of the kidneys depending on a decrease in the glomerular filtration value and more than a 3-month long continuous deterioration in metabolic-endocrine functions (1). Chronic renal failure affects body systems, especially the cardiovascular and musculoskeletal system, negatively. Bone pain, a decrease in the serum calcium levels, muscle weaknesses, an increase in the phosphorous levels and bone diseases related to a decrease in the production of vitamin D are the most important musculoskeletal problems (2).

It is reported that in recent renal patients, physical performance decreases, the limitations in physical

functions affect the general state of health negatively and the length of life decreases (2-5).

Hemodialysis is one of the renal replacement treatment methods frequently used to maintain the life of recent patients with the impaired renal function (6). In chronic renal patients receiving hemodialysis treatment, comorbidities such as diabetes, heart disease, and depression decrease their exercise capacity and create a predisposition to physical inactivity. Physical inactivity is associated with the increased incidence of hospitalizations, the increased risk of mortality due to heart diseases and other reasons in these patients (7-9). It is emphasized that studies related to physical activity in hemodialysis patients should be conducted (9).

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However, no study that investigates the physical and functional activity levels of hemodialysis patients in Turkey has been encountered. The aim of this study was to compare the functional and physical activity levels of chronic renal patients receiving hemodialysis treatment at least for one year to those of their healthy peers. Functional and physical activity levels were assessed using methods similar to those used in previous studies involving dialysis patients. This study has created awareness that, dialysis patients in Turkey have functional limitations similar to chronic kidney disease patients living in other countries.

MATERIAL and METHODS

Participants:

The volunteering patients among the individuals receiving hemodialysis treatment in three different dialysis centres, who live in Kırıkkale city limits, were included in the study. The criteria for inclusion in the study were determined as being over 18 years of age and having been receiving dialysis treatment for longer than one year. Those patients whose duration of hemodialysis treatment was shorter than one year, who were followed up for an orthopedic, neurological, systemic inflammatory and psychiatric disorder, with a serious heart or respiratory failure diagnosis, and/or who failed to establish oral cooperation were excluded from the study.

The study was approved by the Ethics Committee of Kırıkkale University (approval number: 15/02; date: 12.05.2014) By showing the permission of the ethics committee, the necessary permissions were taken from the doctors who are responsible for three private dialysis centres that serve in our province for the conduct of the study.

Procedure

The participants received and signed an informed consent before taking part in the study. The patients were interrogated with two surveys in order to determine the level of functional and physical activity. The questionnaire form was filled in by the researcher by reading aloud the questions to the patient and then taking the answers. The functional activity level was assessed with the Human Activity Profile (HAP). The level of physical activity was determined with the Turkish version of the International Physical Activity Questionnaire (IPAQ) Short Form.

Furthermore, questions assessing the sociodemographic properties and clinical history of the patients were asked. Information on other accompanying diseases in addition to the sociodemographic information of the patient such as age, gender, education status, working status and marital status was collected. Haemoglobin, creatinine and albumin values reported by the doctor were recorded.

One hundred seven individuals ,who were not diagnosed with any disease, had no regular exercising habit and who were volunteers were accepted as the control group. The physical and functional activity levels of the control group were assessed with the same questionnaires, and their sociodemographic information was recorded.

Assessment Tools

Human Activity Profile (HAP)

The HAP is a scale that consists of 94 items developed in order to determine the functional and physical activity levels in healthy individuals or individuals with chronic disease at different ages (10). After completing the survey, the Maximum Activity Score (MAS) and the Adjusted Activity Score (AAS) are obtained. The MAS is the activity that requires the most effort and is still practiced by the individual. The AAS is determined by subtracting the total number of the activities that require less effort and that the patient has stopped doing from the MAS. The AAS reflects typical daily physical activities. Both scores take values between 0 and 94, and higher scores mean more physical activity. The individual's level of physical activity falls into one of the three sub-groups according to his/her AAS: <53 scores: the inadequate level of activity, 53-74 scores: moderately active and >74 scores: active.

International Physical Activity Questionnaire (IPAQ) Short Form

The IPAQ is a questionnaire that assesses the daily physical activity based on personal reports. The short form (7 questions) provides information on the time spent on walking, moderate and severe activities, and the time spent while sitting. The calculation of the total score of the short form includes the total of the duration (minutes) and frequency (days) of walking, moderate and severe activities. The energy required for the activities is calculated with the MET-minute score. Standard MET values were created for these activities. The weekly level of physical activity is calculated using these values (11).

Istatistical Analysis

Statistical analyses were performed using SPSS version 23 software (IBM Corp. Released 2013. IBM SPSS Statistics for Windows, Version 23.0. Armonk, NY: IBM Corp). The suitability of the variables to a normal distribution was investigated using the Kolmogorov-Smirnov test. The Mann-Whitney U test was used in the statistical analysis of the variables that do not show normal distribution. The mean and standard deviation values for continuous variables, and the percentage values for categorical variables were used, in text. Cases, when the P-value was below 0.05, were assessed as statistically significant results (12).

RESULTS

The study was completed with 203 people, 96 of whom were hemodialysis patients (63.22 ± 12.84 years) and 107 (51.07 ± 8.33 years) healthy controls. Fifty two per cent of the hemodialysis patients were females, and 48% were males, and 49.5% of the control group were females, and 50.5% were males. There was no significant difference between the two groups in terms of gender distribution (p<0,05) (Table 1).

The hemodialysis and control group were similar in terms of the body mass index (p>0,05). There was a statistically significant level of difference between the two groups in

terms of age and highest year of education ($p < 0.05$) (Table 1).

There was a significant difference between the two groups in terms of marital status and working status. Among the dialysis patients, the rate of those who were single was higher when compared to the healthy group. The rate of those working at an active job in the control group was significantly higher when compared to the dialysis group ($p < 0.05$) (Table 1).

	Hemodialysis group	Control group
Gender (%)	Female	49.5
	Male	50.5
Age (years) ¹	63.22 ± 12.84	51.07 ± 8.33
Body mass index (kg/m ²)	26.19 ± 4.36	27 ± 4.33
Highest year of education ²	3.84 ± 3.15	8.82 ± 4.06
Marital status ³	Married	92.5
	Single	7.5
Working status (%) ⁴	Actively working	66.4
	Retired or unemployed	33.6

*The Mann-Whitney U test was used
¹p=0.03, ²p= 0.001, ³p= 0.02, ⁴p= 0.001

The clinical features of the patients receiving dialysis treatment are summarized in Table 2. While the period of monitoring the patients with renal failure diagnosis was 8.23 ± 6.37 years, the period of receiving dialysis treatment was 6.65 ± 5.13 years, and the dialysis frequency was 2.95 ± 0.44 days/week. 87.5% of the patients received hemodialysis treatment by means of arteriovenous fistula, while the remaining 12.5% received hemodialysis treatment by means of a catheter. Upon examining the comorbid disease distributions of the patients, it was remarkable that hypertension and diabetes disease diagnoses were common.

Duration of the renal disease (years)	8.23 ± 6.37	
Duration of receiving hemodialysis treatment (years)	6.65 ± 5.13	
Frequency of hemodialysis treatment (days/week)	2.95 ± 0.44	
Hemodialysis approach (%)	Fistula	87.5
	Catheter	12.5
Comorbidities (%)	Hypertension	19.8
	Diabetes	22.9
	Hypertension and diabetes	2
Serum haemoglobin level (g/dL)	10.97 ± 1.02	
Creatine (mg/dL)	9.35 ± 11.41	
Albumin (g/dL)	5.06 ± 5.49	

When the hemodialysis patients and the control group were compared for functional and physical activity levels, in the hemodialysis group daily physical activity levels of IPAQ and MAS and AAS values were significantly lower ($p < 0.05$) (Table 3). When the activity levels of the hemodialysis group were compared by gender, the AAS values of females were significantly lower when compared to males ($p < 0.05$), and the IPAQ daily activity levels and MAS values were similar ($p > 0.05$) (Table 4).

	Hemodialysis group	Control group
HAP	MAS (Mean ± SD) ¹	53.66 ± 19.53
	AAS (Mean ± SD) ²	37.61 ± 21.24
IPAQ Classification (%) ³	Inactive	43
	Inadequately active	48.59
	Active	8.41

HAP: Human Activity Profile, MAS: Maximum Activity Score, AAS: Adjusted Activity Score, IPAQ: International Physical Activity Assessment Questionnaire, SD; standard deviation
 *The Mann-Whitney U test was used
¹p=0.02, ²p= 0.03, ³p= 0.001

	Female	Male
HAP	MAS (Mean ± SD)	50.92 ± 19.09
	AAS (Mean ± SD) ¹	32.96 ± 19.80
IPAQ Classification (%)	Inactive	80.4
	Inadequately active	17.4
	Active	2.2

HAP: Human Activity Profile, MAS: Maximum Activity Score, AAS: Adjusted Activity Score, IPAQ: International Physical Activity Assessment Questionnaire, SD; standard deviation
 *The Mann-Whitney U test was used
¹p=0.001

DISCUSSION

Our study shown that Turkish hemodialysis patients were markedly inactive and had functional disabilities. It was stated that, chronic renal disease disrupts the physical functions starting from early periods, and it may result in serious disability in further periods especially in old patients, and it may even render the patient dependent in daily life activities (13-16). Our general outcome supported the information. Although the patients' dialysis duration was not too long, physical function of the patients were limited.

Suggestions include that the physical function measurement in chronic renal patients must be a part of the routine assessment (17-18). It is expressed that the physical functions of patients are generally assessed

with the questionnaires they fill in by themselves. The assessment of the physical functions by the patient is qualified as easy, low-cost, time-efficient and risk-free. It is reported that habit-related physical activity levels can be assessed with questionnaires in a similar way (17). Among the questionnaires assessing the physical activity, it is shown that the HAP is valid for hemodialysis patients (19) and it has a correlation with many physical activity questionnaires including the IPAQ (20). In parallel to the literature, the HAP and IPAQ questionnaires were preferred in our study. During the implementation of the questionnaires, most of the participants, and especially those in the dialysis group, preferred that the questions were read and then their answers were marked by the implementer instead of reading and answering the questionnaire questions by themselves. It was considered that this striking situation was related to the low education levels of the cases in general.

According to a report, the physical functional capacity of elderly dialysis patients is 50-80% lower when compared to healthy individuals (21). Despite of our patients were not in older age period; their functional activity level was significantly lower than the healthy peers.

In a major part of the studies, it was reported that patients receiving dialysis treatment are less active than sedentary controls with no renal disease (4,22-26). In studies carried out in the USA, it is reported that the activity levels of dialysis patients are low [27-28], and in a study carried out in Japan, it is reported that the physical functions of dialysis patient's decrease (29).

In the study carried out by Anand et al., it is reported that most of the patients with a low AAS score use hemodialysis as a way of treatment, that there are other accompanying problems, and they have low serum creatine and albumin concentrations (30). Kim et al. showed that the HAP MAS and AAS scores decrease in stable hemodialysis patients when compared to healthy individuals (31).

Our study supports the literature when it is interpreted according to the HAP results. It was quite evident that the dialysis patients had very low AAS scores and extremely inadequate activity levels. The HAP of the female patients was low, and their AAS scores and limitations in the functional activity were at a more serious level.

In a new guide, it is indicated that qualified specialists should prescribe exercise programs to chronic renal patients especially with due consideration to the complications related to the cardiovascular diseases accompanying the renal disease (31). In another guide, it is indicated that patients should exercise at least for 30 minutes on many days of the week in order to be protected from cardiovascular diseases (32). On the other hand, the benefits of regular exercising training for the bone health and muscle mass, and the fact that it improves prognosis and life quality in hemodialysis patients are emphasized (31).

Despite the known benefits of the regular physical

activity in renal patients, it is remarkable that patients who continue hemodialysis live a sedentary life and the inactivity increases as they age (25). In a recent study carried out with 31 renal patients, Amaral-Figueroa reported that most of the patients prefer being sedentary (23).

According to the results of the study of Cupisti et al., the low-level physical activity is prevalent even in dialysis patients with no physical or neurological disorder or concurrent serious illness (33). Following the study they carried out in patients receiving treatment in a dialysis centre for two different feet, Li et al. reported that the physical activity levels of the patients are lower when compared to healthy individuals, and also the patients are quite limited in terms of the physical activity, and this limitation occurs especially in walking related to transportation and housework activities (34).

According to the IPAQ, it was determined that the rate of being active in dialysis patients participating in our study was only 1%. The result is compatible with the results of the studies previously carried out in different countries but more dramatic. It is thought-provoking that the rate of being active even in the health control group is limited to 8%, despite being higher when compared to the dialysis group. While it is desired to interpret our result by comparing it with previous studies carried out in our country, unfortunately, no report on the state of activity of the dialysis patients in Turkey was encountered. In a single study including Turkish patients, it was reported that the loss of power and dependence in daily life activities are high and the level of self-sufficiency is low in patients who are applied hemodialysis and continuous ambulatory peritoneal dialysis, however, the physical activity level was not mentioned (35).

Our study has certain limitations. The physical activity levels of the patients were assessed only indirectly with the questionnaire. Unfortunately, a more detailed measurement could not be made by using a tool such as a pedometer and an accelerometer. Furthermore, the inability to detail the laboratory measurements of the patients and make an assessment of their nutrition status is other significant shortcomings.

On the other hand, according to the data for 2015, Kırıkkale is the 63rd most crowded province of Turkey with a population of 270.271 people (36). According to a report, Kırıkkale province ranks at the 33rd place among 81 provinces in the development ranking of the provinces in 2003. In the same report, when the education statistics of Kırıkkale Province are examined, it is indicated that the university graduates are a few when compared to the population (37). Education is a significant determinant in adopting healthy life behaviors. Individuals with a high level of education attach more importance to behaviors protecting the health (38,39). As a result of the mentioned factors, it is not possible to generalize the results we obtained to the dialysis patients in our country.

Despite all its limitations, we believe that the results of our study give a small idea of the possible functional limitations and physical inactivity of the dialysis patients in our country

CONCLUSION

The important clinical messages of this research are dialysis treatment adversely affects the Turkish patient population and leads to functional limitations. On the other hand, these highly inactive patients are likely to increase their limitations with aging process. Physical and functional levels of activity should be evaluated at regular intervals in chronic kidney patients. We hope that this study will pioneer more comprehensive studies and studies with a wider sample on the subject.

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