Orginal Article Open Access

Iranian Journal of Diabetes and Obesity (IJDO)

Evaluation of Restless Leg Syndrome in Patients with Type 2 Diabetes Mellitus

Tayyaba Khalid[1*], M Faheem Afzal[1], Aneela Amjad[1]

[1]PSRD College of Rehabilitation Sciences, Lahore, Pakistan.

Abstract

Objective: To evaluate restless leg syndrome (RLS) in type 2 Diabetes Mellitus (T2DM) in Lahore.

Materials and Methods: A cross-sectional study design was recruited for this study. Non-probability purposive sampling technique was used to select the patients in the study. The data was collected from the Pakistan Society for the Rehabilitation of Disabled (PSRD) Hospital and Hameed Latif Hospital Lahore. Patients diagnosed with T2DM with a maximum of 10 years, ages between 35 to 65 years, and patients who suffer from minor complications of diabetes mellitus were in
cluded in the study. The RLS rating scale was used to assess the severity of restlessness in participants.

Results: Out of 144 subjects, the frequency of the RLS was 71.5% and the majority was more in females as compared to male subjects. The female subjects have moderate severity of RLS while male subjects have mild severity of RLS.

Conclusion: The frequency of RLS was high in patients with T2DM and females were more prone to RLS as compared to male subjects.

Keywords: Frequency, Restless leg syndrome, Type 2 diabetes mellitus

QR Code:

Citation: Khalid T, Afzal M F, Amjad A. Evaluation of Restless Leg Syndrome in Patients with Type 2 Diabetes Mellitus. IJDO 2023; 15 (2) :87-92

URL: http://ijdo.ssu.ac.ir/article-1-791-en.html

10.18502/ijdo.v15i2.12966

Article info:

Received: 06 January 2023

Accepted: 12 April 2023

Published in June 2023

Corresponding Author:

Tayyaba Khalid, PSRD College of Rehabilitation Sciences, Lahore, Pakistan.

Tel: (92) 321 417 4065

Email: taibakhalid44@gmail.com

Orcid ID: 0000-0003-3193-1492

[DOI: 10.18502/ijdo.v15i2.12966]

Introduction

The prevalence of type 2 Diabetes mellitus (T2DM) is found almost in every epidemiological distribution of the population. (1,2). The complication happened due to diabetes mellitus enhancing so rapidly in South Asia than in other continents of the world. (3). This endocrinological syndrome leads to one-third of death occurring in diabetes patients aged less than 60 years. (4). Utilization of an unhealthy diet and lifestyle that lead to an increased body mass index (BMI) promotes the rapid increase of diabetes mellitus. (5). The highest number of diabetes mellitus in low-income countries stipulates a large impact on the economy. (6). The information suggests that precautionary measures are taken by the health agencies for blood pressure, glucose level, and other targets still inadequate for many of the patients. (7). Individuals with T2DM have insulin resistance and relative insulin deficiency (8,9). The International Diabetes Federation estimated that in 2013, 382 million adults aged 20-70 years worldwide had T2DM, with 80% of those affected living in low- and middle-income countries. This number is expected to rise to 592 million by 2035. (10) T2DM leads to complications including neuropathy, nephropathy, retinopathy cardiovascular disease and peripheral artery disease in the general population (11-13).

Restless leg syndrome (RLS), recently renamed as Willis-Ekbom Disease, is a neurological disorder characterized by an inexorable urge to move the lower limbs and sometimes upper limbs, especially during periods of inactivity and at night (14) Sensations like creepy-crawly, tearing, itching in bones, electric current or throbbing pain are reported by the patients (15). Pathogenesis of RLS includes brain iron deficiency that increases in the presynaptic and synaptic dopamine production thus down-regulation of post-synaptic dopamine happens .(16). Co-morbidities of RLS include insomnia, depressive and anxiety disorders, end-stage renal disease and diabetes (17,18). As there is no physical test or tool to measure restlessness, RLS can be confirmed or ruled out based on essential criteria defined by the International RLS Study Group (IRLSSG) (19).

A comparative study between diabetes and non-diabetes shows the prevalence of RLS was 28.6% among patients with diabetes and 7.1% in the control group. The association between RLS and diabetes has a negative impact on daytime activity, quality of life and sleep (20). Patients reported with poly-neuropathy had 22 % of RLS whereas only 3.6% of patients with osteoarthritis had RLS (21). The prevalence of RLS in these patients was found to be 28.3% whereas the prevalence in females was 33.3% and 20.6% in males. Family history of RLS was also reported in 43.3%. Another captivating piece of the literature showed the impact of RLS on quality of life, depression, and anxiety. RLS affects the nocturnal rest and psychological status that endanger the glycemic control in the patients (22). In 2018, Ning et al conducted that RLS was higher in Asian patients than in non-Asian patients (23).

There are many studies conducted that support that RLS is common in diabetic patients, but no well-defined study was found that concludes the frequency of RLS in diabetic patients of Pakistan. The objective of the study was to determine the frequency of RLS in T2DM.

Materials and Methods

The cross-sectional study was conducted at the Pakistan Society for the Rehabilitation of Disabled Hospital (PSRD) and Hameed Latif Hospital Lahore. Non-probability purposive sampling technique was used to recruit patients. The study duration for the recruitment, data entry and analysis of data was 6 months (September 2020 to March 2021). The calculated sample size was 144

[DOI: 10.18502/ijdo.v15i2.12966]

with an anticipated population proportion of 0.072 (24).

The tool used for the assessment of the severity of RLS was International Restless Leg Syndrome (IRLS) which is valid for the confirmation of RLS (intraclass correlation coefficient= 0.94 (25). Patients diagnosed with T2DM with a minimum of 2 years and maximum of 10 years, aged between 35 to 65 years and patients who suffer from minor complications of diabetes like Frozen Shoulder, cardiovascular conditions, and peripheral artery disease were included in the study. Patients with dementia, cerebrovascular diseases, cardiovascular diseases, renal diseases, malignancy, active infection, pregnancy, Parkinson's, myelopathy, radiculopathy, and drug addicts were excluded as they increase the risk of RLS in patients.

Permission was sought from the Institutional Review Board of PSRD (PSRD/CRS/TK/REC /Letter-34). Permission was taken from the institutes before data collection and consent was taken from every patient before participation in the study. Consent was taken from every subject in English or Urdu Language. The RLS Scale was comprised of 10 Likert scale questions and results were presented usually in mild (0-10), moderate (11-20), severe (21-30) and very severe (31-40) forms of RLS.

Data was entered and analyzed through Statistical Package for Social Sciences (SPSS version.26). Frequencies and percentages were computed for variables like age, gender, the weight of the patients and occupation. The quantitative variables were presented in form of frequency and percentages. Descriptive analysis was used to compute the quantitative variables.

Ethical considerations

Approval for research proposal "Prevalence of restless leg in type II diabetes mellitus in Lahore, Pakistan" with ref: PSRD/CRS/TK/ REC/Letter-34. Date: 20-08-2020.

Results

Totally 144 subjects were recruited in this study, 80 (55.5%) were female and 64 (44.4%) were male, and the mean age was 51.5 (±8.005) years. The most of the subjects (n= 53) were 46 to 55 years old. Mean age of the patients diagnosed with RLS (n= 103) was 51 (±7.8) years, and mean age of those patients who were not diagnosed with RLS (n= 41) was 52.5 (±7) years. Most of the subjects were working in their relevant organization as full-time employees (55.5%). The *P*-value of 0.73 indicates that there is no statistically significant difference in the severity of RLS between males and females.

The severity of RLS in females with T2DM was at moderate levels 28 (35%) and 1 (1.3%) in mild levels. The severity of RLS in male diabetics was at mild levels in 26 (40.6%) and moderately found in 8 (12.5%) (Table 1).

Discussion

The results of the study show that the frequency of RLS in T2DM was high at 71.5%. The study was conducted in 2019 to determine the prevalence of restless leg syndrome in T2DM and concluded that RLS is frequently found in patients with T2DM (13). It is concluded by the evidence that T2DM is

Table 1. The frequency and percentages of all variables of International Restless Leg Syndrome (IRLS) n=144

Questions	None	Mild	Moderate	Severe	Very severe
Discomfort in legs and arms	58 (40.3%)	33 (22.9%)	37 (25.7%)	14 (9.7%)	2 (1.4%)
Need to move around because of RLS symptoms	59 (41%)	36 (25.0%)	38 (26.4%)	9 (6.3%)	2 (1.4%)
Frequency of relieving from discomfort after moving	59 (41%)	38 (26.4%)	34 (23.6%)	12 (8.3%)	1 (7%)
Frequency of sleep disturbances	65 (45.2%)	32 (22.2%)	35 (24.3%)	8 (5.6%)	4 (2.8%)
Frequency of severity of tiredness and sleepiness during the daytime	59 (41%)	35 (24.3%)	32 (22.2%)	14 (9.7%)	4 (2.8%)
Frequency of severity of RLS as a whole	59 (41%)	39 (27.1%)	31 (21.5%)	13 (9.0%)	2 (1.4%)
Frequency of occurrence of RLS symptoms	59 (41%)	46 (31.9%)	29 (20.1%)	7 (4.9%)	3 (2.1%)
Frequency of average severity of RLS symptoms	59 (41%)	57 (39.6%)	22 (15.3%)	3 (2.1%)	3 (2.1%)
Frequency of impact of RLS symptoms on daily affairs	65 (45.2%)	47 (32.6%)	26 (18.1%)	4 (2.8%)	2 (1.4%)
Frequency of severity of RLS symptoms on mood disturbances	63 (43.8%)	53 (36.8%)	22 (15.3%)	6 (4.2%)	0 (0%)

[DOI: 10.18502/ijdo.v15i2.12966]

considered a risk factor for RLS (26). It is proven by the evidence that RLS is very common in T2DM and most commonly happen with neuropathy. (27). A study conducted in Pakistan reported that diabetic patients suffer from moderate to severe RLS (28). An Iranian study showed the risk of RLS is 1.7-2.87 folds higher in diabetic patients (29).

The results of the study show that 35% of studied females with RLS suffer from moderate severity of RLS. A study conducted in 2021, shows that the prevalence of RLS in female have moderate severity (34%). (28). Evidence collected in 2019 shows that RLS prevalence in female patients was 60.3%. (30).

On the other hand, 40.6% of studied males with RLS were suffering from mild severity of RLS (40.6%). A study conducted in 2017 suggested that RLS prevalence was high in male diabetic patients. (2). Another study conducted in 2022 found that prevalence of RLS in males was 49%. (31).

During the comparison of male and female subjects having RLS positive with diabetes, results of the study support that almost equal number of subjects were involved in RLS with frequency and percentages of 46 (44.66%) and 57 (55.34%) in male and female respectively. Similarly, study conducted in 2019 by Akı n et al. shows the frequency of RLS in patients with T2DM was found to be 28.3%. RLS frequency in females was 33.3% and 20.6% in males. Hence it shows that there is a strong association between the female gender with RLS syndrome.(13).

According to the study, very severe day time sleepiness and tiredness were in only about 4.9% due to RLS being present while Lopes et al. shows RLS was found in 27% of patients. Excessive daytime sleepiness was found in 26% of patients. (8). There is a strong correlation full form between sleep disturbances and RLS. According to the results of current study, almost 45% participants with RLS had disturbance in their sleep due to symptoms. Modarresnia et al. conducted a cross-sectional study on 210 people with DM. The tool used for the diagnosis of RLS was established by the National Institutes of Health. The frequency of RLS was 19.5%; of whom 38.1% had poor sleep (31). As the study limitation we can notice, Most of the questionnaires was filled out online thus it cannot guarantee that the answers were given honestly. There was inconsistency in data collection. Due to COVID-19 some hospitals and diabetes centers refused to allow data collection.

Recommendations, the sample size should be larger for these types of studies to ensure the certainty of the results. Questionnaires should be filled in person rather than using online platforms.

Conclusions

The frequency of RLS was high in patients with T2DM and females were more prone to RLS as compared to male subjects

Acknowledgments

The authors are grateful to all data collection institutes and the Pakistan Society for the Rehabilitation of Disabled (PSRD) Hospital.

Funding

No funding agencies supported this project.

Conflict of Interest

The author declare no conflict of interest

References

1. Atlas D. International diabetes federation. IDF Diabetes Atlas, 7th edn. Brussels, Belgium: International Diabetes Federation. 2015;33:2.
2. Flores-Hernández S, Saturno-Hernandez PJ, Reyes-Morales H, Barrientos-Gutierrez T, Villalpando S, Hernandez-Avila M. Quality of diabetes care: the challenges of an increasing epidemic in Mexico. Results from two national health surveys (2006 and 2012). PloS one. 2015;10(7):e0133958.

[DOI: 10.18502/ijdo.v15i2.12966]

3. Arokiasamy P, Uttamacharya, Kowal P, Capistrant BD, Gildner TE, Thiele E, et al. Chronic noncommunicable diseases in 6 low-and middle-income countries: findings from wave 1 of the World Health Organization's study on global Ageing and adult health (SAGE). American journal of epidemiology. 2017;185(6):414-28.
4. Alotaibi A, Perry L, Gholizadeh L, Al-Ganmi A. Incidence and prevalence rates of diabetes mellitus in Saudi Arabia: an overview. Journal of epidemiology and global health. 2017;7(4):211-8.
5. Lone S, Lone K, Khan S, Pampori RA. Assessment of metabolic syndrome in Kashmiri population with type 2 diabetes employing the standard criteria's given by WHO, NCEPATP III and IDF. Journal of epidemiology and global health. 2017;7(4):235-9.
6. Seuring T, Archangelidi O, Suhrcke M. The economic costs of type 2 diabetes: a global systematic review. Pharmacoeconomics. 2015:811-31.
7. Al Slail FY, Abid O, Assiri AM, Memish ZA, Ali MK. Cardiovascular risk profiles of adults with type-2 diabetes treated at urban hospitals in Riyadh, Saudi Arabia. Journal of epidemiology and global health. 2016;6(1):29-36.
8. Surani S, Brito V, Surani A, Ghamande S. Effect of diabetes mellitus on sleep quality. World journal of diabetes. 2015;6(6):868.
9. American Diabetes Association. Diagnosis and classification of diabetes mellitus. Diabetes care. 2014;37(Supplement_1):S81-90.
10. DeFronzo RA, Ferrannini E, Groop L, Henry RR, Herman WH, Holst JJ. Type 2 diabetes mellitus. Nature reviews Disease primers. 2015; 1 (1): 1-22.
11. Papatheodorou K, Banach M, Bekiari E, Rizzo M, Edmonds M. Complications of diabetes 2017. Journal of diabetes research. 2018;2018.
12. Chawla A, Chawla R, Jaggi S. Microvasular and macrovascular complications in diabetes mellitus: distinct or continuum?. Indian journal of endocrinology and metabolism. 2016;20(4):546.
13. Akı n S, Bölük C, Börü ÜT, Taş demir M, Gezer T, Ş ahbaz FG, et al. Restless legs syndrome in type 2 diabetes mellitus. Primary care diabetes. 2019;13(1):87-91.
14. Kambampati S, Wasim S, Kukkar V, Awad VM, Malik BH. Restless leg syndrome in the setting of patients with end-stage renal disease on hemodialysis: a literature review. Cureus. 2020;12(8).
15. Wijemanne S, Jankovic J. Restless legs syndrome: clinical presentation diagnosis and treatment. Sleep medicine. 2015 Jun 1;16(6):678-90.
16. Allen RP. Restless leg syndrome/Willis-Ekbom disease pathophysiology. Sleep medicine clinics. 2015;10(3):207-14.
17. Becker PM, Novak M. Diagnosis, comorbidities, and management of restless legs syndrome. Current medical research and opinion. 2014;30(8):1441-60.
18. Trenkwalder C, Allen R, Högl B, Clemens S, Patton S, Schormair B, et al. Comorbidities, treatment, and pathophysiology in restless legs syndrome. The Lancet Neurology. 2018;17(11):994-1005.
19. Walters AS, Frauscher B, Allen R, Benes H, Chaudhuri KR, Garcia-Borreguero D, et al. Review of diagnostic instruments for the restless legs syndrome/Willis-Ekbom Disease (RLS/WED): critique and recommendations. Journal of Clinical Sleep Medicine. 2014;10(12):1343-9.
20. Zobeiri M, Shokoohi A. Restless leg syndrome in diabetics compared with normal controls. Sleep disorders. 2014;2014.
21. Cho YW, Na GY, Lim JG, Kim SH, Kim HS, Earley CJ, et al. Prevalence and clinical characteristics of restless legs syndrome in diabetic peripheral neuropathy: comparison with chronic osteoarthritis. Sleep medicine. 2013;14(12):1387-92.
22. Merlino G, Valente M, Serafini A, Fratticci L, Del Giudice A, Piani A, et al. Effects of restless legs syndrome on quality of life and psychological status in patients with type 2 diabetes. The Diabetes Educator. 2010;36(1):79-87.
23. Ning P, Hu F, Yang B, Shen Q, Zhao Q, Huang H, et al. Systematic review and meta-analysis of observational studies to understand the prevalence of restless legs syndrome in multiple sclerosis: an update. Sleep Medicine. 2018;50:97-104.
24. Didriksen M, Rigas AS, Allen RP, Burchell BJ, Di Angelantonio E, Nielsen MH, et al. Prevalence of restless legs syndrome and associated factors in an otherwise healthy population: results from the Danish Blood Donor Study. Sleep medicine. 2017;36:55-61.
25. Sharon D, Allen RP, Martinez-Martin P, Walters AS, Strambi LF, Högl B, et al. Validation of the self-administered version of the international Restless Legs Syndrome study group severity rating scale–the sIRLS. Sleep medicine. 2019;54:94-100.
26. Harashima SI, Nishimura A, Osugi T, Wang Y, Liu Y, Takayama H, et al. Restless legs syndrome in patients with type 2 diabetes: effectiveness of pramipexole therapy. BMJ supportive & palliative care. 2016;6(1):89-93.
27. Mirghani H. Restless legs syndrome among Sudanese patients with type 2 diabetes mellitus: a case-control study. Cureus. 2020;12(8).
28. Nawaz MS, Nawaz MS, Shah KU, ul Mustafa Z, Ahmed A, Ahmed HS, et al. Prevalence and determinants of restless leg syndrome in type 2 diabetes mellitus (T2DM) in Pakistan. Diabetes & Metabolic Syndrome: Clinical Research & Reviews. 2021;15(2):525-8.

[DOI: 10.18502/ijdo.v15i2.12966]

29. Afkhami-Ardekani A, Momayez-Sanat Z, Vahhabi Z, Vazirpanah T, Afkhami-Ardekani M. The relationship between frequency of restless leg syndrome and type 2 diabetes. Iranian Journal of Diabetes and Obesity. 2017;9(1):40-4.
30. Ning P, Mu X, Yang X, Li T, Xu Y. Prevalence of restless legs syndrome in people with diabetes mellitus: A pooling analysis of observational studies. EClinicalMedicine. 2022 ;46:101357.
31. Modarresnia L, Golgiri F, Madani NH, Emami Z, Tanha K. Restless legs syndrome in Iranian people with type 2 diabetes mellitus: the role in quality of life and quality of sleep. Journal of clinical sleep medicine. 2018;14(2):223-8.

[DOI: 10.18502/ijdo.v15i2.12966]