

Knowledge among nephrologists about the importance of exercise in the intradialytic period

LENIZE CRISTINE SILVA, PT¹⁾, PATRÍCIA ÉRIKA M. MARINHO, PT, PhD¹⁾*

¹⁾ Department of Physical Therapy, Universidade Federal de Pernambuco: Av. Jornalista Anibal Fernandes, s/n, Cidade Universitária, Recife, PE, 50740-560, Brazil

Abstract. [Purpose] To assess knowledge among nephrologists at hemodialysis services about routine intradialytic therapeutic exercise, in the city of Recife. [Subjects and Methods] A cross-sectional study, consisting of 49 nephrologists working in public and/or private hemodialysis services, who responded to a semi-structured questionnaire about their academic background, medical residency, and knowledge about exercise during the intradialytic period. [Results] About 56.3% practiced for more than 10 years as nephrologists, 69.4% did not receive information about intradialytic physical exercise while in residency, 81.6% considered intradialytic exercise to be important, and 53.0% did not prescribe exercise during hemodialysis. About 61.2% consider the level of physical activity among their patients to be poor. Nephrologists graduating within 2 years were 10 times more likely to prescribe exercise, compared to those with more than 2 years since graduation. [Conclusion] Our study found that the nephrologists interviewed do not usually prescribe intradialytic therapeutic exercise, despite understanding its importance as part of the treatment process. It is necessary to update doctors about the importance of exercise for patients during the intradialytic period, as well as to incorporate this knowledge at the undergraduate level.

Key words: Chronic kidney disease, Dialysis, Exercise

(This article was submitted May 29, 2015, and was accepted Jun. 24, 2015)

INTRODUCTION

Chronic kidney disease (CKD) is a major health problem worldwide. It is an important cause of morbidity and mortality, characterized by slow, progressive, and irreversible loss of kidney function¹⁻⁴⁾. In Brazil, the number of patients with chronic kidney failure in outpatient dialysis programs increases by 8% per year¹⁾.

Dialysis can prolong the lives of patients, but does not prevent setbacks caused by the basic pathological condition and the treatment itself⁵⁾.

The accumulation of toxic substances⁶⁾ in the blood causes easy fatigue, mental impairment, peripheral circulatory deficits, changes in sensation, and muscle dysfunction^{7, 8)}. The muscle dysfunction manifests as changes in structure and function⁹⁾, which may present as atrophy, proximal muscle weakness, predominantly in the lower limbs, and results in anemia and peripheral neuropathy^{10, 11)}.

Exercise during the intradialytic period can help minimize these conditions, by promoting increased blood flow to peripheral tissues and improved perfusion of muscle cells^{11, 12)}. Exercise programs have been proposed, and are aimed not only at the clinical signs of the disease, but also

the repercussions on function and quality of life, as these individuals tend to have a sedentary lifestyle and functional limitations^{5, 7, 13)}. Aerobic exercise, with or without muscle strengthening, use of a bicycle ergometer, calisthenics, resistance and/or strengthening exercises, and stretching, are examples of therapeutic modalities used by physiotherapy^{7, 10, 14)}. However, exercise implementation during hemodialysis (HD) is not yet a reality in Brazil¹⁵⁾.

Although the National Kidney Foundation (NKF)²⁾, through the Clinical Practice Guidelines for Chronic Kidney Disease, (KDOQI) (2002) advises nephrologists to prescribe routine physical activity for HD patients¹⁶⁾, the implementation of physical exercise programs during HD in the USA and other countries is not common¹⁷⁾. Some studies have described physical exercise programs in other countries, but the extent to which these programs are part of the treatment of these patients during HD is unknown¹⁸⁻²⁰⁾.

Although some studies show the benefits of regular exercise programs in HD patients^{12, 21, 22)}, the assessment of physical functioning and the incentive to increase physical activity and/or regular participation in exercise programs, specifically during the HD period, are not a routine component of medical care²³⁾.

Thus, this study aimed to assess the opinions of nephrologists at dialysis services in the city of Recife about the importance of routine therapeutic exercise during the intradialytic period.

SUBJECTS AND METHODS

This was an analytical, cross-sectional study, and the

*Corresponding author. Patrícia Érika M Marinho (E-mail: patmarinho@yahoo.com.br; patricia.marinho@upfe.br)

©2015 The Society of Physical Therapy Science. Published by IPEC Inc. This is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial No Derivatives (by-nc-nd) License <<http://creativecommons.org/licenses/by-nc-nd/3.0/>>.

population consisted of nephrologists who practiced in professional groups at HD centers in the city of Recife, Brazil, and provided care for chronic uremic patients undergoing dialysis. The instrument used for data collection was devised specifically for this study, and consisted of a questionnaire containing 15 semi-structured questions pertinent to nephrologists.

The study was conducted in accordance with the ethical standards of the Declaration of Helsinki. All subjects provided written informed consent prior to the study, which was approved by the Ethics Committee of Universidade Federal de Pernambuco.

The first phase of the research was characterized by the identification of dialysis services in the city with a query to the National Register of Health Care Facilities through the Datasus website (<http://cnes.datasus.gov.br/>). Twelve public and private HD centers were identified in the city of Recife. In a second phase, consultation was conducted through the website of the Regional Medical Council of Pernambuco, to determine the number of nephrologists active in the city, and 56 physicians were identified. Of the dialysis services queried, 11 could be contacted, but only 8 allowed data collection.

The sample calculation was performed using a total of 56 nephrologists. With consideration of bilateral statistics at a significance level of $p = 0.05$ and confidence interval of 95%, a total of 49 volunteers was proposed for interviews.

The data collection instrument consisted of information about age, gender, academic background, and residency (place and time of graduation; training in nephrology; HD experience), and knowledge about exercise (intradialytic therapeutic exercise, level of physical activity and exercise prescription for chronic kidney disease patients, and indications for intradialytic exercise). For purposes of analysis in this study, therapeutic physical exercise was considered to be physical activity that was planned and aimed at the maintenance or improvement of the components of physical fitness, that promoted minimum energy expenditure above the resting state, and which should be repeated at least 3 times per week²⁴.

To evaluate personal data, academic profile, perception of exercise during the intradialytic period, and knowledge about the physical status of patients, we calculated the percentage frequencies and constructed frequency distributions. To evaluate which factors significantly influence the practice of prescribing of physical activity, contingency tables were created, and the χ^2 test was applied for independence. Where the test assumptions were not met, we applied Fisher's exact test. For the factors determining prescribing of physical exercise, the prevalence ratio among the levels evaluated was calculated. All conclusions were evaluated at a significance level of 5%. A database was created in a Microsoft Excel spreadsheet, which was exported to SPSS software (IBM Corporation, Armonk, NY, USA) version 18.0 for the analysis.

RESULTS

Among eleven HD services contacted, only 8 allowed data collection. From those, 49 nephrologists at public and

Table 1. Characteristics of the professional profile of nephrologists in the city of Recife

Evaluated factor	n	%
Place of graduation *		
UFPE	27	55.1
UPE	18	36.7
Others	4	8.2
Training in Nephrology *		
UFPE	26	53.1
IMIP	6	12.2
HBL	4	8.2
Others	13	26.5
Actuation time as a Nephrologist *		
Up to 2 years	6	12.2
More than 2 to 5 years	11	22.4
More than 5 to 10 years	7	14.3
More than 10 years	25	51.0
Time experience with Hemodialysis *		
Up to 2 years	4	8.2
More than 2 to 5 years	10	20.4
More than 5 to 10 anos	8	16.3
More than 10 years	27	55.1
Received information on use of therapeutic exercises in intradialytic period during residency in nephrology **		
Yes	15	30.6
No	34	69.4

UFPE: Universidade Federal de Pernambuco (*Federal University of Pernambuco*); UPE: Universidade de Pernambuco (*University of Pernambuco*); IMIP: Instituto Materno Infantil de Pernambuco (*Maternal Child Institute of Pernambuco*); HBL: Hospital Barão de Lucena (*Barão de Lucena Hospital*). Fisher's Exact Test. * $p < 0.001$ and ** $p = 0.007$.
n = number of nephrologists

private institutions in the city of Recife were evaluated. Among those evaluated, 51% were females, 38%, 29% and 33% had an average of 35, between 36 and 45 and above 45 years respectively 69.4% were engaged in regular physical activity ($p = 0.007$), and 87.5% were working in private institutions ($p < 0.001$).

Table 1 shows the characteristics of medical training in nephrology. A total 69.4% of physicians surveyed did not have information on the use of physical exercise for patients on HD during their residency training ($p = 0.007$).

Table 2 shows characteristics concerning prescribing, guidance, and opinions about the practice of physical exercise during the intradialytic period. Although 53.1% of the interviewed nephrologists do not prescribe physical exercises for their patients, 81.6% consider therapeutic exercise to be important during the intradialytic period ($p < 0.001$). Only 8.7% advise their patient about physical exercises ($p < 0.001$), leaving the responsibility to the physiotherapist.

Regarding knowledge about the level of physical activity of their patients, 61.2% of nephrologists consider it to be poor ($p < 0.001$), 65.4% ask very little about the level of physical activity ($p < 0.001$), and only 10.2% of HD patients

Table 2. Opinion of nephrologists about the practice of therapeutic exercise during the intradialytic period

Evaluated factor	n	%
Do you indicate intradialytic exercises for your patient?		
Yes	23	46.9
No	26	53.1
Who guides these exercises? *		
You	2	8.7
Physiotherapist	21	91.3
Your opinion about the therapeutic exercises in intradialytic period? *		
Important	40	81.6
Unaware of the study	4	8.2
I have no opinion	5	10.2

n= number of nephrologists. Fisher's Exact Test. * p <0.001

perform some type of physical exercise (p<0.001) (Table 3).

With regard to the association with the length of professional experience in HD, those with less time in practice (up to 2 years) tended to prescribe physical exercise as a treatment for these patients (p<0.010).

The prevalence ratio for the prescribing of physical exercise was 10 times higher for those professionals with up to 2 years of experience, compared to those with 5–10 years (5.00 times), and more than 10 years (5.19 times) of experience.

Among those who exercise regularly, 88.2% consider physical exercise to be important for HD patients (p=0.009). The nephrologists who exercise had a 1.32-fold likelihood of considering therapeutic exercise during HD to be important, compared to those who do not perform physical activity.

No correlation was observed between prescribing physical exercise and the nephrologist's workplace (public/private) (p=0.670).

DISCUSSION

The results of this study show that more than half of interviewees did not prescribe intradialytic therapeutic exercise for patients on HD, although they perceived it as an important component of the treatment process. Most interviewees did not receive information on the use of physical exercise as a therapeutic tool for CKD patients during residency; they recognize that the level of physical activity of their patients is poor and that most do not perform physical exercise. This study also found that nephrologists with less work experience are more likely to prescribe physical exercise for these patients.

The lack of information about the use of physical exercise in patients undergoing HD that was provided during training in nephrology is similar to that reported by Delgado and Johansen¹⁶⁾, Johansen et al.²⁵⁾, Painter et al.²⁶⁾, and Kontos et al.²⁷⁾. These authors identified a lack of knowledge and commitment to discuss the issue, and consider these to be one of the primary barriers to patient access to intradialytic therapeutic exercise programs.

While nephrologists recognize the importance of physical

Table 3. Knowledge of nephrologists about the level of physical activity among hemodialysis patients in Recife, Brazil, 2014

Evaluated factor	n	%
What level of physical activity among your patients? *		
I don't know	8	16.3
Bad	30	61.2
Reasonable	10	20.4
Excellent	1	2.0
Do you consider your patients active?		
Yes	18	36.7
No	31	63.3
Your patients do physical exercises? *		
Yes	5	10.2
No	44	89.8
How often do you ask your patient about their level of physical activity or exercise? *		
Never	6	12.2
Sometimes	32	65.4
Always	11	22.4

n= number of nephrologists. Fisher's Exact Test. * p <0.001

exercise, prescribing is not routine. Delgado and Johansen²⁸⁾ and Kontos et al.²⁷⁾ reported the lack of prescribing, despite the recognition of the importance of exercise. The reasons for this may lie in the curriculum of the medical residency¹⁶⁾.

Delgado and Johansen²⁸⁾ emphasize that physicians need tools, training, and dialogue on exercise recommendations; in their absence, they feel insecure about prescribing.

Painter et al. reported that nonmedical professionals at HD centers recognize that patients might benefit from an exercise program, and that these patients could have a better level of physical functioning²⁶⁾. The incorporation of physical activity evaluation as a routine for these patients could alter this situation, adding to the recommendations and guidelines of the NKF KDOQI¹⁶⁾.

Most of the nephrologists did not usually evaluate or express concern about the level of physical activity of their patients, despite describing the activity level as poor.

The lack of encouragement by nephrologists could be one of the major factors that inhibit the practice of physical activity among patients²⁷⁾, which conflicts with the KDOQI suggestion that all dialysis patients should be advised and encouraged to exercise regularly by a nephrologist and other team members¹⁶⁾.

This study found that nephrologists with up to 2 years of experience the area had a 10 times greater likelihood of prescribing exercise for these patients, compared to those with more professional experience.

Contrary to the present results, Delgado and Johansen observed that the most experienced nephrologists (older than 55 years old) queried their patients and prescribed physical activity with greater frequency¹⁶⁾. It is possible that younger nephrologists have had the opportunity to work in HD services where contact with the physiotherapist and the availability of physical therapy for chronic renal patients is

a part of the treatment plan, and that this contributed to the difference between the results of the present study and those of Delgado and Johansen¹⁶⁾.

The limitations of this study are the omission of questions about the contact of nephrologists with physiotherapists in or outside of the HD service, and knowledge among these professionals about the physiotherapist's role in caring for patients during the intradialytic period.

The prescribing of therapeutic exercise for patients with CKD undergoing HD needs to be common among nephrologists, so that patients can benefit from an exercise program directed and conducted by a physiotherapist. This study revealed that although nephrologists recognize the importance of physical exercise, few prescribe it during the intradialytic period. Considering the adverse consequences of HD on the physical condition of these patients, the physiotherapist must find ways to promote exercise in this area, since the nephrologists interviewed reported exercise as an adjuvant to HD was neglected during their training in nephrology.

This study found that the nephrologists interviewed do not usually prescribe intradialytic therapeutic exercises for HD patients, while noting it has an important role in the treatment process.

Part of this problem may be related to the lack of education during training of these professionals during residency, but also is probably due to the lack of knowledge among physiotherapists regarding the possibility of interacting with these patients through a supervised program of therapeutic physical exercise.

Thus, it is necessary to continue to investigate other possible factors related to solutions for these patients in clinical practice.

REFERENCES

- 1) Sesso R, Lopes AA, Thomé AS, et al.: Relatório do censo brasileiro de diálise, 2008. *J Bras Neurol*, 2008, 30: 233–238.
- 2) NKF (NATIONAL KIDNEY FOUNDATION): Clinical practice guidelines for chronic kidney disease: evaluation, classification and stratification. *Am J Kidney Dis*, 2002, 39: 1–266.
- 3) K/DOQI: Clinical practice guidelines for chronic kidney disease: evaluation, classification and stratification. *Am J Kidney Dis*, 2002, 39: 1–266.
- 4) Romão Junior JE: Doença renal crônica: Definição, epidemiologia e classificação. *J Bras Neurol*, 2004, 26: 1–3.
- 5) Corrêa LB, Oliveira, RN, Cantareli F, et al.: Efeito do treinamento muscular periférico na capacidade funcional e qualidade de vida nos pacientes em hemodiálise. *J Bras Nefrol*, 2009, 31: 18–24.
- 6) Ponggeon O, Chaunchaiyakul R, Vareesangthip K, et al.: Home-based walking program increases leg muscle strength in hemodialysis patients. *J Phys Ther Sci*, 2011, 23: 345–348. [[CrossRef](#)]
- 7) Moura RM, Silva FC, Ribeiro GM, et al.: Efeitos do exercício físico durante a hemodiálise em indivíduos com insuficiência renal crônica: Uma revisão. *Fisiot Pesq*, 2008, 16: 86–91.
- 8) Vieira WP, Gomes KW, Frota NB, et al.: Manifestações musculoesqueléticas em pacientes submetidos à hemodiálise. *Rev Bras Reumatol*. 2005, 45: 357–364. [[CrossRef](#)]
- 9) Lewis MI, Fournier M, Wang H, et al.: Metabolic and morphometric profile of muscle fibers in chronic hemodialysis patients. *J Appl Physiol* 1985, 2012, 112: 72–78. [[Medline](#)] [[CrossRef](#)]
- 10) Moreira PR, Barros EG: Revisão/Atualização em Diálise: capacidade e condicionamento físico em pacientes mantidos em hemodiálise. *J Bras Neurol*, 1998, 20: 207–210.
- 11) Adams GR, Vaziri ND: Skeletal muscle dysfunction in chronic renal failure: effects of exercise. *Am J Physiol Renal Physiol*, 2006, 290: F753–F761. [[Medline](#)] [[CrossRef](#)]
- 12) Kong CH, Tattersall JE, Greenwood RN, et al.: The effect of exercise during haemodialysis on solute removal. *Nephrol Dial Transplant*, 1999, 14: 2927–2931. [[Medline](#)] [[CrossRef](#)]
- 13) Shi ZM, Wen HP, Liu FR, et al.: The effects of tai chi on the renal and cardiac functions of patients with chronic kidney and cardiovascular diseases. *J Phys Ther Sci*, 2014, 26: 1733–1736. [[Medline](#)] [[CrossRef](#)]
- 14) Bae YH, Lee SM, Jo JI: Aerobic training during hemodialysis improves body composition, muscle function, physical performance, and quality of life in chronic kidney disease patients. *J Phys Ther Sci*, 2015, 27: 1445–1449. [[CrossRef](#)]
- 15) Reboredo MM, Henrique DM, Bastos MG, et al.: Exercício físico em pacientes dialisados. *Rev Bras Med Esporte*. 2007, 13: 427–430. [[CrossRef](#)]
- 16) Delgado C, Johansen KL: Deficient counseling on physical activity among nephrologists. *Nephron Clin Pract*, 2010, 116: c330–c336. [[Medline](#)] [[CrossRef](#)]
- 17) Segura-Ortí E: Ejercicio en pacientes en hemodiálisis: revisión sistemática de la literatura. *Nefrología*, 2010, 30: 236–246. [[Medline](#)]
- 18) Ouzouni S, Kouidi E, Sioulis A, et al.: Effects of intradialytic exercise training on health-related quality of life indices in haemodialysis patients. *Clin Rehabil*, 2009, 23: 53–63. [[Medline](#)] [[CrossRef](#)]
- 19) Cheema BS, Smith BC, Singh MA: A rationale for intradialytic exercise training as standard clinical practice in ESRD. *Am J Kidney Dis*, 2005, 45: 912–916. [[Medline](#)] [[CrossRef](#)]
- 20) Knap B, Buturović-Ponikvar J, Ponikvar R, et al.: Regular exercise as a part of treatment for patients with end-stage renal disease. *Ther Apher Dial*, 2005, 9: 211–213. [[Medline](#)] [[CrossRef](#)]
- 21) Poortmans JR, Vanderstraeten J: Kidney function during exercise in healthy and diseased humans. An update. *Sports Med*, 1994, 18: 419–437. [[Medline](#)] [[CrossRef](#)]
- 22) Wibert W, Paduin A, Navarro F: Contribuição do exercício intradialítico na eficácia da hemodiálise: Uma revisão sistemática. *Rev Bras Presc Fisiot Exerc*, 2011, 5: 242–251.
- 23) Painter P: Implementing exercise: what do we know? Where do we go? *Adv Chronic Kidney Dis*, 2009, 16: 536–544. [[Medline](#)] [[CrossRef](#)]
- 24) Caspersen CJ, Powell KE, Christenson GM: Physical activity, exercise, and physical fitness: definitions and distinctions for health-related research. *Public Health Rep*, 1985, 100: 126–131. [[Medline](#)]
- 25) Johansen KL, Sakkas GK, Doyle J, et al.: Exercise counseling practices among nephrologists caring for patients on dialysis. *Am J Kidney Dis*, 2003, 41: 171–178. [[Medline](#)] [[CrossRef](#)]
- 26) Painter P, Carlson L, Carey S, et al.: Determinants of exercise encouragement practices in hemodialysis staff. *Nephrol Nurs J*, 2004, 31: 67–74. [[Medline](#)]
- 27) Kontos PC, Miller KL, Brooks D, et al.: Factors influencing exercise participation by older adults requiring chronic hemodialysis: a qualitative study. *Int Urol Nephrol*, 2007, 39: 1303–1311. [[Medline](#)] [[CrossRef](#)]
- 28) Delgado C, Johansen KL: Barriers to exercise participation among dialysis patients. *Nephrol Dial Transplant*, 2012, 27: 1152–1157. [[Medline](#)] [[CrossRef](#)]