*J Sleep Med Surg*
*Vol 1, Num 1, July 2022*

**ORIGINAL RESEARCH**

# PRESUMPTIVE DIAGNOSIS OF INSOMNIA AND SNORING ASSOCIATED WITH RESTLESS LEGS SYNDROME

Francisco Sánchez-Narváez, Ph.D.,[1] Reyes Haro-Valencia, Ph.D.[1]

*1. Mexican Institute of Integral Sleep Medicine, Mexico City.*

ARTICLE INFO

*Keywords:*
*Insomnia, Restlesss legs syndrome, Snoring*

*Cite:* Sánchez-Narváez F, Haro-Valencia R. Presumptive diagnosis of insomnia and snoring associated with restless legs syndrome. *Jour Sleep Med Surg* 2022;1(1):11-6

ABSTRACT

***Introduction:*** Restless legs syndrome (RLS) is a frequent sleep disorder that may be easily missed at the outpatient clinic. It may be comorbid to a number of different sleep conditions, and if it is not properly assessed, it could lead to treatment failure.

***Methods:*** 85 consecutive files were evaluated, looking for restless legs symptoms according to their primary consultation reason.

***Results:*** 62.4% of the patients were male and 37.6% female. The mean age was 46.8 years. The main complaint was insomnia in 54.1% of the patients and 45.9% complained of snoring. 54.3% of insomnia patients referred restless legs symptoms, as well as 30.8% of snorers. Prevalence of restless legs syndrome was 43.5%.

***Discussion:*** The prevalence of restless legs syndrome in our population was higher than other reports. The prevalence of insomnia was slightly higher than snoring. The presence of restless legs syndrome showed to be statistically significant in both, patients with insomnia and snorers.

***Conclusions:*** A significant relationship with restless legs syndrome in patients complaining of insomnia or snoring, so symptoms of restless legs should be always addressed.

## 1. INTRODUCCIÓN

According to the International Classification of Sleep Disorders (ICSD-3), more than 100 sleep disorders have been described,[1] being the most common insomnia and sleep apnea. However, comorbidity between sleep disorders is often observed in everyday clinical praxis, and they are not always identified.[2]

Restless Legs Syndrome (RLS) is a relatively common condition that is frequently undiagnosed, and it is characterized by the presence of uncomfortable sensations at the legs that usually appear at rest before sleep onset and are relieved by movement. It is estimated that the relationship between insomnia and restless legs syndrome is present in 15.6% of the general population[3] and the relationship of sleep apnea and RLS is 7% - 36%.[4-5]

Epidemiological studies suggest that most of individuals with obstructive sleep apnea (OSA) remain undiagnosed.[6-7] This is partially due to the association between symptoms such as drowsiness and snoring, with the presence or severity of sleep-disordered breathing. This is a clinical challenge, given that OSA may be especially relevant in patients with insomnia with or without restless legs syndrome.[8]

In sleep medicine, clinical diagnosis usually relies on an adequate and detailed structure of clinical history to

Corresponding author: Francisco Sánchez-Narváez, Ph.D. e-mail: fsannar01@gmail.com
Address: Patricio Sanz 745, Col. del Valle, Mexico City, 03100.

Received: May 5th, 2022, Accepted: June 2nd 2022
Available online: July 1st, 2022

confirm or rule out comorbidity with other sleep disorders. Polysomnography (PSG) is an important tool in order to establish a differential diagnosis in some sleep conditions.[9-10] It is also useful in cases of sleep disorders that do not respond to treatment. One common example is untreated OSA, which may worsen RLS symptoms, making medical treatment harder, whereas, in the other hand, treatment of comorbid OSA may improve RLS management.[8]

The purpose of this study is to analyze the frequency of insomnia and snoring associated with other comorbidities such as restless legs syndrome and sleep apnea in the everyday clinical practice of sleep medicine.

## 2. METHODS

The files of 85 consecutive patients of the Mexican Institute of Integral Sleep Medicine were evaluated. All of them came to the outpatient clinic with symptoms of insomnia or snoring. Symptoms of restless legs syndrome and day-time somnolence were assessed as well. The statistical analysis consisted in descriptive statistics, crosstables, risk estimation and non-parametric tests (U-Mann Whitney), using the SPSS 20.0 software.

## 3. RESULTS

Of the 85 subjects included in this study, 62.4% (53) were male and 37.6% (32) were female. The mean age was 46.8 (±1.61) years.

Table 1 shows significant differences in two of the variables according to gender: consultation reason among men 1.66 (±0.06) compared to women 1.13 (±0.06) and daytime sleepiness 1.85 (±0.05) compared to women 1.94 (±0.04). With respect to the other variables, no significant differences were found.

54.1% of the patients complained of insomnia as their main symptom, and 45.9% complained of snoring. No statistically significant differences were found in this group ($p<0.49$). Regarding gender, no significant differences were observed. In the sleep apnea and daytime sleepiness parameters, significant differences were observed in each both groups. (Table 2).

When comparing the main consultation reason (insomnia and snoring), we found that there are significant differences between insomnia and snoring group with the restless legs syndrome group, 1.46 (±0.07) and 169 (±0.07) respectively. These significant differences are also present when comparing the consultation reason according to gender (Table 3).

Among the patients whose main complaint was insomnia, RLS was diagnosed in 54.3% of cases (n=25); while, in those whose primary complain was snoring, RLS was present in 30.8% of them (n=12). The presence of restless legs syndrome showed no statistically significant differences related to the primary complain of the patients (insomnia or snoring). Nevertheless, the consultation reason was significantly associated with restless legs syndrome when using Pearson's Chi-square statistical analysis (4.77 and $p\leq0.029$). (Table 4)

We also found that the consultation reason had a significant probability of presenting with restless legs syndrome almost three times higher (value 2.68) with a 95% confidence interval (1.096-6.55). No significant odds ratio was found for the association between the consultation and daytime sleepiness or gender (Table 5).

| | Male | | Female | | U Mann-Whitney |
|---|---|---|---|---|---|
| | X (SD) | 95% (CI) | X (SD) | 95% (CI) | p≤0.05 |
| Age | 48.75 (2.08) | (44.57- 52.94) | 43.56 (2.5) | (44.57-52.94) | 0.11 |
| Consultation reason | 1.66 (0.06) | (1.53-1.79) | 1.13 (0.06) | (1.13 – 1.79) | 0.00* |
| Restless legs syndrome | 1.58 (0.07) | (1.45 – 1.72) | 1.53 (0.09) | (1.35 – 1.71) | 0.63 |
| Day-time somnolence | 1.85 (0.05) | (1.75 – 1.95) | 1.94 (0.04) | (1.85 – 2.03) | 0.02* |
| AHI | 1.55 (0.8) | (-0.05 – 3.14) | 0.0 (0.00) | | 0.07 |

*Table 1: Features of the sample, according to gender. X=mean. SD= Standard deviation. CI = Confidence interval.*

| Variable | Condition | N | % | Chi² |
|---|---|---|---|---|
| Gender | Male | 53 | 62.4 | p<0.23 |
| | Female | 32 | 37.6 | |
| Consultation reason | Insomnia | 46 | 54.1 | p<0.49 |
| | Snoring | 39 | 45.9 | |
| Restless legs syndrome | Yes | 37 | 43.5 | p<0.23 |
| | No | 48 | 56.5 | |
| Day-time somnolence | Yes | 10 | 11.8 | p<0.00 |
| | No | 75 | 88.2 | |
| Sleep anpea | Yes | 4 | 4.7 | p<0.00 |
| | No | 81 | 95.3 | |

*Table 2: Features of the sample, according to their group*

In the analysis of the consultation reason associated with other factors such as the presence of sleep apnea and gender are significant. The results indicate that the percentage of individuals with insomnia and without apnea is 100% (n=46), while those with snoring problems in the consultation and the presence of apnea confirmed by polysomnography is 10.3% (Table 6). On the other hand, the results regarding the association between the consultation reason and daytime sleepiness were not statistically significant.

In the analysis of the risk estimation regarding the consultation reason and sleep apnea (table 7), we found a significant probability of occurrence (1.11) with a 95% confidence interval (1.02 - 1.24).

In table 8, we can see two cases of snoring, sleep apnea and RLS. The group with insomnia and RLS without apnea represents 54.3% and 45.7% only presents insomnia. In the group that presented snoring and RLS without sleep apnea, it was 28.6%, while those that only presented snoring was 71.4%.

| | Insomnia | | Snoring | | U Mann-Whitney |
|---|---|---|---|---|---|
| | X (SD) | 95% (CI) | X (SD) | 95% (CI) | p≤0.05 |
| Age | 45.17 (2.17) | (40.8 - 44.9) | 48.72 (2.4) | (43.81 - 53.62) | 0.25 |
| Gender | 1.61 (0.07) | (1.46 -1.76) | 1.10 (0.04) | (1.00 – 1.20) | 0.000* |
| Restless legs syndrome | 1.46 (0.07) | (1.31 – 1.61) | 1.69 (0.07) | (1.31 – 1.61) | 0.03* |
| Day-time somnolence | 1.87 (0.5) | (1.77 – 1.97) | 1.90 (0.05) | (1.80 – 2.00) | 0.69 |
| Sleep apnea | 0.07 (0.06) | (-0.07 – 0.2) | 48.72 (2.42) | (43.81 – 53.62) | 0.11 |

*Table 3: Features of the sample according to the consultation reason. X=mean. SD= Standard deviation. CI= Confidence interval.*

| Consultation reason | Restless legs syndrome | | No restless legs symptoms | | Total (%) |
|---|---|---|---|---|---|
| | N | % | N | % | |
| Insomnia | 25 | 54.30 | 21 | 45.70 | 46 (100) |
| Snoring | 12 | 30.8 | 27 | 69.20 | 39 (100) |
| Total | 37 | 43.50* | 48 | 56.50 | 85 (100) |

*Table 4: Crosstable for consultation reason and restless legs syndrome. *Pearson's Chi²: association between consultation reason and restless legs syndrome (4.77, p≤0.029).*

## 4. DISCUSSION

54.1% of the patients presented at the outpatient clinic due to insomnia while 45.9% presented due to snoring. In the general population, insomnia presents between 10% to 20% and 50% of the patients may have chronic insomnia.[11-12] On the other hand, the presence of snoring is the most common symptom of sleep apnea, which is reported by patients in around 94% of them.[13] However, in this study 45.9% reported snoring as the only consultation reason without sleep apnea.

The prevalence of restless legs syndrome in this study was 43.5%, while in the world literature it is reported between 7 and 36% in the general population,[14] however, we found one study where a RLS prevalence of 49.4% is reported,[15] very similar to our findings. It is important to point out that in our study, the estimation of sleep conditions may be higher because it is a diagnostic center of sleep disorders; therefore, prevalences are expected to be higher compared to those of the general population.

The prevalence of RLS related to the consultation reason were 54.3% for insomnia and 30.8% for snoring, no statistical differences were observed between these groups, which indicates that RLS may be common in these disorders and this comorbidity may be present in a significant association (p≤0.029).

| Risk estimation | | | |
|---|---|---|---|
| | Value | 95 % Confidence interval | |
| | | Lower | Upper |
| Odds ratio for consultation reason (insomnia, snoring) and restless legs syndrome | 2.68 | 1.10 | 6.548 |
| Odds ratio for consultation reason (insomnia, snoring) and day-time somnolence | 1.313 | .342 | 5.033 |
| Odds ratio for consultation reason (insomnia, snoring) and gender | .073 | .022 | .242 |
| Total | 85 | 85 | 85 |

*Table 5: Risk estimation for the consultation reason, restless legs syndrome, day-time somnolence and gender.*

It is known that snoring in most patients is associated with sleep apnea,[13] in this study there were only four cases with snoring and polysomnographically documented presence of sleep apnea and of these two had snoring, apnea and RLS.

Although snoring may manifest as an independent condition or as a symptom of a sleep disorder, such as obstructive sleep apnea, polysomnographic studies are required to make a differential diagnosis.[18-19] A limitation of this study is that the presence of snoring was not evaluated using other diagnostic procedures.[19-20] Another limitation of this study is that the patients were not selected randomly, but rather from a consecutive list.

| Consultation reason | Sleep apnea | | No sleep apnea | | Total (%) |
|---|---|---|---|---|---|
| | N | % | N | % | |
| Insomnia | 0 | 0 | 46 | 100 | 46 (100) |
| Snoring | 4 | 10.3 | 35 | 89.7 | 39 (100) |
| Total | 4 | 4.7%* | 81 | 95.3 | 85 (100) |

*Table 6: Crosstable for consultation reason and sleep apnea. *Pearson's Chi²: association between consultation reason and sleep apnea (4.95, p≤0.026).*

| Risk estimation | | | |
|---|---|---|---|
| | Value | 95% Confidence interval | |
| | | Lower | Upper |
| Odds ratio for consultation reason (insomnia, snoring) and sleep apnea | 1.11 | 1.02 | 1.24 |
| Total | 85 | | |

*Table 7: Risk estimation for consultation reason and sleep apnea.*

| Consultation reason without sleep apnea | Restless legs syndrome | | No restless legs symptoms | | Total (%) |
|---|---|---|---|---|---|
| | N | % | N | % | |
| Insomnia | 25 | 54.30 | 21 | 45.70 | 46 (100) |
| Snoring | 10 | 28.6 | 25 | 71.4% | 35 (100) |
| Total | 35 | 43.2 | 46 | 56.8 | 81 (100) |
| Consultation reason with sleep apnea | Restless legs syndrome | | No restless legs symptoms | | Total (%) |
| | N | % | N | % | |
| Snoring | 2 | 50 | 2 | 50% | 4 (100) |

*Table 8: Crosstable for consultation reason, restless legs syndrome and sleep apnea*

## 5. CONCLUSIONS

Restless legs syndrome is a highly prevalent condition, which is not commonly addressed during clinical evaluation. Even if our patients come to the clinic for different consultation reasons, like insomnia or snoring, the presence of associated sleep comorbidities should be ruled out, including RLS, and a comprehensive history, along with polysomnography will confirm the proper diagnosis.

The prevalence of insomnia and snoring associated with restless leg syndrome is high compared to the general population, so it is important to conduct new randomized studies in clinical and non-clinical groups.

## 6. REFERENCES

1. American Academy of Sleep Medicine. *International classification of sleep disorders.* 3rd ed. 2014

2. Pistorius F, Geisler P, Wetter TC, Crönlein T. Sleep apnea syndrome comorbid with and without restless legs syndrome: differences in insomnia specific symptoms. *Sleep Breath* 2020; 24(3):1167-1172. doi:10.1007/s11325-020-02063-8

3. Bonakis A, Androutsou A, Koloutsou ME, Vagiakis E. Restless Legs Syndrome masquerades as chronic insomnia. *Sleep Med* 2020; 75:106-111. doi:10.1016/j.sleep.2020.06.003

4. Lakshminarayanan S, Paramasivan KD, Walters AS, Wagner ML, Patel S, Passi V. 2005 Clinically significant but unsuspected restless legs syndrome in patients with sleep apnea. *Mov Disord* 2005; 20:501–503

5. Benediktsdottir B, Arnardottir ES, Jansson C, Pack A, Juliusson S, Gislason T 2012 Prevalence of restless legs syndrome among patients with obstructive sleep apnea before and after CPAP treatment, compared to general population. The Icelandic Sleep Apnea Cohort (ISAC). *Eur Respir J* 2012; 40:436

6. Punjabi NM. The epidemiology of adult obstructive sleep apnea. *Proc Am Thorac Soc* 2008;5(2):136-143. doi:10.1513/pats.200709-155MG

7. Kapur V, Strohl KP, Redline S, Iber C, O'Connor G, Nieto J. Underdiagnosis of sleep apnea syndrome in U.S. communities. *Sleep Breath* 2002;6(2):49-54. doi:10.1007/s11325-002-0049-5

8. Bianchi MT, Goparaju B, Moro M. Sleep apnea in patients reporting insomnia or restless legs symptoms. *Acta Neurol Scand* 2016;133(1):61-67. doi:10.1111/ane.12439

9. Chokroverty S. Overview of sleep & sleep disorders. Indian J Med Res. 2010;131:126-140.

10. Ramar K, Olson EJ. Management of common sleep disorders. *Am Fam Physician* 2013;88(4):231-238.

11. Bollu PC, Kaur H. Sleep Medicine: Insomnia and Sleep. *Mo Med* 2019;116(1):68-75.

12. Buysse DJ. Insomnia. *JAMA* 2013;309(7):706-716. doi:10.1001/jama.2013.193

13. Mattei A, Tabbia G, Baldi S. Diagnosis of sleep apnea. *Minerva Med* 2004; 95(3):213-231.

14. Lakshminarayanan, S., Paramasivan, K.D., Walters, A.S., Wagner, M.L., Patel, S. and Passi, V. Clinically significant but unsuspected restless legs syndrome in patients with sleep apnea. *Mov Disord* 2005; 20: 501-503. https://doi.org/10.1002/mds.20366

15. Zhuang S, Na M, Winkelman JW, et al. Association of Restless Legs Syndrome With Risk of Suicide and Self-harm. *JAMA Net Open* 2019;2(8):e199966. Published 2019 Aug 2. doi:10.1001/jamanetworkopen.2019.9966

16. Sun S, Qiu J, Ren J, et al. Association between leg motor restlessness and depression among Chinese males living at high-altitude: the mediating role of insomnia. *Sleep Breath* 2021;25(2):979-987. doi:10.1007/s11325-020-02156-4

17. Liu X, Chen H, Liu ZZ, Jia CX. Insomnia and Psychopathological Features Associated With Restless Legs Syndrome in Chinese Adolescents. *J Clin Psychiatry* 2018;79(1):16m11358. doi:10.4088/JCP.16m11358

18. Stuck BA, Hofauer B. The Diagnosis and Treatment of Snoring in Adults. *Dtsch Arztebl Int* 2019;116(48):817-824. doi:10.3238/arztebl.2019.0817

19 Hofauer B, Braumann B, Heiser C, et al. Diagnosis and treatment of isolated snoring-open questions and areas for future research. *Sleep Breath* 2021;25(2):1011-1017. doi:10.1007/s11325-020-02138-6

20. Moaeri S, Hildebrandt O, Cassel W, et al. Die Analyse von Schnarchen bei Patienten mit obstruktiver Schlafapnoe (OSA) anhand von Polysomnografie und LEOSound [Analysis of Snoring in Patients with Obstructive Sleep Apnea (OSA) by Polysomnography and LEOSound]. *Pneumologie* 2020;74(8):509-514. doi:10.1055/a-1155-8772