Medical - Surgical Nursing Journal 2017; 6(1): 27-33.

Published online 2017 December 10 Original Article

Effect of herbal medicine named hypericum perforatum on sleep quality of hemodialysis patients with restless legs syndrome

Sepideh Nasrollah[1], Tahereh Nasrabadi[2], Mahmoud Mahmoudi[3], Mohammad-Hossein SalehiSurmaghi[4]

1. Instructor, Department of Medical-Surgical Nursing, School of Nursing and Midwifery, Tehran Medical Sciences Branch, Islamic Azad University, Tehran, Iran.
2. Assistant Professor, Department of Medical-Surgical Nursing, School of Nursing and Midwifery, Tehran Medical Sciences Branch, Islamic Azad University, Tehran, Iran.
3. Professor, Department of Epidemiology and Biostatistics, School of Public Health, Tehran University of Medical Sciences, Tehran, Iran.
4. Professor, Department of Pharmacognosy, School of Pharmacy, Tehran University of Medical Sciences, Tehran, Iran.

***Correspondence:** Sepideh Nasrollah, Department of Medical-Surgical Nursing, School of Nursing and Midwifery, Tehran Medical Sciences Branch, Islamic Azad University, Tehran, Iran. Email: Nasrollah.S@gmail.com*

ARTICLE INFO

Article history:

Received: 29 May 2017
Revised: 06 September 2017
Accepted: 03 October 2017

Key words:

Sleep
Hypericum perforatum
Hemodialysis
Restless legs syndrome

ABSTRACT

Background: Restless legs syndrome (RLS) is one of the most common problems of hemodialysis patients affecting their sleep quality. Therefore, it is important for these patients to develop several coping strategies. Given the fact that herbal medicine has been used from ancient times due to their effectiveness and low adverse effects, this study aimed to determine the effect of Hypiran herbal medicine on the sleep quality of hemodialysis patients with RLS.

Methods: This quasi-experimental study was conducted on the hemodialysis patients with RLS referred to three selected hospitals of Tehran, Iran, in 2016. A total of 180 patients were selected through convenience sampling method and randomly assigned into two groups of control and intervention. The subjects in the intervention group were treated by drop of Hypiran three times a day (30 drops each time) for four months. On the other hand, the patients in the control group received placebo. Data was collected using demographic data form, RLS assessment questionnaire, and Pittsburgh Sleep Quality Index. Data analysis was performed by applying descriptive statistics, as well as Chi-squared and independent and paired t-tests in SPSS software, version 18.

Results: At the post-intervention phase, the mean score of the sleep quality of the subjects in the intervention group changed from 17.51±0.21 to 10.55±0.59 (P<0.001). According to the results of independent samples t-test, there was a significant difference between the groups in sleep quality (P<0.001).

Conclusion: Given the results, the sleep quality of the hemodialysis patients with RLS improved by using Hypiran oral drops. Therefore, it is recommended to use this herbal medicine to improve sleep quality in these patients.

1. Introduction

Chronic kidney disease (CKD) is one of the most common health problems, which is characterized by loss of kidney function to do regulation and metabolic wastes disposal.[1] Therefore, accumulation of toxic compounds, fluid and electrolyte imbalance, and eventually uremia may occur.[2] CKD is a progressive and irreversible disorder with a growing incidence.[3-6]

Patients with CKD require alternative treatments to survive, the most common of which is hemodialysis.[1, 5]. According to the literature, about 54% of patients with CKD undergo hemodialysis.[7] This technique is associated with several advantages and disadvantages. The patients face to mental tensions such as anxiety, depression, social problems, social isolation, and decreased sleep quality, in addition to physiologic alterations.[2]

Sleep disturbance and reduced sleep quality, which is defined as disturbed sleep patterns or behaviors, are among the most important problems of hemodialysis patients affecting their quality of life.[8] According to the literature, one of the etiologies of this problem is restless legs syndrome (RLS).[9, 10] This syndrome is a common problem in CKD patients, which causes unpleasant feelings in their

limbs as creeping, crawling, pulling, itching, tingling, and burning that get worse after a period of inactivity and cause insomnia.[9, 11, 12]

Hashemi et al. in 2016 determined that RLS is the fourth cause of insomnia after mental disorders, drug abuse, and breathing-related sleep disorders.[13] In addition, Masoumi et al. in 2013 demonstrated that 86.6% of hemodialysis patients with RLS reported complaints such as awakenings, insomnia, and daytime sleepiness.[14] Given the evidence, the definite cause of RLS was not found. Therefore, there is no specific treatment for this condition, and the current treatments can only be used to relieve the symptoms.[15]

However, using these medications such as dopaminergic agents could be vulnerable for hemodialysis patients, which highlights the importance of using complementary therapies in these patients.[16] Traditional medicine is one of the most commonly used complementary therapies. It has the same physiopathology and principles of diagnosis as modern medicine, and the only difference is using natural products rather than chemical substances.

Hypericum perforatum is one of the medicinal herbs with sedative properties, which can be found in the form of Hypiran drops in pharmacies of Iran.[17, 18] This plant contains numerous active ingredients including hypericin and flavonoids. Additionally, it is able to inhibit the monoamine oxidase enzyme. Therefore, it can be used as a sedative without any serious adverse effects.[19, 20]

Regarding the sedative properties of this plant, it has been used in various studies to control depression and anxiety.[21, 22] However, to the best of our knowledge, no study was found to be conducted on the effect of this herb on the sleep quality of hemodialysis patients with RLS. According to the importance of sleep disturbance and its high prevalence, this study aimed to evaluate the effect of Hypiran on the sleep quality of hemodialysis patients with RLS.

2. Methods

2.1. Design

This quasi-experimental and single blinded study was conducted on all the hemodialysis patients with RLS referred to three educational hospitals of Tehran, Iran, in 2016.

2.2. Participants and settings

The sample size was estimated to be 79 according to the study carried out by Mohammad Fakhar et al. in 2010 and sample size formula ($Z_{1-\square.2}$= 1.96, $Z_{1-\square}$=0.84, P_2=0.2, P_1=0.4)[23] In order to increase the validity of the study and regarding the sample attrition, 90 cases were allocated to each study group, and totally 180 patients participated in this study. The participants were selected through convenience sampling method and randomly assigned into two groups of control and intervention. For random allocation of the subjects, all the file numbers were listed, and the even numbers were allocated to the intervention group by coin tossing. Certainly, the odd numbers were assigned to the control group.

The inclusion criteria entailed the age range of 18-80 years old, undergoing hemodialysis for at least one year, having medical records at the hemodialysis units of the selected hospitals, lack of history of allergy to medical herbs and mental disability, full consciousness, adequate listening and speaking ability to answer to questions, not being under treatment with antiviral drugs, antidepressants, and oral contraceptives at least two weeks prior to the study, not having other diseases leading to unpleasant feelings in the legs (e.g., pregnancy, anemia, thyroid diseases, diabetes, Parkinson's disease, rheumatoid arthritis), and having severe and extremely severe RLS (obtained score of 21 and above based on the standard questionnaire for measuring the severity of RLS).

The exclusion criteria included being pregnant or in the lactation period, having viral diseases, being under treatment with analgesics, hypnotics, sedatives, antidepressants, cyclosporine, digoxin, theophylline, and warfarin according to the physician's order, having the signs of allergy during the study, immigration or death of the patients, and irregular use of Hypiran drop three consecutive times or more than five times in total.

2.3. Instruments

Data was collected using demographic characteristics form, standard questionnaire for assessment of RLS, and Pittsburgh Sleep Quality Questionnaire (PSQI). The demographic characteristic form contained information about age, the duration of CKD, and the duration of hemodialysis.

The RLS severity assessment questionnaire was developed by the International RLS Study Group in 1995.[24, 25] This questionnaire contains 10 items, each with five alternatives, and each item was scored from 0 to 4. Accordingly, the total score ranged from 0 to 40. The total score of 0-10, 11-20, 21-30, and 31-40 indicated mild, moderate, severe, and extremely severe RLS syndrome, respectively. The validity and reliability of the mentioned questionnaire were confirmed by Habibzadeh et al.

in 2011. The reliability of the tool in terms of content validity was evaluated using Cronbach's alpha (%94).[26] In the current study, test-retest reliability was applied to measure the reliability of the test. Prior to the intervention, the questionnaire was presented to 10 patients, who did not participate in the study. One week later, the questionnaire was filled once again by the same patients. The correlation between these two stages was estimated using correlation test and the reliability of the questionnaire was confirmed (%94).

The PSQI was developed by Buysse et al. in 1989 in seven subscales of subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency (the percentage of time in bed that one is asleep), sleep disturbances (nightly awakenings), use of sleeping medication, and morning performance (problems facing an individual during day as a result of insomnia).[27]

Each subscale is scored according to the 4-point Likert scale from 0 to 3. The total score obtained from the seven dimensions ranges from 0 to 21, and the scores above five are indicative of inappropriate quality of sleep. Eventually, the results are categorized according to the total score in four groups of good (0-5), medium (6-10), fairly bad (11-15), and bad.[16-21, 28-30] The validity and reliability of this tool was confirmed in Iran by Shahri far.[31]

The reliability of the mentioned tool was confirmed in several studies such as the study conducted by Farahi et al. in 2009 with a Cronbach's alpha of 0.89.[32] In the present study, the reliability of the instrument was evaluated by presenting the questionnaire to 20 hemodialysis patients, who did not participated in the study (α=0.82).

2.4. Data Collection

Prior to the study, the researcher interviewed with the patients and reviewed their medical records after considering the ethical issues and obtaining permission from the patients, physicians, and the head of the unit. After that, the patients were asked to fill the RLS questionnaire to detect the severity of RLS. After collecting data and selection of eligible patients, the subjects were randomly assigned into two groups of intervention and control. Prior to the intervention, the participants were asked to fill the demographic characteristics form and PSQI as pre-test.

To perform the intervention, oral Hypiran drop (Poursina pharmacy laboratory, Iran) was used, which is produced from the extract of Hypericum perforatum.[18] Each milliliter of this drop contains 0.25 mg of hypericin, which was used in various studies as a sedative medication.[22, 33, 34] At this stage, the subjects of the intervention group were asked to consume 30 drops of this medicine three times a day (morning, noon, and night) for four months.

It is noteworthy that this study was single-blinded, which means that the patients were unaware about the groups they were allocated to. The patients in the control group received placebo. In this regard, the drops of the control group contained drinking water. The patients were asked to inform the researcher after running out of the drop to receive the medication in the hospital or at their door. After four months of constant use of Hypiran drop, the sleep quality was assessed in both groups as a post-test (Diagram 1).

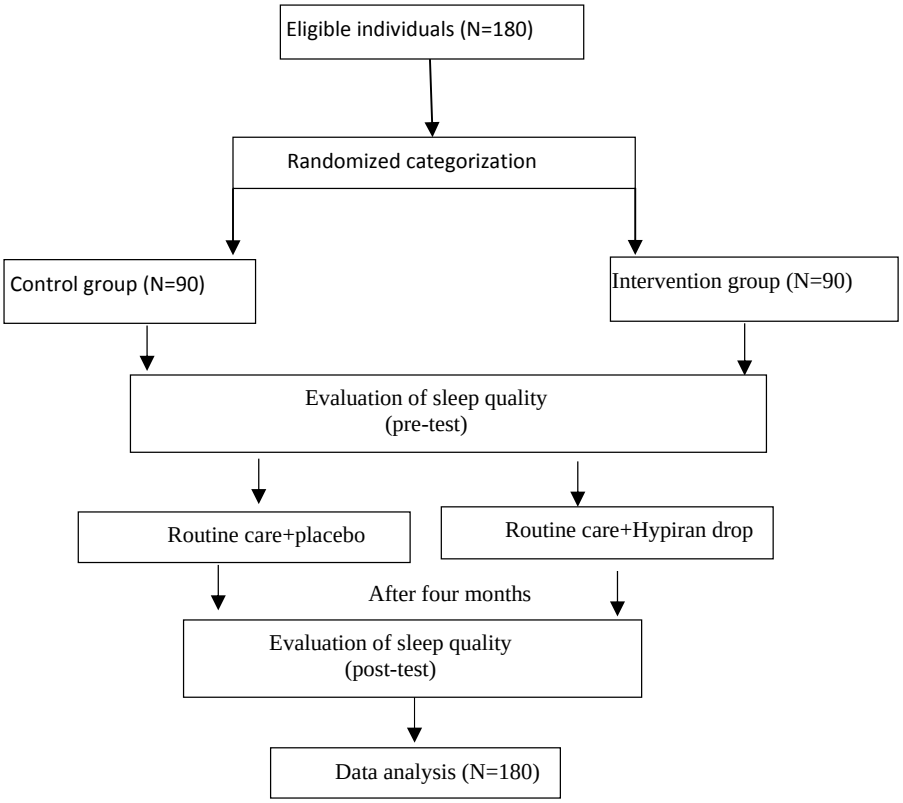

Diagram 1. Steps of the study

2.5. Ethical considerations

Prior to the study, the researcher explained the aims of the study to the participants and their families, and a written informed consent was obtained from them. Furthermore, the subjects were ensured of the confidentiality of their personal information. They were allowed to withdraw from the study at any time, which had no effect on their treatment process.

2.6. Statistical analysis

Data analysis was performed in SPSS, version 28, using descriptive statistics, Chi-squared test (for evaluation of the difference between the groups in terms of gender, the duration of CKD, and the duration of hemodialysis), and independent samples t-test (to compare the study groups regarding the mean scores of age and sleep quality and its dimensions pre- and post-intervention). In all the measurements, P-value less than 0.05 was considered statistically significant.

3. Results

The demographic characteristics of the patients are presented in Table 1, according to which no significant difference was observed between the groups in terms of its variables.

Given the results showed in Table 2, there was a significant difference between the groups with respect to the mean scores of subjective sleep quality (P=0.021), sleep latency (P=0.034), sleep duration (P=0.014), habitual sleep efficiency (P=0.026), sleep disturbances (P=0.011), use of sleeping medications (P=0.018), and morning performance (P=0.20). In the intervention group, there was a significant difference between the pre- and post-intervention phases considering the mean total score of sleep quality (P<0.001). In addition, a significant difference was found between the intervention and control groups (P<0.05; Table 2).

Table 1. The demographic characteristics of the participants

Variables	Groups	Intervention group N(%)	Control group N(%)	P-value
Gender	Female	44(48.9)	27(30)	0.972*
	Male	46(51.1)	63(70)	
Duration of CKD* **	<5 years	52(57.8)	48(53.3)	0.118*
	>5 years	38(42.2)	42(46.7)	
Duration of hemodialysis	<5 years	53(58.9)	49(54.4)	0.433*
	>5 years	37(41.1)	41(45.6)	
Age	Mean±SD	71.61±11.12	71.44±11.27	0.221**

*Chi-squared test, ** Independent samples t-test, *** Chronic kidney disease, Mean and standard deviation

Table 2. Comparison between the groups in terms of the mean sleep quality score

Sleep quality	Time	Intervention group Mean±SD	Control group Mean±SD	*P-value
Subjective sleep quality	Pre-intervention	2.12±0.60	2.13±0.13	0.291
	Post-intervention	1.25±0.22	2.12±0.19	0.011
	P-value*	0.021	0.48	
Sleep latency	Pre-intervention	2.43±0.6	2.43±0.13	0.362
	Post-intervention	1.42±0.11	2.45±0.03	0.023
	P-value*	0.034	0.71	
Sleep duration	Pre-intervention	2.57±0.6	2.58±0.31	0.180
	Post-intervention	1.52±0.43	2.57±0.59	0.012
	P-value*	0.014	0.42	
Habitual sleep efficiency	Pre-intervention	2.21±1.17	2.20±0.60	0.124
	Post-intervention	1.28±0.29	2.20±0.61	0.013
	P-value*	0.026	0.64	
Sleep disturbances	Pre-intervention	2.61±0.16	2.61±0.33	0.241
	Post-intervention	1.63±0.51	2.60±0.60	0.009
	P-value*	0.011	0.57	
Use of sleeping medications	Pre-intervention	2.88±0.76	2.89±0.11	0.323
	Post-intervention	1.81±0.67	2.88±0.17	0.021
	P-value*	0.018	0.87	
Morning performance	Pre-intervention	2.69±0.59	2.70±0.03	0.197
	Post-intervention	1.64±0.52	2.69±0.77	0.021
	P-value*	0.020	0.81	
Total score	Pre-intervention	17.51±0.21	17.54±0.60	0.168
	Post-intervention	10.55±0.59	17.51±0.60	0.001
	P-value*	0.001	0.511	

*Paired t-test; **Independent t-test

4. Discussion

According to the results of the present study, Hypiran oral drops improved the sleep quality of the hemodialysis patients with RLS. This result was in line with the studies conducted on the effect of this medication on insomnia in various patients. Asali et al. in 2013 reported that the extract of Hypericum perforatum could be used to treat insomnia in postmenopausal women.[35]

The results obtained by Kheirkhah et al. in 2014 demonstrated that Hypericum perforatum could affect sleep disturbances in postmenopausal females.[36] Sharpli et al. in 1998 demonstrated an enhancement in the sleep quality of patients with depression after using Hypericum perforatum.[37] Additionally, Antoniad et al. in 2012 introduced Hypericum perforatum as an effective herb in the treatment of insomnia.[38]

The results of the mentioned studies were in congruence with our results despite of the difference between the studies in terms of the study population, environment, and tools. This consistency might be due to the mechanism of action of Hypericum perforatum and its sedative and anxiolytic effects as a result of containing hypericin and flavonoids.

Regarding the results of a study conducted by Sholz et al. in 1994, using Hypericum perforatum extract had a positive effect on the sleep quality of patients with sleep disturbances.[39] The results of the mentioned study supported our findings to some extent. In the other word, the positive effects of this herb were significant only on the dimensions of sleep quality and sleep duration. This disparity might be due to different study population and the doses of the medication.

One of the major drawbacks of this study was that despite of the recommendation of the researcher about the prohibition of the use of several medications (e.g., antivirals, anti-

depressants, and oral contraceptives), there was no guarantee that the patients did not use them at all.

5. Conclusion

According to the results of the current study, using Hypiran oral drops improved sleep quality in the hemodialysis patients with RLS. Use of this medication was possible without the need for any specific tool or facility. Therefore, it be used to treat sleep disorders in hemodialysis patients with RLS. Moreover, further studies are recommended to evaluate the effect of this medication on sleep disturbances in other patients.

Conflicts of interest

The authors declare no conflicts of interest.

Authors' contributions

Sepideh Nasrollah: Design, implementation and scientific edit of the article, Tahereh Nasrabadi: Participation in research design and article preparation ,Mahmoud Mahmoudi: Statistical counselor, participation in data analysis, Mohammad Salehi Surmaghi: Medical counseling, participation in research design.

Acknowledgments

This study was approved by the Ethics Committee of Islamic Azad University, Branch of Tehran, Tehran, Iran, with the code No. IR.IAU.TMU.REC.1394.40. The authors wish to thank the Research Deputy of Islamic Azad University, Branch of Tehran, as well as the nurses and the patients and all the staff of the selected hospitals for their cooperation

References

1. Hinkle JL, Cheever KH. Study Guide for Brunner and Suddarths Textbook of Medical-Surgical Nursing. 13th ed. Philadelphia: Lippincott Co; 2014.
2. Vassalotti JA, Centor R, Turner BJ, Greer RC, Choi M, Sequist TD. Practical approach to detection and management of chronic kidney disease for the primary care clinician. American Journal of Medicine 2016; 129(2): 153-62.
3. Levy J, Brown E, Lawrence A. Oxford handbook of dialysis. 4th ed. London: Oxford University Press; 2016.
4. National Institutes of Health. 2016 USRDS Annual Data Report: Epidemiology of Kidney Disease in the United States. Bethesda, MD: National Institutes of Health, National Institute of Diabetes and Digestive and Kidney Diseases, 2016.Potter P, Perry A. Basic nursing: a critical thinking approach, 50th ed, Philadlphia, Mosby Co 2001: 1228-40.
5. Centers for Disease Control and Prevention 2017 [Accessed March 9]. Available from: Chronic kidney disease surveillance system website. Available from: http://www.cdc.gov/ckd.
6. Azizi F, Hatami H, Janghorbani M. Epidemiology and control of common disease in Iran. 4th ed. Tehran: Khosravi Publications; 2010. [Persian]
7. Arefzadeh A, Lesan-Pezeshki M, Safi S. The cost of hemodialysis in Iran. Saudi Journal of Kidney Diseases Transplantation 2009; 20(2): 307-11.
8. American Academy of Sleep Medicine. International classification of Sleep Disorders. Darien, IL: American Academy of Sleep Medicine, 2014.
9. Alidosti M, Hemate Z, Reisi M. Relationship between the quality of sleep and restless legs syndrome among the hemodialysis patients admitted to dialysis centers in Chaharmahal and Bakhtiari during 2011-2012. Feyz 2013; 17(1): 85-90. [Persian]
10. Astanaki S. The survey of sleeping disturbances state and related factors in hemodialysis patients reffering to dialysis center of imam reza hospital In kermanshah city 1389. Kermashah. [MSC thesis]
11. Giannaki CD, Hadjigeorgiou GM, Karatzaferi C, Pantzaris MC, Stefanidis L, Sakkas GK. Epidemiology, impact and treatment options of restless legs syndrome in end stage renal disease patients: an evidence based review. Kidney International. 2014; 85(6): 1275-82.
12. Mousavi M, Soleimani MA, Akrami R, Tadayonfar M. The effect of progressive muscle relaxation on the severity of restless leg syndrome in patients under treatment with hemodialysis. Hayat 2016; 22(3): 279-90. [Persian]
13. Hashemi H, Kheirkhah D, Aghajani M. The effect of massage with glycerin oil on restless leg syndrome in hemodyalysis patients . Complementary Medicine Journal 2016; 6(19): 1500-10. [Persian]
14. Masoumi M, Naini AE, Gholamrezaei A. Sleep quality in patients on maintenance hemodialysis and peritoneal dialysis. International Journal of Preventive Medicine 2013; 4(2): 165-72.
15. Nasiriani K, Eftekhari A. Effect of hot water bag on severity of restless legs syndrome in hemodialysis patients. Journal of Mazandaran University of Medical Sciences 2016; 26(142): 23-30. [Persian]
16. Siegfried E, Glenn E. Use of olive oil for the treatment of seborrheic dermatitis in children. Archives of Pediatrics and Adolescent Medicine 2012; 166(10): 967.
17. Askenasy N, Askenasy JJ. Restless legs syndrome in Neurologic and medical disorders. Sleep Medicine Clinics 2015; 10(3): 343-50.
18. Zargari A. Medical plants. 1th ed. Tehran: Tehran University Publications; 2014.
19. Mozaffarian VA. Identification of Medicinal and Aromatic Plants of Iran. 1th ed. Tehran: Farhang Moaser Publishers; 2013.
20. Mirheydar H. Usage of Plants in prevention and Treatment of Diseases. 1th ed. Tehran: Islamic Culture Press Center; 2010.
21. Erfany N, Hejazi S, Zeighami Mohammadi S, Salehi Surmaghi MH. Effect of hypericum perforatum on anxiety. Modern Care Journal 2012; 8(4): 179-85.
22. Noorbakhsh M, Alijani-Eidy P. Comparison of walking, yoga and hypiran on depression in non-athlete middle aged woman. Sport Sciences Quarterly 2011; 2(6):71-94. [Persian]
23. Mohammadi-Fakhar F, Rafii F, Jamshidi-Orak R, Inanloo M. Effect of jaw relaxation on pain intensity of burn dressing. Iranian Journal of Nursing Research 2010; 5(19): 58-67. [Persian]
24. The international restless legs syndrome study group (arthur s. walters md – group organizer and correspondent)towards a better definition of the restless legs syndrome Mov Disord, 10 (1995), pp. 634-642
25. Ghanei R, Hemati-Maslak-Pak M, Ghosi S, Hossein-Pour H, Amin-Pour E, Baghi V. Restless legs syndrome and the quality of sleep in type II diabetes. Feyz 2011; 15(3): 240-6. [Persian]
26. Habibzade H, Khalkhali H, Ghaneii R. Study of the relationship between restless legs syndrome and sleep disturbance among patients in critical care units. Iranian Journal of Critical Care Nursing 2011; 4(3): 153-8. [Persian]
27. Buysse DJ, Reynolds CF, Monk TH, Berman SR, Kupfer DJ. The pittsburgh sleep quality index: a new instrument for

psychiatric practice and research. Psychiatry Research 1989; 28(2): 193-213.
28. Ghiasvandian SH, Haghverdi R, Zakerimoghadam M, Kazemnezhad A, Mousavi M, Saeid Y. The effect of preferred music on sleep quality among patients after coronary artery bypass surgery. Cardiovascular Nursing Journal 2014; 3(3): 14-21. [Persian]
29. Mohaddes Ardabili F, Abdi S, Najafi Ghezeljeh T, Hoseini AF, Teimoori A. Evaluation of the effect of patient-selected music on sleep quality and pain intensity in burn patients. Medical - Surgical Nursing Journal 2016; 5(2): 32-40. [Persian]
30. Salahuddin M, Maru TT, Kumalo A, Pandi-Perumal SR, Bahammam AS, Manzar D. Validation of the pittsburgh sleep quality index in community dwelling ethiopian adults. Health and Quality of Life Outcomes 2017; 15(58): 2-7.
31. Shahrifar M. The effect of relaxation on sleep quality and sleeping rate on shift work nurses: Jondi Shapour University of Medical Sciences; 2010.
32. Farrahi J, Nakhaee N, Sheibani V, Garrusi B, Amirkafi A. psychometric properties of the persian version of the pittsburgh sleep quality index addendum for PTSD (PSQI-A). Sleep and Breathing 2009; 13(3): 259-62.
33. http://www.irteb.com/herbal/hypiran.htm
34. Pakgohar M, Mehran A, Salehi-Sourmoghi MH, Akhondzadeh S, Ahmadi M. Comparison of hypericum perforatum and placebo in treatment of physical symptoms of premenstrual syndrome. Hayat 2004; 10(3): 31-7. [Persian]
35. Asali Z, Fahami F, Aslani A, Fathizade N. Comparative evaluation of st jhon's wrot and passion flower effect on hot flash and insomnia in menopausal woman. Complementary Medicine Journal of faculty of Nursing and Midwifery. 2013; 3(1): 383-93.
36. Kheirkhah M, Hamzi S, Vahedi M, Sadeghi-Aval-Shahr H. Effect of hypericum perforatum oral capsule on sleep problems during menopause. Complementary Medicine Journal of faculty of Nursing and Midwifery 2014; 4(3): 935-43. [Persian]
37. Sharpley AL, McGavin CL, Whale R, Cowen PJ. Antidepressant-like effect of hypericum perforatum (St Johns wort) on the sleep polysomnogram. Psychopharmacology 1998; 139(1): 286-7.
38. Antoniades J, Jones K, Hassed C, Piterman L. Sleep. Naturally: a review of the efficacy of herbal remedies for managing insomnia. Alternative and Complementary therapies 2012; 18(3): 136-40.
39. Schulz H, Jobert M. Effects of hypericum extract on the sleep EEG in older volunteers. Journal of Geriatric Psychiatry and Neurology 1994; 7(1): 39-43.

How to cite: Nasrollah S, Nasrabadi T, Mahmoudi M, SalehiSurmaghi MH. Effect of herbal medicine named hypiran on sleep quality of hemodialysis patients with restless legs syndrome. Medical - Surgical Nursing Journal 2017; 6(1): 27-33.