

<https://doi.org/10.56770/jcp2024814>

ASSOCIATION OF RESTLESS LEG SYNDROME WITH FATIGUE AND SLEEP QUALITY AMONG STUDENTS TAKING PARACETAMOL

Ayesha Rehman*, Ayesha Karim, Muhammad Ejaz, Hunsha Imran, Zunaira Iqbal, Rimsha Aslam, Isbah Siddique

Department of Allied Health Sciences, Lahore Institute of Science and Technology, Lahore, Pakistan

Submitted February 3, 2024; Accepted May 14, 2024; Online June 30, 2024

ABSTRACT

Objective: Restless leg syndrome is a major condition experienced by many individuals and is mostly present in medical undergraduates it is mostly found in correspondence with fatigue and sleep and many other factors as well. This research aimed to examine the correlation between restless leg syndrome (RLS), sleep and Paracetamol within the population of medical students. **Methods:** The inquiry is a sampling pattern of a cross-sectional study and sampling is done with a convenience sampling technique. To diagnose Restless Leg Syndrome, International Restless Legs Syndrome Study Group Diagnostic criteria are used, as well as fatigue and sleep quality are assessed by Fatigue Severity Scale and Pittsburgh Sleep Quality Index respectively. The responses from the participants were taken in the form of a Questionnaire. Statistical Package for Social Sciences (SPSS) determines the interaction of restless leg syndrome with sleep, the need of taking Paracetamol, and fatigue in medical undergraduates. The gathered data was evaluated over SPSS. The data was collected from 178 medical students both female and male mainly ranging from 18 to 26 years. **Intervention:** The data collection is done by International Restless Legs Syndrome Study Group Diagnostic criteria, Fatigue Severity Scale, and Pittsburgh Sleep Quality Index. The study is mainly conducted to raise awareness about restless leg syndrome in students and its correlating factors i.e. Poor sleep and fatigue. **Results:** This research contains 178 respondents. The mean age of respondents was 20.80 ± 1.692 years with 36 (20.2%) being males and 142 (79.8%) being females. Sleep disturbance was observed in 80.9 % of the total population and fatigue was present in 53.4% of the total population. Restless Leg Syndrome was also frequently present (36%) in medical students, and students who used to take Paracetamol for RLS had better sleep. **Conclusion:** The statistical analysis showed that restless leg syndrome was common in medical students and is most significantly correlated with fatigue and Sleep disturbance among medical undergraduates of Lahore Institute of Science & Technology with statistically significant ($p=0.04$) and ($P=0.011$) respectively.

Keywords: Fatigue, Restless leg syndrome, Students, Sleep quality, Medical undergraduate

*Corresponding Author. E-mail: ayesharehman195@gmail.com

INTRODUCTION

Restless legs syndrome (RLS) is a neurological disorder with symptoms like leg pain, fatigue, and an uncontrollable urge to move the legs. These symptoms worsen over time and greatly affect sleep quality for those with the condition [1]. The inability to sleep or abnormal sleep also causes mood swings, lethargy in the daytime, mental and psychological problems, and the individual feels fatigued to participate in daily activities [2]. To live a healthy life an adequate amount of sleep is necessary. Improper sleep causes the occurrence of RLS [3]. The term restless legs syndrome (RLS) refers to a group of symptoms that include flexion of the ankles, knees, and hips, also known as

periodic limb movements, and abrupt and involuntary movement of the limbs [4]. Rhythmic muscular contractions primarily affect the lower limbs and are characterized by dorsiflexion, or fanning, of the toes. Intermittent symptoms of restless leg syndrome (RLS) may appear, and sleep deprivation may make RLS symptoms worse [5]. The pathophysiology of restless legs syndrome (RLS) suggests that anomalies in dopaminergic and iron metabolism are involved at every age, from infancy to 80 years of age and beyond [6]. RLS can also affect a person's mind's ability to think, decide and learn. At the same place, RLS can also be related to some major depressive disorders [7].

Generally, the majority of students due to their studies also suffer from major fatigue and sleep disturbances [8]. In the same regard, most medical students due to excessive studying hours and clinical wards and exams face a hectic routine that lacks proper sleeping hours [9]. The disorder known as RLS is characterized by a diverse set of symptoms and the primary problems that are associated with its presence. According to reports, affected people and the general community exhibit a wide range of symptoms, and this holds for the severity of the condition as well [10]. According to recent research that has been conducted RLS is said to be a disorder of the CNS rather than PNS due to its pathophysiology involving the decreased level of dopamine in the brain which affects the movement of the limb causing RLS [6]. RLS is said to be the fourth leading cause of sleep disturbances and sleeplessness which are most of the time responsible for causing primary RLS and for which seeking medical attention is necessary [4]. RLS is characterized by four fundamental symptoms, including weakness in the lower legs, discomfort, and restlessness, which tend to exacerbate with physical activity and alleviate upon rest [11]. Uncomfortable feelings, discomfort during the time, and poor sleep, patients complain that they cannot able to maintain a refreshing and sound sleep [12]. The fact revealed by other research is that at midnight, or after midnight patient experience most of the discomfort in their legs that may or may not be associated with pain. Along with pain, some other sensations have also been experienced which have descriptions like prickling, aching, burning, tingling, electrical, and itching sensations [13]. RLS as shown by the name most commonly occurs in the legs although any area from the hips to the feet can have the symptom. As the severity increases it can also involve the upper limb including the shoulder arms and wrists [14]. The manifestations of restless legs syndrome extend beyond the confines of the lower extremities [15]. RLS rarely involves the upper limb first, or without involving the lower limb. As Restless leg syndrome's frequency and severity of symptoms advance this condition may be characterized by the involvement of other body parts, including the hips, arms, trunk, and even the face, but the lower limb is seen to be always the most commonly occurring site of RLS [16]. The dopamine antagonist that is capable of passing through the blood-brain barrier is responsible for exacerbating the symptoms of restless leg syndrome [15]. A circadian rhythm in the occurrence of this condition is said to be seen. In this regard, continuous movement of the legs can

trigger multiple other conditions and defects involving the major systems of the body causing functional and cognitive deficits as well. We can take account of the condition by measuring it through different scales. Such as the ones developed by Epworth and Stanford, which are highly effective in investigating the RLS [17].

Most of the students are affected by Restless leg syndrome and they didn't even know it so we were interested in finding the association of Restless leg syndrome with fatigue. Medical students have a very tough routine, and due to that they pay very little attention to their physical and mental health where Restless leg syndrome is a very common condition and its symptoms are mostly neglected. This study was conducted to spread awareness in them about their health condition including their sleep and fatigue levels in correspondence with Restless leg syndrome.

An epidemiological study conducted at the University of Lahore by Komal Sikander et al determined the prevalence of RLS and QoL in medical students. A convenient sampling technique and standardized Questionnaire of RLS was used by the researchers. Data were analyzed through SPSS 25. Out of the total population of 142 medical students, 48(33.8%) that responded were male and 94 (66.2%) were female. Moderate sleeping disturbance was found in 46 respondents (32.4%) and severity was found among 21 (14.8%) students. The effect of RLS on QoL was noted as moderate in 42 (29.6%) and severity was recorded in 9 (6.3%) medical students. Prevalence among students was low (severe 14.9% and very severe 3.6%). QoL was also seen to be affected by mild to moderate. It concluded that young females were highly affected by RLS. That causes major changes in their activities of daily living and also causes considerable changes in their sleeping patterns as well [18]. Students might take Paracetamol for RLS to alleviate mild discomfort or pain associated with the condition, although it does not treat the underlying neurological cause of RLS but improves the symptoms [19].

A cross-section study was conducted by Ali S Shalash et al in Egypt. The basic purpose of their research was to find the prevalence of RLS and the validity of IRRLS in medical students. They conducted the research at Ain Shams University in Cairo. This literature included 389 subjects 217 females and 172 males the average score of IRLS was 16.33÷5.3 the prevalent rate of restless leg syndrome of at least moderate severity per week was 5.9%. 11.9% of students had RLS out of which 27 were females and 19 were males. They were assessed by International Restless leg syndrome

Study Group Diagnostic Criteria and they were also interviewed face to face to confirm the diagnosis of RLS. The mean total IRLS score was 16.33 ± 5.3 , with moderate severity (11.62 ± 3.9) and low impact (3.1 ± 1.8). Thus it was concluded that the prevalence of restless leg syndrome was found with the fact that quality of life has a very decreased rate of impact and the IRLSSG Diagnostic Criteria is more reliable and effective for more advanced research [5].

In 2018 Deldar Morad Abdullah and colleagues conducted a comprehensive epidemiological study in Saudi Arabia. This study examines the causes and effects of different sleep disturbances on medical students' health. A selected cohort of medical students from a top public university were generously invited to participate in this cross-sectional study. They contributed by completing the SLEEP-50 self-reported questionnaire, a carefully designed instrument. The comprehensive questionnaire revealed a wide range of sleep disturbances in medical students. Restless legs syndrome, sleepwalking, insomnia, circadian rhythm sleep disorder, sleep apnea, nightmares, narcolepsy, and other conditions that affect sleep patterns were included. The study also examined how sleep issues affect daily life, motivation, and functioning. The study also analyzed sleep length as a key component. A cohort of 317 volunteers helped collect valuable data for this study. A significant share, 165 respondents, reported sleeping fewer than 7 hours. Additionally, these people reported several sleep abnormalities other than hypersomnia. This discussion discusses the many reasons that prevent restful sleep. A thorough review of the literature indicates many causes, including a lack of happiness, pleasure, entertainment, guilt, and melancholy. It is also generally known that alcohol, smoking, and anxiety negatively impact sleep. Aging, a noisy or lit sleeping environment, and, most importantly, substance addiction have all been connected to sleep disturbances. The study also found that those with sleep difficulties had trouble waking up and may be tired during the day. In addition, these students are more irritable, have trouble focusing, and have poor sleep quality. Modern culture struggles with sleep deprivation. According to research, people with sleep disorders, especially students, are more irritable. Inadequate sleep worsens students' quality of life [20].

MATERIAL AND METHODS

It was a non-experimental and descriptive cross-sectional study. The objective of this study was to conduct a comparative analysis of the sleep patterns exhibited by medical students enrolled at

Lahore Institute of Science and Technology, in contrast to a control group consisting of individuals not pursuing a medical education. The setting of this study was Lahore. Upon the acceptance of the synopsis defense, the study was successfully conducted within four months. Materials that are used are a Consent form, PSQI, Fatigue severity scale, and Restless leg syndrome Diagnostic criteria. The sample was taken from all the batches of medical students at the Lahore Institute of Science & technology. The study population consisted of students who were studying for a degree in Doctor of Physical Therapy at the Lahore Institute of Science & technology. Students of the first year, second year, third year & fifth year were involved in the study. The aim was to include all the Lahore Institute of Science & Technology medical students taking Paracetamol. A convenient sampling technique was used. However, 178 medical students were captured out of Medical students. The questionnaires employed in this study were the Pittsburgh Sleep Quality Index, the Fatigue Severity Scale, and the International Restless Legs Syndrome Study Group Diagnostic Criteria for RLS (consisting of four items). These questionnaires are reliable and taken from previous research [21]. Sleep was assessed by PSQI which consisted of 9 Components comprising of at which time respondents go to bed, how much time is required to sleep, when they get up, actual hours of sleep, and hours in bed. The remaining components were marked according to the occurrence in the past month, once per week, two times a week, and thrice or more than thrice per week. Another data collecting instrument Fatigue Severity Scale (FSS) that was used in the previous international research was used [22]. The FSS consists of nine statements that are responded by strong disagreement shown by the minimum value 1 to the strong agreement up to 7. The statements are mostly from the daily life of the respondents like fatigue interfering with social life, work, and family, exercise brings fatigue and fatigue also interferes with physical functioning and motivation. The organization referred to as the International RLS Study Group, the Diagnostic Criteria for RLS was employed to collect data about the condition. The utilization of this information in previous research for the diagnosis of RLS has been firmly proven [21]. This criteria consists of the will to move the legs that it is present at rest or not, relieved by movement and demonstration of regular pattern with highest frequency of symptoms at night. This criterion is valid for diagnosing RLS [22]. Data collection procedure. The method of collecting data was simple. Self-administrative questionnaire and a

consent form were used to collect data from participants in the class. The IRLSSG diagnostic criteria were valid and reliable which were included in the study. The questionnaires used are valid and reliable and hence various types of research prove their validity and reliability as well. We approached each student and delivered each questionnaire personally to every student in LIST (Lahore Institute of Science and Technology) in their classrooms. We explained a bit about restless leg syndrome so that they may know the background and objective of the research. We explained every part of all the sections of the questionnaire to them for their proper understanding as well, especially PSQI. We also described the aims and objectives of the questionnaire. Data collection was an interesting task yet challenging for us because the questionnaires were quite lengthy and complex and due to this we had to explain many sections of the questionnaire twice or thrice. We also provided complete assistance in letting them understand and fill out the questionnaire. All those students who were willing to take part in the study filled the questionnaire at the moment. Some of the students were no interested in filling out the questionnaire considering it may reveal some of their personal life we explained to them about protecting their privacy and after reading the consent form they were satisfied enough and filled out the questionnaire. Data that was acquired, and analyzed for this study was done with the help of SPSS Windows 10. Personal information was expressed in mean, standard deviation, and minimum and maximum values. SPSS was used to analyze the correlation between Restless leg syndrome and sleep and restless leg syndrome with fatigue. $P > 0.05$ and $P > 0.01$ was set for the level of significance.

RESULTS

Demographic Description of Age Collected from Study Participants

Out of 178 participants, 96 participants were belonging to the age group of 16 to 20 years. The second highest of them were from the age group 21 to 23 years which were 72 participants. Only 10 respondents were aged between 24 to 26 years old. (Figure 1).

Regarding the Prevalence of Fatigue among respondents results of our research showed that 95 respondents out of 178 participants are suffering from fatigue. While 83 respondents were having no fatigue (Figure 2). Figure 3 shows the total number of respondents that are suffering from sleep disturbances. A large number of students specifically 144 respondents were having disturbed sleep. Only 44 participants had normal sleep patterns.

Out of 178 participants, 113 participants experienced no symptoms of Restless leg syndrome. While the rest 65 participants had Restless leg syndrome as shown in Figure 4.

Correlation between RLS with Poor Sleep, Paracetamol and fatigue

In our research, the results revealed that RLS is positively correlated with Sleep disturbances. The level of significance is 0.001 and shows a great association of both variables. The correlation between RLS with fatigue was found to be positively correlated with each other as their *p value* is 0.004. Hence, an increase in the fatigue level of a person will increase the chances of occurrence of Restless leg syndrome. Students taking Paracetamol had better and improved sleep due to less discomfort.

DISCUSSION

The questionnaire used in this study was filled by

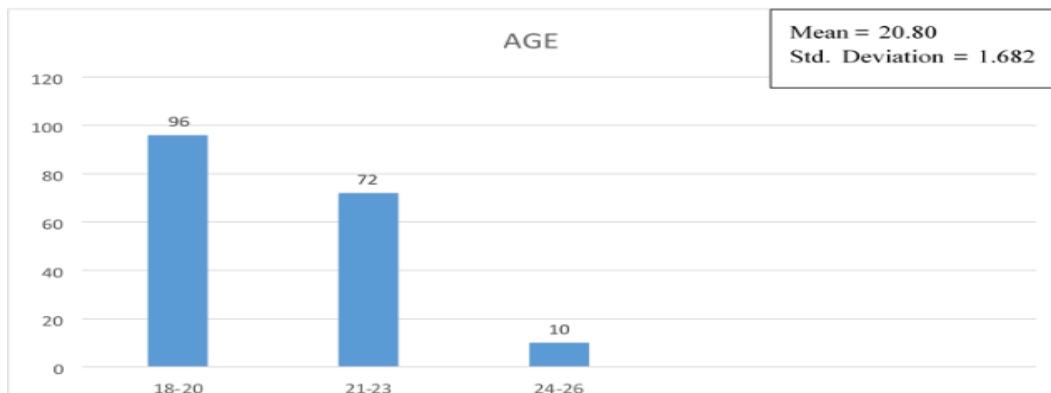


Figure 1: Age distribution of 178 participants ranging from 16 to 26 years

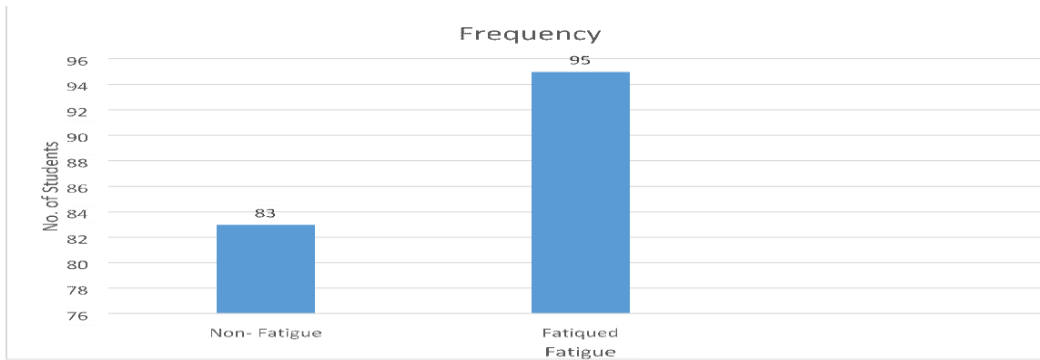


Figure 2: Prevalence of Fatigue among respondents.

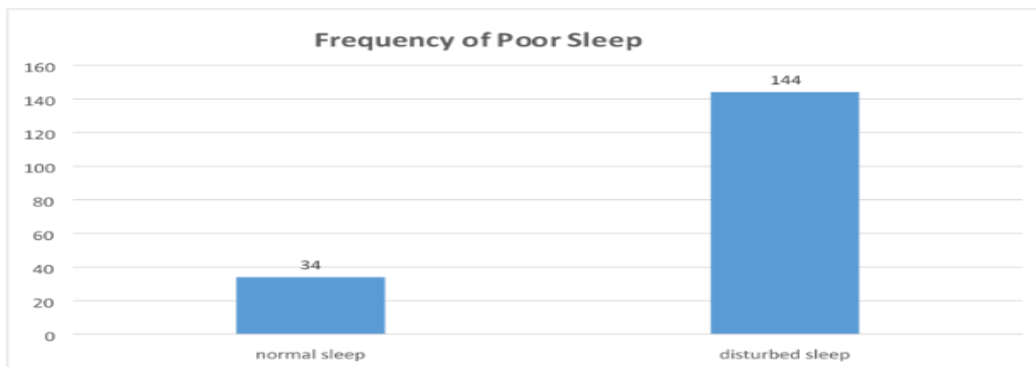


Figure 3: Prevalence of disturbed Sleep among respondents

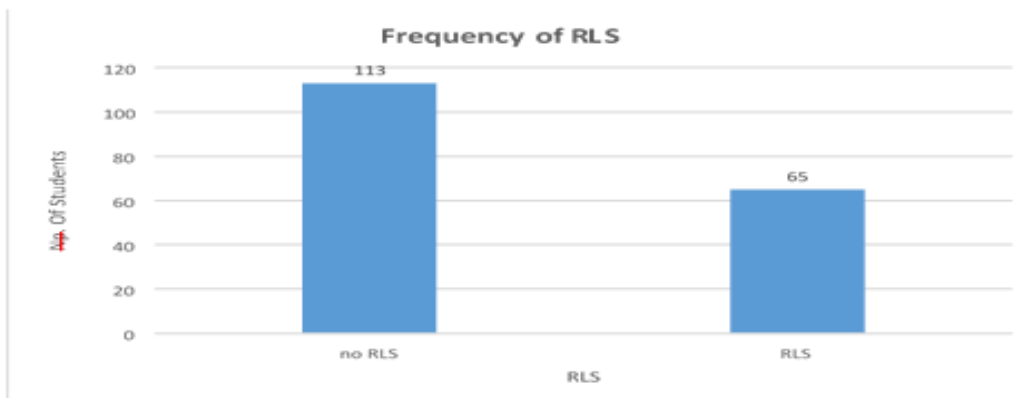


Figure 4: Prevalence of Restless Leg Syndrome among respondents.

the students of Lahore institute of science and Technology. We collected data from 178 students of LIST University. They were asked to fill the questionnaires to determine the sleep quality in medical students with RLS. We also checked the association between RLS and fatigue. We collected demographic data and other variables to find out associations among these variables. The respondents of the questionnaire were (n=178). In

this study, most of the respondents were between 17 to 23 years of age. More People suffering from RLS reported that they face trouble while sleeping at night especially when they require more time while sleeping as compared to their original time of sleeping. These participants also added that they felt that more energy is required to complete tasks of daily living as compared to the people who have no RLS. The respondents in this cross-section

study were 100%. Most of the subjects in this study were in the study are mostly aged 17-26 years with a mean age of 20 years of similar age groups. Many people suffering from RLS are unable to sleep properly. Severe RLS deliberately affects general lifestyle people and can also affect mental health as well. Regarding the association, our study exhibited a positive association between RLS and sleep which is 80%.

CONCLUSION

In conclusion, the outcome of this cross-sectional research exhibited the great prevalence of sleep disturbance and fatigue in nearly half of the

undergraduates of medical universities. However, students taking Paracetamol had better sleep and reduced fatigue due to a decrease in symptoms and discomfort caused by RLS. Fatigue and Sleep disturbance are reported to be the most influential triggers of Restless leg syndrome among students of medicine at The Lahore Institute of Science and Technology. Research also concluded that a significant positive association exists the Sleep disturbance RLS and fatigue as well in medical students of Lahore Institute of Science and Technology.

REFERENCES

- Ostacoli L, Saini A, Ferini-Strambi L, Castronovo V, Sguazzotti E, Picci RL, Toje M, Gorzegno G, Capogna S, Dongiovanni V, Dogliotti L. Restless legs syndrome and its relationship with anxiety, depression, and quality of life in cancer patients undergoing chemotherapy. *Quality of Life Research*. 2010 May;19:531-7.
- Benes H, Walters AS, Allen RP, Hening WA, Kohlen R. Definition of restless legs syndrome, how to diagnose it, and how to differentiate it from RLS mimics. *Movement disorders: official journal of the Movement Disorder Society*. 2007;22(S18):S401-8.
- Hening WA. Restless legs syndrome: a sensorimotor disorder of sleep/wake motor regulation. *Current Neurology and Neuroscience Reports*. 2002 Apr;2(2):186-96.
- Coleman RM, Roffwarg HP, Kennedy SJ, Guilleminault C, Cinque J, Cohn MA, Karacan I, Kupfer DJ, Lemmi H, Miles LE, Orr WC. Sleep-wake disorders based on a polysomnographic diagnosis: a national cooperative study. *Jama*. 1982 Feb 19;247(7):997-1003.
- Elrassas HH, Elsayed YA, Abdeen MS, Shady MM, Shalash A, Morsy M. Restless legs syndrome among patients receiving antipsychotic and antidepressant drugs. *Human Psychopharmacology: Clinical and Experimental*. 2022 Mar;37(2):e2817.
- Allen RP, Picchetti D, Hening WA, Trenkwalder C, Walters AS, Montplaisi J. Restless legs syndrome: diagnostic criteria, special considerations, and epidemiology: a report from the restless legs syndrome diagnosis and epidemiology workshop at the National Institutes of Health. *Sleep medicine*. 2003 Mar 1;4(2):101-19.
- Cho SJ, Hong JP, Hahm BJ, Jeon HJ, Chang SM, Cho MJ, Lee HB. Restless legs syndrome in a community sample of Korean adults: prevalence, impact on quality of life, and association with DSM-IV psychiatric disorders. *Sleep*. 2009 Aug 1;32(8):1069-76.
- Veldi M, Aluoja A, Vasar V. Sleep quality and more common sleep-related problems in medical students. *Sleep medicine*. 2005 May 1;6(3):269-75.
- Alsaggaf MA, Wali SO, Merdad RA, Merdad LA. Sleep quantity, quality, and insomnia symptoms of medical students during clinical years: relationship with stress and academic performance. *Saudi medical journal*. 2016 Feb;37(2):173.
- Connor JR, Wang XS, Allen RP, Beard JL, Wiesinger JA, Felt BT, Earley CJ. Altered dopaminergic profile in the putamen and substantia nigra in restless leg syndrome. *Brain*. 2009 Sep 1;132(9):2403-12.
- Gupta R, Lahan V, Goel D. Prevalence of restless leg syndrome in subjects with depressive disorder. *Indian journal of psychiatry*. 2013 Jan 1;55(1):70-3.
- Eisensehr I, Ehrenberg BL, Noachtar S. Different sleep characteristics in restless legs syndrome and periodic limb movement disorder. *Sleep Medicine*. 2003 Mar 1;4(2):147-52.
- Karroum EG, Golmard JL, Leu-Semenescu S, Arnulf I. Sensations in restless legs syndrome. *Sleep medicine*. 2012 Apr 1;13(4):402-8.
- Kang EB, Kwon IS, Koo JH, Kim EJ, Kim CH, Lee J, Yang CH, Lee YI, Cho IH, Cho JY. Treadmill exercise represses neuronal cell death and inflammation during A β -induced ER stress by regulating unfolded protein response in aged presenilin 2 mutant mice. *Apoptosis*. 2013 Nov;18:1332-47.
- Winkelmann J, Wetter TC, Collado-Seidel V, Gasser T, Dichgans M, Yassouridis A, Trenkwalder C. Clinical characteristics and frequency of the hereditary restless legs syndrome in a population of 300 patients. *Sleep*. 2000 Aug 1;23(5):1-6.
- Fukunishi I, Kitaoka T, Shirai T, Kino K. Facial paresthesias resembling restless legs syndrome in a patient on hemodialysis. *Nephron*. 1998 Aug 1;79(4):485-.
- Johns MW. A new method for measuring daytime sleepiness: the Epworth sleepiness scale. *sleep*. 1991 Nov 1;14(6):540-5..
- Sikandar K, Sharif F, Ahmad S, Ahmad A, Gilani A. Prevalence of restless leg syndrome and its impact on quality of life in medical students. *Rawal Medical Journal*. 2022 Feb 1;47(1):199-.
- Ghini M, Carpenito G and Mascia MT. Effects of a paracetamol and tramadol fixed-dose combination on pain, asthenia, cognitive disorders and sleep quality in fibromyalgia. *Clin Exp Rheumatol* 2016; 34: 152.
- Piro RS, Alhakem SS, Azzez SS, Abdulah DM. Prevalence of sleep disorders and their impact on academic performance in medical students/University of Duhok. *Sleep and Biological Rhythms*. 2018 Jan;16:125-32.
- Ergin N, Kılıç BB, Ergin A, Varlı S. Sleep quality and related factors including restless leg syndrome in medical students and residents in a Turkish university. *Sleep and Breathing*. 2022 Sep;26(3):1299-307.
- Cavalcante AG, de Bruin PF, de Bruin VM, Pereira ED, Cavalcante MM, Nunes DM, Viana CS. Restless legs syndrome, sleep impairment, and fatigue in chronic obstructive pulmonary disease. *Sleep medicine*. 2012 Aug 1;13(7):842-7.