

1-1-2010

## Prevalence and risk factors of restless leg syndrome in a single hemodialysis unit

YASEMİN SOYORAL

HAYRİYE SAYARLIOĞLU

DENİZ TUNCEL

MURAT ŞAHİN

EKREM DOĞAN

*See next page for additional authors*

Follow this and additional works at: <https://journals.tubitak.gov.tr/medical>



Part of the [Medical Sciences Commons](#)

---

### Recommended Citation

SOYORAL, YASEMİN; SAYARLIOĞLU, HAYRİYE; TUNCEL, DENİZ; ŞAHİN, MURAT; DOĞAN, EKREM; and ERKOÇ, REHA (2010) "Prevalence and risk factors of restless leg syndrome in a single hemodialysis unit," *Turkish Journal of Medical Sciences*: Vol. 40: No. 3, Article 16. <https://doi.org/10.3906/sag-0903-10>  
Available at: <https://journals.tubitak.gov.tr/medical/vol40/iss3/16>

This Article is brought to you for free and open access by TÜBİTAK Academic Journals. It has been accepted for inclusion in Turkish Journal of Medical Sciences by an authorized editor of TÜBİTAK Academic Journals. For more information, please contact [academic.publications@tubitak.gov.tr](mailto:academic.publications@tubitak.gov.tr).

---

## Prevalence and risk factors of restless leg syndrome in a single hemodialysis unit

### Authors

YASEMİN SOYORAL, HAYRİYE SAYARLIOĞLU, DENİZ TUNCEL, MURAT ŞAHİN, EKREM DOĞAN, and REHA ERKOÇ

## Prevalence and risk factors of restless leg syndrome in a single hemodialysis unit

Yasemin SOYORAL<sup>1</sup>, Hayriye SAYARLIOĞLU<sup>2</sup>, Deniz TUNCEL<sup>3</sup>, Murat ŞAHİN<sup>4</sup>, Ekrem DOĞAN<sup>2</sup>,  
Reha ERKOÇ<sup>1</sup>

**Aim:** Restless legs syndrome (RLS) is characterized by symptoms of spontaneous, continuous leg movements associated with unpleasant paresthesias. RLS is common among dialysis patients, with a reported incidence of 6.6 to 6.8 percent. This study is an attempt to find out the prevalence of RLS in our hemodialysis patients. We compared several demographic and clinical characteristics of RLS patients identified by the International Restless Legs Syndrome Study Group (IRLSSG) criteria with those of individuals without RLS.

**Materials and methods:** We studied 76 patients with end-stage renal disease (ESRD) on hemodialysis (34 females and 42 males, mean age: 52.28 ± 18.13, range: 18–83 years). RLS patients' diagnoses were confirmed using the IRLSSG criteria. RLS is diagnosed when a patient answered positively to all of the 4 questions. Hemoglobin, ferritin, iron, iron binding capacity, PTH, and Kt/V ratio values were measured.

**Results:** We found an RLS frequency of 14.5% in our sample. There was no significant difference in terms of serum iron, ferritin, creatinine, iPTH, hemoglobin, and Kt/V between groups of hemodialysis patients with and without RLS (P = 0.89, 0.87, and 0.37, respectively).

**Conclusion:** The 14.5% prevalence of RLS in hemodialysis patients was lower than that has been reported previously. The variability in RLS prevalence rates among hemodialysis patients may result from some racial, regional, socioeconomic, or ethnic differences. These findings need to be confirmed in larger studies.

**Key words:** Restless leg syndrome, prevalence, hemodialysis patients

### Bir hemodiyaliz ünitesinde huzursuz bacak sendromunun prevalansı ve risk faktörleri

**Amaç:** Huzursuz bacak sendromu (HBS); bacaklarda rahatsızlık hissi nedeniyle sürekli spontan bacak hareketleri ile karakterize bir durumdur. HBS hemodiyaliz hastalarında sık görülür, insidansı % 6,6 - % 6,8 arasındadır. Bu çalışma hemodiyaliz hastalarımızdaki HBS sıklığını saptamak için planlandı. HBS semptomu olmayanlar ile uluslararası HBS çalışma grubunun kriterleri ile HBS olduğu düşünülen hastalar arasındaki klinik ve demografik özellikleri karşılaştırdık.

**Yöntem ve gereç:** Çalışmaya 76 hemodiyaliz hastası alındı. Hastaların yaş ortalaması 52,28 ± 18,13 (18–83) yılı, ve hastaların 34'ü kadın, 42'si erkekti. Hastalara huzursuz bacak sendromu tanısı uluslararası huzursuz bacak sendromu çalışma grubunun kriterlerine göre kondu. Tüm sorulara olumlu cevap veren hastalar HBS olarak değerlendirildi. Hemoglobin, ferritin, demir, demir bağlama kapasitesi, PTH, ve Kt/V değerleri ölçüldü.

**Bulgular:** HBS sıklığı % 14,5 idi. HBS olan hastalarla olmayan hastalar serum demir, ferritin, kreatinin, PTH, hemoglobin ve Kt/V açısından karşılaştırıldığında anlamlı fark saptanmadı (sırasıyla P = 0,89, 0,87, ve 0,37).

Received: 19.03.2009 – Accepted: 14.01.2010

<sup>1</sup> Department of Nephrology, Faculty of Medicine, Yüzüncü Yıl University, Van - TURKEY

<sup>2</sup> Department of Nephrology, Faculty of Medicine, Sütçü İmam University, Kahramanmaraş - TURKEY

<sup>3</sup> Department of Neurology, Faculty of Medicine, Sütçü İmam University, Kahramanmaraş - TURKEY

<sup>4</sup> Department of Internal Medicine, Sütçü İmam University, Kahramanmaraş - TURKEY

**Correspondence:** Hayriye SAYARLIOĞLU, Department of Nephrology, Faculty of Medicine, Sütçü İmam University, Kahramanmaraş - TURKEY

E-mail: hayriyesayarlioglu@yahoo.com

**Sonuç:** Hemodiyaliz hastalarındaki % 14,5 HBS sıklığı benzer çalışmalara göre daha düşüktü. Hemodiyaliz hastalarındaki HBS sıklığındaki değişiklikler ırksal, bölgesel, sosyoekonomik veya etnik değişikliklerden kaynaklanabilir. Bu bulgular daha geniş çalışmalarla doğrulanmalıdır.

**Anahtar sözcükler:** Huzursuz bacak sendromu, prevalans, hemodiyaliz hastaları

## Introduction

Restless legs syndrome (RLS) is characterized by symptoms of spontaneous, continuous leg movements associated with unpleasant paresthesias. These symptoms worsen during rest and relief by activity (1). RLS is a sensorimotor disorder characterized by the following features: 1) an urge to move the legs causing restlessness; 2) uncomfortable sensations in the legs at the same time; 3) symptoms become worse during rest; 4) motor and often mental activity leads to a temporary partial and complete relief of symptoms. Internationally recognized diagnostic criteria were published by the International Restless Legs Syndrome Study Group (IRLSSG) (2). According to these criteria, RLS is diagnosed when a patient answers positively to all 4 questions. Mild symptoms of RLS occur in 5 to 15 percent of the population. In most cases RLS is a primary idiopathic disorder, but it also can be associated with a variety of underlying medical disorders. The diagnosis of primary RLS is based on the presence of typical symptoms in the absence of any of these disorders. RLS can occur secondary to a number of disorders including iron deficiency, uremia, diabetes mellitus, rheumatic disease, and venous insufficiency. RLS is common among dialysis patients, with a reported incidence of 6.6 to 68 percent (3-4). Anemia and low serum parathyroid hormone concentration may play a role in RLS (5-6).

This study is an attempt to find out the prevalence of RLS in our hemodialysis patients. We compared several demographic and clinical characteristics of patients identified by the IRLSSG criteria with those of individuals without symptoms.

### Patients and method

We studied 76 patients with end-stage renal disease (ESRD) on hemodialysis (34 females and 42 males, mean age:  $52.28 \pm 18.13$ , range: 18–83 years). Bicarbonate-based hemodialysis was performed 3 times a week for 4 to 5 h from an arterio-venous fistula and a cellulose diacetate dialyzing membrane was employed. Sociodemographic characteristics and

biochemical parameters of the patients were obtained from patient files. RLS diagnosis of the patients were confirmed using the IRLSSG criteria. The questions were as follows: “A) Are there moments in which you have an urge to move your legs, accompanied by sensations of numbness or affliction in the legs?; B) Are these sensations worse at rest or inactivity?; C) Are these sensations with at least partial relief by activity?; D) Are these sensations worse in any particular period of the day? Which?” RLS was diagnosed when a patient answered positively to all 4 questions. Venous blood samples were obtained after 12 h of fasting and before dialysis. Serum PTH and ferritin were measured using the commercial IMMULITE kits, which are solid-phase, two-site chemiluminescent immunometric assays (Immullite, DPC, USA). Iron, iron binding capacity, creatinine, and urea were determined in the serum by routine colorimetric methods on a Roche modular autoanalyzer (Roche modular autoanalyzer, Tokyo, Japan). Kt/V ratio was calculated.

### Statistical Analysis

Distribution of diabetic patients according to RLS was evaluated with the  $\kappa^2$  test. Biochemical parameters were evaluated with the Mann Whitney T Tests. SPSS V15.0 was used for statistical evaluation. Any P value less than 0.05 was considered significant.

## Results

Participants of the present study (n = 76) had a mean age of  $52.28 \pm 18.13$  (18–83) years, and had been on a dialysis program for a mean period of time of  $45.61 (\pm 32.54)$  months. There were 42 males (55.3%) and 34 females (44.7%). We found an RLS frequency of 14.5%. Neither the mean age of patients with and without RLS (50.55 vs. 52.57 years, P = 0.74) nor the mean time on the dialysis program were significantly different (52.8 as 44.4 months, P = 0.69). Demographic and biochemical findings are shown in Table 1. There was no significant difference in terms of serum iron, ferritin, creatinine, iPTH, hemoglobin,

and Kt/V between hemodialysis patients with and without RLS.

Distribution of the patients' answers are shown in Table 2. We found no association between any of the biochemical parameters studied and RLS.

RLS can be a prominent feature of diabetic neuropathy (7-8). There was no significant difference in RLS frequency between subjects with and without diabetes (Table 3).

## Discussion

RLS is common among dialysis patients, with a reported prevalence of 6.6 to 68 percent. In Turkish studies, the prevalence of RLS in patients on regular hemodialysis have been reported as 5% in Ankara (9) and 31% in Afyon (10). The prevalence of RLS in patients on regular hemodialysis have been reported as 22.96% in central Serbia (11), 14% in Budapest (12), 21.5% in Udine/Italy (13), 1.5%-6.6% in India (14-15),

and 14.8% in Petr polis, Brazil (16). The prevalence of RLS in dialysis populations appears to be greater than in the general populations, although there is wide variation. The wide variation may be resulted from some racial, socioeconomic, or ethnic differences.

Anemia may play a role in RLS, since low-dose erythropoietin therapy significantly reduced RLS as reported previously (5). Sloan JA et al. showed that high-dose iron dextran infusion is associated with a significant, but transient, reduction in symptoms of RLS in patients with ESRD (17). Earley et al. found no differences in serum iron, serum ferritin levels, and transferrin saturation between RLS patients and controls (18). However, in their study, patients with RLS had lower cerebrospinal fluid (CSF) ferritin levels and higher CSF transferrin levels compared with control subjects. There was no difference in serum ferritin and transferrin levels between groups. The presence of reduced ferritin and elevated transferrin levels in CSF is indicative of low brain iron in patients

Table 1. Demographic and laboratory findings of HD patients with and without RLS.

	HD patients with RLS (n = 11)	HD patients without RLS (n = 65)	P
Age(years)	50.55 ± 15.69	52.34 ± 18.97	0.74
Sex (M/F)	42	34	0.21
HD duration (months)	52.8 ± 43.7	44.4 ± 30.5	0.69
Hemoglobin (g/dL)	10.6 ± 1.7	10.7 ± 1.6	0.89
Ferritin (ng/mL)	739.3 ± 345.3	730.6 ± 369.4	0.87
Iron (ug/dL)	116.6 ± 118.1	85.6 ± 80.1	0.26
Iron binding capacity(%)	115.2 ± 41.6	163.3 ± 110.4	0.06
Creatinine (mg/dL)	7.2 ± 2.5	7.7 ± 3.3	0.85
Kt/V	1.6 ± 0.2	1.6 ± 0.5	0.37
PTH(pg/mL)	301.8 ± 464.4	423.5 ± 360.7	0.06

Table 2. Distribution of patients' responses.

Number of "yes" responses	Number of patients	Percent
0.00	50	65.8
2.00	3	3.9
3.00	11	14.5
4.00	12	15.8
Total	76	100.0

Table 3. Distribution of diabetic HD patients according to RLS.

HD patients	Without RLS	With RLS	Total
Diabetes	56	9	65
Non-diabetes	9	2	11
Total	65	11	76

with idiopathic RLS. Patients actually have reduced iron stores in the substantia nigra compared to normal controls on specialized magnetic resonance imaging studies (19). This suggests a state of regional iron deficiency. In fact, if only serum measurements of iron markers are used to define iron deficiency, no relationship between iron deficiency and restless leg syndrome is found (20). In another study, uremic patients with RLS showed significantly lower iPTH concentrations (6). However, Miranda et al. determined no relationship between iPTH concentrations and RLS (21)

In conclusion, RLS is very prevalent in dialysis patients. RLS is usually more troublesome in hemodialysis patients than in other patients as they have to spend several hours a day, 3-4 days a week immobilized in a dialysis chair. Thus, RLS symptoms precipitate largely due to regular obligatory physical inactivity. The 14.5% prevalence of RLS in hemodialysis patients was lower than that reported previously. The variability of prevalence of RLS in hemodialysis patients may be resulted from racial, regional, socioeconomic, or ethnic differences. These factors need to be determined in larger studies.

## References

1. Aksu M. Restless Legs Syndrome. *Turkiye Klinikleri J Int Med Sci.* 2007; 3: 44-7
2. Walters AS. Toward a better definition of the restless legs syndrome. *The International Restless Legs Syndrome Study Group. Mov Disord.* 1995; 10: 634-42.
3. Bhowmik D, Bhatia M, Gupta S, Agarwal S, Tiwari S, Dash S. Restless leg syndrome in uremic patients on hemodialysis. *Am J Kidney Dis.* 2003; 41: 833-9.
4. Kutner N, Bliwisd D. Restless leg complaint in African American and Caucasian hemodialysis patients. *Sleep Med.* 2002; 3: 497-500.
5. Harris DC, Chapman JR, Stewart JH, Lawrence S, Roger SD. Low dose erythropoietin in maintenance haemodialysis: improvement in quality of life and reduction in true cost of haemodialysis. *Aust N Z J Med.* 1991; 21: 693-700.
6. Collado-Seidel V, Kohnen R, Samtleben W, Hillebrand GF, Oertel WH, Trenkwalder C. Clinical and biochemical findings in uremic patients with and without restless legs syndrome. *Am J Kidney Dis.* 1998; 31: 324-8.
7. Greco D, Gambina F, Pisciotta M, Abrignani M, Maggio F. Clinical characteristics and associated comorbidities in diabetic patients with restless legs syndrome. *Exp Clin Endocrinol Diabetes* 2009; 9: 496-9.
8. Lopes LA, Lins Cde M, Adeodato VG, Quental DP, de Bruin PF, Montenegro RM Jr et al. Restless legs syndrome and quality of sleep in type 2 diabetes. *Diabetes Care* 2005; 28: 2633-6.
9. Micozkadioglu H, Ozdemir FN, Kut Akut, Sezer S, Saatci U, Haberal M. Gabapentin versus levodopa for the treatment of restless legs syndrome in hemodialysis patients: an open label study. *Ren Fail.* 2004; 26: 393-7.
10. Yuksel S, Colbay M, Yaman M, Uslan I, Acarturk G, Karaman O. Evaluation of diagnostic criteria of restless leg syndrome in hemodialysis patients. *Eur J Gen Med.* 2007; 4: 145-8.
11. Nikić PM, Andrić BR, Stojanović-Stanojević M, Dordević V, Petrović D, Stojimirović BB. Restless legs syndrome prevalence in patients on chronic hemodialysis in central Serbia. *Vojnosanit Pregl.* 2007; 64: 129-34.
12. Mucsi I, Molnar MZ, Ambrus C, Szeifert L, Kovacs AZ, Zoller R et al. Restless legs syndrome, insomnia and quality of life in patients on maintenance dialysis. *Nephrol Dial Transplant.* 2005; 20: 571-7.
13. Gigli GL, Adorati M, Dolso P, Piani A, Valente M, Brotini S et al. Restless legs syndrome in end-stage renal disease. *Sleep Med.* 2004; 5: 309-15.
14. Bhowmik D, Bhatia M, Tiwari S, Mahajan S, Gupta S, Agarwal SK et al. Low prevalence of restless legs syndrome in patients with advanced chronic renal failure in the Indian population: a case controlled study. *Ren Fail.* 2004; 26: 69-72.
15. Bhowmik D, Bhatia M, Gupta S, Agarwal SK, Tiwari SC, Dash SC. Restless legs syndrome in hemodialysis patients in India: a case controlled study. *Sleep Med.* 2003; 4: 143-6.
16. Goffredo Filho GS, Gorini CC, Purysko AS, Silva HC, Elias IE. Restless legs syndrome in patients on chronic hemodialysis in a Brazilian city: frequency, biochemical findings and comorbidities. *Arq Neuropsiquiatr.* 2003; 3B: 723-7.
17. Sloand JA, Shelly MA, Feigin A, Bernstein P, Monk RD. A double-blind, placebo-controlled trial of intravenous iron dextran therapy in patients with ESRD and restless legs syndrome. *Am J Kidney Dis.* 2004; 43: 663-70.
18. Earley CJ, Connor JR, Beard JL, Malecki EA, Epstein DK, Allen RP. Abnormalities in CSF concentrations of ferritin and transferrin in restless legs syndrome. *Neurology* 2000; 54: 1698-700.
19. Allen RP, Barker PB, Wehrl F, Song HK, Earley CJ. MRI measurement of brain iron in patients with restless legs syndrome. *Neurology* 2001; 56: 263-5.
20. Berger K, von Eckardstein A, Trenkwalder C, Rothdach A, Junker R, Weiland SK. Iron metabolism and the risk of restless legs syndrome in an elderly general population: the MEMO-Study. *J Neurol.* 2002; 249: 1195-9.
21. Miranda M, Araya F, Castillo JL, Durán C, González F, Arís L. Restless legs syndrome: a clinical study in adult general population and in uremic patients. *Rev Med Chil.* 2001; 129: 179-86.