Anatomía Digital

ISSN: 2697-3391
Vol. 7 No. 1, pp. 120 – 139, January - March 2024

www.anatomiadigital.org

Trastornos del sueño, generalidades y panorama en estudiantes universitarios

Sleep disorders, generalities and outlook in university students

[1] John Loor Left https://orcid.org/0009-0003-0371-0876
General Physician, University of Guayaquil, Guayaquil, Ecuador.
Jhons1997i@hotmail.com

[2] Cynthia Benavides Silva https://orcid.org/0000-0002-4254-0123
General Practitioner, Central University of Ecuador, Quito, Ecuador.
Master's degree in Occupational Health and Safety, Graduate School, University of the Americas, Quito, Ecuador.
Cinthyanicole98@gmail.com

[3] Karol Garcia Palacios https://orcid.org/0009-0007-1370-7768
Medical Surgeon, Technical University of Manabí, Portoviejo, Ecuador.
Kgarcia7994@gmail.com

[4] Carlos Eduardo Marroquin Pasquel https://orcid.org/0000-0002-2477-4014
Physician, Central University of Ecuador, Quito, Ecuador.
Master in Occupational Health and Safety, specializing in Occupational Risk Prevention, SEK International University
edufarm96@gmail.com

[5] Andrea Isabel Quiroga Sabando https://orcid.org/0009-0008-1161-1698
Resident Physician, Fresenius Medical Care, Daule.
isa20011939@gmail.com

Scientific and Technological Research Article
Sent: 11/12/2023
Revised: 09/12/2023
Accepted: 02/01/2024
Published: 01/30/2024
DOI: **https://doi.org/10.33262/anatomiadigital.v7i1.2997**

Please quote: Loor Izquierdo, J., Benavides Silva, C., García Palacios, K., Marroquín Pasquel, C.E., & Quiroga Sabando, A.I. (2024). Sleep disorders, generalities and outlook in university students. Digital Anatomy, 7(1), 120-139.https://doi.org/10.33262/anatomiadigital.v7i1.2997

DIGITAL ANATOMY is an electronic, quarterly journal that will be published in electronic format and has the mission of contributing to the training of competent professionals with a humanistic and critical vision who are capable of presenting their investigative and scientific results to the same extent that positive changes in society are promoted through their intervention.https://anatomiadigital.org
The journal is published by Editorial Ciencia Digital (a prestigious publisher registered with the Ecuadorian Book Chamber with membership number 663).www.celibro.org.ec

ISSN: 2697-3391
Vol. 7 No. 1, pp. 120 – 139, January - March 2024

www.anatomiadigital.org

Palabras claves:
trastornos del sueño; trastornos sueño-vigilia; hipersomnolencia; parasomnias.

Resumen

Introducción: Los trastornos del sueño son la alteración en el ciclo de sueño – vigilia, que afecta la consolidación y el mantenimiento del sueño y por lo tanto el funcionamiento humano, se asocian a diversos factores que pueden coexistir en un mismo sujeto y se asocian al incremento de riesgo de patologías cardiometabólicas y peor calidad de vida. **Objeto:** abordar las generalidades de los trastornos del sueño, de forma sintética orientado principalmente a constituir un recurso de fácil acceso para el personal de salud del primer nivel de atención. **Metodología:** se realizó una búsqueda no sistemática de artículos originales, reportes de caso y revisiones bibliográficas publicadas en PubMed, ScienceDirect, Redalyc, y SciELO; descriptores: trastornos del sueño; trastornos sueño-vigilia; hipersomnolencia; parasomnias. Se incluyó trabajos con antigüedad menor a 5 años, idioma inglés y/o español y encontrarse disponible de forma libre. **Resultados:** Se construyó un documento científico de fácil lectura y que aborda los principales tópicos para el conocimiento del personal del primer nivel de atención. **Conclusión:** Los trastornos del sueño son entidades patológicas complejas, cuyo abordaje integral implica el conocimiento de factores incidentes, clínica y principios del tratamiento, previa valoración por especialidad que oferte tratamiento avanzado, cuando el caso lo necesite. **Área de estudio general:** medicina**. Área de estudio específica:** psiquiatría. **Tipo de estudio:** original.

Keywords:
sleep disorders; sleep-wake disorders; hypersomnolence; parasomnias.

Abstract

Introduction: Sleep disorders are alterations in the sleep-wake cycle, which affect the consolidation and maintenance of sleep and therefore human functioning. They are associated with various factors that can coexist in the same subject and are associated with an increase in risk of cardiometabolic pathologies and worse quality of life. Objective: to address the generalities of sleep disorders, in a synthetic manner aimed primarily at constituting an easily accessible resource for health personnel at the first level of care. Methodology: a non-systematic search of original articles, case reports and bibliographic reviews published in PubMed, ScienceDirect,

Anatomía Digital

ISSN: 2697-3391
Vol. 7 No. 1, pp. 120 – 139, January - March 2024

www.anatomiadigital.org

Redalyc, and SciELO was conducted; descriptors: sleep disorders; sleep-wake disorders; hypersomnolence; parasomnias. Works older than 5 years, English and/or Spanish language are included and are available freely. Results: An easy-to-read scientific document was constructed that addresses the main topics for the knowledge of first-level care personnel. Conclusion: Sleep disorders are complex pathological entities, whose comprehensive approach involves knowledge of incident factors, clinical symptoms and principles of previous treatment, assessment by specialty that offers advanced treatment, when the case needs it. General area of study: medicine. Specific area of study: psychiatry. Type of study: narrative review.

Introduction

Sleep disorders are defined as alterations in the sleep-wake cycle, which affect the consolidation and maintenance of sleep and therefore human functioning.(1), which are classified into seven categories related to intrinsic characteristics of each form of the disorder(1–5).

They are associated with various factors that influence the sleep-wake cycle, from general factors such as age and sex, genetics, functional status, internal, pharmacological, external and social factors, generally several factors coexisting in the same individual, causing sleep disorders.(4).

The epidemiological distribution of sleep disorders varies widely depending on the population and the diagnostic instrument, in addition to the poor methodological heterogeneity between studies; it is estimated that worldwide 45% of the population suffers from a sleep disorder.(6, 7).

The purpose of this paper is to address the generalities of sleep disorders in a synthetic manner, mainly aimed at providing an easily accessible resource for primary care health personnel, including a brief section on sleep disorders in university students.

Methodology

A narrative bibliographic review was conducted, taking as reference original articles, case reports and bibliographic reviews published in PubMed, ScienceDirect, Redalyc, and SciELO, using the descriptors and terms: sleep disorders; sleep-wake disorders; hypersomnolence; parasomnias. The selection was made according to the inclusion

criteria: publication time less than 5 years, English and/or Spanish language and freely available.

Sleep disorders

The American Academy of Sleep Medicine (AASM) International Classification of Sleep Disorders, Third Edition (ICSD-3), defines sleep disorders as: "A disturbance in the sleep-wake cycle, affecting the consolidation and maintenance of sleep and therefore human functioning."(1), and classifies them into seven categories: insomnia, sleep-related breathing disorders, central hypersomnolence disorders, circadian rhythm sleep-wake disorders, parasomnias, sleep movement disorders, and other sleep disorders.(1–5).

Factors that influence the sleep-wake cycle, affect and modify sleep

- General: Such as age and sex(3, 4, 6, 7). Age: Although sleep disorders can occur at any age, as age progresses there is a deterioration in the quality and quantity of hours of sleep, which is why it is more common in older people.(3,4). Sex: It is more prevalent in women(4).

- Genetics: Some studies have shown the existence of a certain predisposition related to temperament traits.(3, 4).

- Functional states: Sleep disorders in adults, except in older adults, are usually related to: states of nervousness, anxiety, stress, low emotional state, other emotional disturbances(4, 6).

- Internal: Health status: apnea, fever, depression, etc.; Physiological states: adaptation to changes, menopause, etc.; Changes in circadian rhythms due to time zone (jet-lag), night shift or rotating day/night shift(4), due to certain alterations of the Central Nervous System (CNS)(3). In addition to hormonal levels (cortisol, estrogen and testosterone), sedentary lifestyle and obesity(6).

- Pharmacological: Insomnia can be caused by certain drugs such as: amphetamines, corticosteroids, adrenergic stimulants, beta-blockers, antidepressants, diuretics, anabolic steroids, theophylline, aminophylline, benzodiazepines, anticonvulsants, high-dose levodopa, vitamin B6, ciprofloxacin, levofloxacin, antipsychotics and antiepileptics.(3, 4).

- External: Environmental, lifestyle habits: consumption of tobacco, alcohol, caffeine, stimulants and energy drinks(4, 6), poor sleep hygiene: lack of regular schedule and routine; use of electronic devices or exposure to bright light before going to sleep, intense exercise in the late afternoon, etc.)(4, 7).

ISSN: 2697-3391
Vol. 7 No. 1, pp. 120 – 139, January - March 2024
www.anatomiadigital.org

- Social: low educational level, low economic income, certain ethnicities(6).

Epidemiology

The World Health Organization (WHO) recognizes 88 different types of sleep disorders, insomnia being the most common, affecting 8 out of 10 adults, and transient insomnia affecting approximately 40% of the total population in any Western country.(7).

The prevalence of sleep disorders is highly variable, because it depends on the population studied and the diagnostic tools.(6). Worldwide, 45% of the population suffers from some type of sleep disorder(1, 7)In the United States of America (USA), the prevalence of sleep disorders is between 10% and 30% in adults between 30 and 64 years of age, and in older adults the incidence reaches 50%. The most prevalent disorder (4.2%) is obstructive sleep apnea, followed by insomnia (1.2%), periodic limb movement disorder (0.4%) and narcolepsy (0.04%).(1).

Symptoms/Consequences

Sleep disorders cause fatigue, lack of energy, anxiety, irritability, depression, excessive daytime sleepiness, difficulty concentrating, paying attention, remembering or memorizing and other skills that negatively impact the lives of patients and hinder activities in the workplace and education (learning).(6).

Diagnostic Methods

The clinical study of disorders requires different diagnostic studies(5), such as specialized equipment or questionnaires and scales. Ideally, the diagnosis of sleep disorders should be obtained from data obtained by specialized equipment such as polysomnography [PSG] but, due to the high economic cost involved, they are not so feasible for the general population. For this reason, it is more common to use standardized self-assessment scales and questionnaires.(5, 7).

Questionnaires and scales

There is a wide variety of scales and self-assessment questionnaires that allow for the subjective assessment of the presence of a sleep disorder. They consist of qualifying and quantifying the characteristic symptoms or functional effects of the different sleep disorders in order to identify them according to their frequency and severity.(5, 7)For example, using scales and questionnaires, patients self-evaluate and indicate when and how they slept and how active they are during the day.(7).

Among the different scales we have(5):

1. Scales to estimate the risk or probability of suffering from a specific sleep disorder such as: the Berlin questionnaire, the sleep disorders questionnaire, the STOP scale applied for obstructive sleep apnea syndrome (OSAS) or the Athens insomnia scale used in insomnia(5).

2. Scales that measure the consequences of sleep disorders, such as the Epworth scale applied to excessive daytime sleepiness(5).

3. Questionnaires that measure overall sleep quality in the days prior to the assessment, such as the Pittsburgh Sleep Quality Index(5).

Due to inconsistent results, questionnaires are not an accurate diagnostic tool, but rather an adjuvant tool in the diagnosis of sleep disorders. Questionnaires allow the estimation of subjective components of sleep disorders such as: sleep quality, satisfaction, repercussions on daily life and allow sleep to be assessed over longer periods of time, and not just during a "normal" night of sleep as in PSG studies.(5).

Sleep diary

Another method is through a sleep diary, in which the patient must record the times and hours he slept, awakenings, medications taken, etc. The sleep diary is a medical history that is used for the diagnosis and treatment of sleep disorders.(7).

Polysomnography

Polysomnography (PSG) is the most widely used technique for studying the structure of sleep and for diagnosing sleep disorders.(5, 7)PSG consists of obtaining information from electrodes placed on the scalp, on the outer edge of the eyelids and the chin.(7).

PSG is performed in a specialized laboratory where activity and sleep stages are monitored during a "normal" night of sleep, by continuously monitoring the brain's electrical activity (EEG), eye movements (electrooculogram or EOG), muscle tone (submental electromyogram or EMG), airflow with each breath, respiratory effort, oximetry, electrocardiogram (ECG), electromyogram (EMG) of the tibialis anterior muscle and the patient's position.(5, 7).

Depending on the patient's clinical diagnosis, other parameters can be monitored such as: transcutaneous CO2, muscle activity of the extremities, extended video-EEG; penile enlargement, esophageal pressure or continuous blood pressure monitoring.(5).

Actigraphy

Anatomía Digital
ISSN: 2697-3391
Vol. 7 No. 1, pp. 120 – 139, January - March 2024
www.anatomiadigital.org

It is a study that quantifies the time of activity or movements and the periods of rest-sleep, that is, sleep latency, sleep duration, alertness duration and the number of awakenings during the night that an individual presents over 24 hours, for this study a portable device is used, generally placed on the wrist of the hand, for example, an accelerometer. This study does not replace a PSG, but it is useful in patients with circadian cycle disorders or in patients who do not tolerate the conditions of a sleep laboratory, such as children and the elderly.(5).

Multiple sleep latency study

This is the preferred study for diagnosing daytime hypersomnia disorders or narcolepsy. This study is performed during the day, generally between 1.5 to 3 hours after having finished the night's sleep; the study, technique and method are similar to those of the PSG, but it differs in that it is performed during 4 or 5 brief, daytime naps.(5).

This study evaluates sleep latency, especially REM sleep latency, i.e. how quickly the patient falls asleep during the day and how quickly he or she enters REM sleep. If the result is equal to or greater than 2 REM sleep onsets or an average sleep latency of less than five minutes is considered pathological and suggests narcolepsy.(5).

Treatment

Treatment for sleep disorders depends on the individual pathology, including surgical intervention, pharmacological treatment, sleep aids, and empirical psychological treatment, the latter being relatively new.(1).

Classification of sleep disorders

1. *Insomnia*

According to ICSD-3, insomnia is defined as persistent difficulty in falling into or maintaining good quality, long-lasting, restful sleep that provides the sensation of restful sleep, despite adequate sleeping conditions, and the next day is accompanied by fatigue, impaired function, and daytime sleepiness.(3, 5, 8, 9).

According to statistics from the Spanish Sleep Society, insomnia is the most common sleep disorder in the general population and one of the most common reasons for consultation in sleep units.(4)The prevalence of insomnia varies between 5 and 50% if only nocturnal characteristics are considered (difficulty initiating or maintaining sleep).(3, 8), but if they include the complete clinical syndrome of chronic insomnia, the prevalence fluctuates between 6% and 10% of the total population(8, 9).

Anatomía Digital
ISSN: 2697-3391
Vol. 7 No. 1, pp. 120 – 139, January - March 2024
www.anatomiadigital.org

The prevalence is higher in women, with a higher prevalence between the fourth and sixth decades of life; elderly and middle-aged people, more common in patients over 65 years of age, night shift workers, and/or those suffering from medical or psychiatric conditions.(5.9)In young adults, difficulty initiating sleep is most common, unlike in older adults where the problem is maintaining sleep.(9).

Chronic insomnia is defined as episodes of insomnia lasting more than 3 months and more than 3 times a week, and is related to chronic diseases and their respective treatment.(5). Other factors related to insomnia are(5, 9):

- Psychological factors: Stress, anxiety and depression.
- Post-traumatic stress: Nightmares, fear of falling asleep or going back to sleep.
- Diseases: Asthma, arthritis, hypertension, diabetes, heart failure, Parkinson's disease, cancer.
- Medications: Benzodiazepines, barbiturates, antidepressants.
- Environmental factors: Light in the room, noise, excessive heat or cold.
- Substances: Alcohol, caffeine, nicotine and other drugs.
- Other sleep disorders Restless legs syndrome and obstructive sleep apnea syndrome, etc.

The consequences of insomnia are: daytime fatigue, impaired functions, decreased work or academic performance, decreased attention and concentration, behavioral problems such as irritability, anxiety, hyperactivity, impulsivity or aggression; impact on mood and increased risk of suffering from depression in the long term.(5, 9).

Treatment for insomnia should be assigned individually to each patient according to the duration, severity of causes and circumstances of the disorder. Treatment may be pharmacological or non-pharmacological.(5, 9). First-line non-pharmacological treatment aims to improve the lifestyle and emotional situations that trigger the disorder in the insomniac patient. Initial treatment consists of applying sleep hygiene measures(5)Other treatment is through therapies such as: cognitive-behavioral psychological therapy, occupational therapy, relaxation therapy, stimulus control, sleep restriction, regular aerobic exercise, etc.(3, 5).

Pharmacological treatment includes the use of different drugs with hypnotic properties, which improve the quality and quantity of sleep.(3, 5). Among the most commonly used are benzodiazepines (BZDs) such as clonazepam, triazolam, midazolam, lorazepam and the “Z” (or non-benzodiazepine) drugs such as zolpidem, zeleplon and zopliclone. Certain

Anatomía Digital
ISSN: 2697-3391
Vol. 7 No. 1, pp. 120 – 139, January - March 2024
www.anatomiadigital.org

antidepressants such as trazodone, mirtazapine; and antihistamines such as doxylamine and diphenhydramine may also be used. However, due to the side effects of the drugs, the most important thing is the individual assessment and treatment of the patient.(5).

2. *Sleep-related breathing disorders*

These include obstructive sleep apnea, central apnea, and Cheynne-Stokes respiration. Many neurological diseases also predispose to the appearance of sleep-related respiratory abnormalities, both obstructive and central apnea.(3).

Obstructive sleep apnea syndrome (OSAS). OSAS is characterized by recurrent episodes of 10 seconds or more of total occlusion (apnea) or partial occlusion (hypopnea) of the upper airways during sleep.(5, 9); these episodes stop the airflow causing brief awakenings (sleep fragmentation), accompanied by loud snoring and, consequently, excessive sleep during the day. A person is considered to have OSA when there are more than 5 episodes of apnea or hypopnea per hour of sleep.(5).

It has a high prevalence in the general population. In the adult population, it is more prevalent in men than in women (ratio 8:1); it affects 2% of women and 4% of men and is more frequent in the age group between 40 and 50 years. The risk factors associated with the presence of this disease are: advanced age, family history of OSA, menopause, hypothyroidism, obesity, alcoholism and smoking, use of sedatives and hypnotics, anatomical alterations of the nose, mouth, pharynx and jaw, and a very thick neck (circumference in men > 44 cm and in women > 38 cm).(3 ,5, 9).

People with OSA often have excessive daytime sleepiness, which is caused by sleep fragmentation and/or pulmonary and systemic hypertension, right heart failure, and polycythemia.(3, 5), which may be accompanied by headache, fatigue, dry mouth and throat, weakness and concentration problems. In addition, the patient may snore loudly, gasp for air, have shortness of breath, nocturnal diaphoresis and sleep talking.(5, 9).

The general treatment of OSA consists of weight loss, changing sleeping positions, avoiding the use of substances such as alcohol and tobacco, and treating diseases associated with OSA.(5, 9)Specific treatment for OSA is classified into treatment with mechanical devices and surgical treatments. The first is performed using mandibular advancement devices and positive pressure masks, which generate pressure on the upper airways during sleep to unclog the airways.(3, 5, 9)Surgical treatment is indicated in cases of anatomical alterations; such as surgery of the palate and tongue, advancement of the hyoid bone or mandibular surgeries.(5, 9).

Cheyne-Stokes breathing. This type of breathing is described in many neurological diseases, and is related to pathological processes that decrease the level of consciousness. In rarer cases, it can appear in healthy people. This type of breathing disorder seems to

be related to respiratory control dysfunction. If this disease occurs during sleep, it can cause frequent awakenings in otherwise healthy people. Treatment may be with acetazolamide, CPAP or benzodiazepines.(3).

3. *Central hypersomnolence disorders*

The most common cause of daytime hypersomnolence is chronic voluntary sleep deprivation, which is caused by social and work demands, for example, rotating shift work. The hours of sleep required are determined by the feeling of adequate rest upon awakening; these hours are genetically determined and vary between 4 and 10 hours. Sleep deprivation is cumulative and can only be recovered by sleeping enough hours to achieve restful sleep. Hypersomnolence without sleep deprivation is almost always caused by a CNS disorder such as obstructive sleep apnea syndrome (OSA), narcolepsy or idiopathic hypersomnia.(3).

Narcolepsy (NL). It is a rare sleep-wake dissociation disorder of REM sleep, in which the common components of one state (wakefulness, non-REM or REM) appear in another state.(3, 5)Narcolepsy is classified into type 1 (with decreased levels of hypocretin-1 in the CSF and cataplexy) and type 2 (without cataplexy and with normal levels of hypocretin-1).(5).

NL is characterized by the presence of the following symptoms: 1) excessive daytime sleepiness with uncontrollable sleep attacks, 2) cataplexy or cataplexy (sudden loss of muscle tone during wakefulness), 3) hypnagogic hallucinations (during the sleep/wake transition), hypnopompic hallucinations (in the awakening transition) and 4) sleep paralysis (SP) during the sleep-wake transition.(3, 5).

The incidence of narcolepsy is between 0.74 and 1.37/100,000 inhabitants per year, it occurs most frequently between 15 and 30 years of age, the prevalence is 0.09% and it has a significant genetic predisposition; 90% of people have a gene for the human leukocyte antigen HLA DR15 and HLA-DQ6, therefore, the siblings of these patients have a 60 times greater risk of developing the disease.(3, 5)However, possession of these genes is neither necessary nor sufficient to suffer from the disease.(3).

Treatment of NL is based on the use of stimulant drugs, such as drugs that increase brain monoamine levels: pemoline, modafinil, methylphenidate, dextroamphetamine, and methamphetamine. Drugs that suppress REM sleep, such as tricyclic antidepressants and certain selective serotonin and norepinephrine reuptake inhibitor antidepressants, are also used to improve PS episodes and hypnotic hallucinations.(5).

4. *Circadian rhythm sleep-wake disorders*

Alterations of the biological “clock” can be classified into(3):

Primary or endogenous: caused by an alteration in the function of the biological "clock" per se(3)Endogenous alterations can be subclassified into:

- Delayed sleep phase syndrome: The main complaint is insomnia because it takes longer to fall asleep. It appears during adolescence. It can occur after a traumatic brain injury (TBI) and there may be a family history. These people go to bed earlier and get up earlier than people without sleep disorders. Treatment is done by exposure to light at the end of the sleep phase, in the afternoon or at the beginning of the night.(3).
- Advanced sleep phase syndrome(3).
- Irregular sleep/wake syndrome(9).
- Sleep/wake syndrome lasting more than 24 hours (hypernictohemeral syndrome): Patients cannot maintain a regular rhythm of the sleep/wake cycle, nor can they keep their cycle synchronized with daily activities. They have variable sleep timing. It is the most common disease in patients with visual impairment or patients with hypothalamic tumors. It has also been observed in patients with perinatal static encephalopathy, TBI, and Alzheimer's disease.(3).
- Work-Time Shift Disorder(9).
- Jet lag(9).
- TRCSV not specified elsewhere(9).

Secondary: caused by environmental factors such as jet lag, shift work, depression, bipolar disorder, seasonal affective disorder, among others.(3).

5. *Parasomnias*

Parasomnias are unpleasant and undesirable behaviors or experiences that occur primarily during sleep or upon awakening from sleep.(3, 9). A state of dosed awakening occurs. Sleep and wakefulness are not always mutually exclusive and there are times when, in waking states, non-REM sleep and REM sleep may occur at the same time or rapidly oscillate between the two.(3).

Epidemiological data vary according to the population and the parasomnia studied. For example, sleepwalking or night terrors are more frequent in children, although they are not exclusive to this age group and sometimes persist into adulthood. For example, nocturnal feeding parasomnias often begin in adolescence or adulthood, but are not exclusive to this age group. Some parasomnias can also be triggered by the consumption of frequently used drugs. For example, the use of zolpidem can cause sleepwalking or

behaviors such as sleep driving. Or by substance abuse or withdrawal, as in the case of alcoholism.(9).

Sleep parasomnias can be classified according to the sleep phase when they occur:

- Arousal disorders (including disorders associated with inability to arouse): Confusing arousals and Sleepwalking(3).
- Night terrors(3).
- Sleep-wake transition disorders (includes those disorders that occur during the sleep-wake transition, sleep-wake transition, or, more rarely, during sleep in the transition between the different stages): Rhythmic movement disturbances during sleep, sleep starts, somniloquy, nocturnal leg cramps, and sleep movement disorders(3).

6. *Sleep movement disorders*

Sleep movement disorders include disorders such as restless legs syndrome, periodic leg movements, rhythmic sleep movements, nocturnal cramps, bruxism, sleep myoclonus, sleep movement due to a medical condition, sleep movement due to medications, sleep movement not otherwise specified, among others. These disorders often cause fragmented sleep, and may make it difficult to fall asleep or lead to daytime symptoms such as drowsiness or fatigue. Movements are often simple, stereotyped, and involuntary.(10).

7. *Other sleep disorders: Sleep disorders associated with neurological pathologies*

Neurological diseases or lesions of the brain stem, thalamus and/or hypothalamus can cause alterations in the sleep/wake cycle. Pathologies in the brain stem such as syringobulbia, Arnold-Chiari malformation, a tumor or a vascular pathology are related to breathing disorders during sleep (sleep apnea syndrome, Cheyne-Stokes respiration). Patients with sleep apnea syndrome have an increased risk of developing a cerebrovascular pathology.(3).

Sleep disorders in university students

College students are more likely to suffer from sleep disorders. This population has specific factors for suffering from these disorders, for example: the academic requirements inherent to university study, extracurricular activities, such as work, the use of psychotropic substances and the use of some modern technologies.(11).

Sleep disorders are common in the general population, affecting approximately 30% of adults and 40% of the university population.(12). The prevalence of sleep disorders in medical students is often high(6), that is, medical students are a group vulnerable to lack

Anatomía Digital
ISSN: 2697-3391
Vol. 7 No. 1, pp. 120 – 139, January - March 2024
www.anatomiadigital.org

of sleep, this is related to the long duration of the medical career, the high intensity of the study and clinical activities that include hours of guard duty during the night, where various emergencies can occur; and the current habits or lifestyles(12). Sleep disorders negatively impact students' physical, social and mental health and academic performance.(6, 13).

Epidemiological data on sleep disorders in medical students vary from country to country. For example, in the United States, the quality of sleep in medical students, according to the Pittsburgh Sleep Quality Index (PSQI), was significantly worse than in healthy adults. In Paraguay, the index increased to levels above 50%; insomnia is the most common and prevalent among women. In Panama, the index increases to 56% for women and decreases to 43% for men. In Europe, a study revealed poor sleep quality in 47% of medical students according to the PSQI.(12).

In China, according to PSQI data, approximately 50% of students have poor sleep quality, with a prevalence in the male gender. In Hong Kong, about 70% of medical students reported poor sleep with no significant gender and age differences. And 35.5% of Malaysian medical students had daytime sleepiness, which was more prevalent in clinical students and those with poor sleep quality (as assessed by Epworth Sleepiness Score [ESS] > 11), and 16% reported poor sleep quality.(12).

Student attitudes, lifestyle, academic demands, and use of the Internet or other methods of transmitting information are factors in the development of sleep disorders. These factors may be interrelated. For example, sleep time may be affected by the following factors: lifestyle, academic demands, and use of the Internet.(12).

In summary, sleep disorders are common among medical students worldwide, regardless of: their gender, background, curriculum or culture. The exact prevalence of sleep disorders in medical students depends on the measurement tools used in different studies and on different basic demographic characteristics such as: age, sex and degree of study. Attitudes and academic demands are the main causal factors of sleep disorders and the most frequent disorders are insomnia and drowsiness.(12, 13).

Pittsburgh Sleep Quality Index (PSQI)

The Pittsburgh Sleep Quality Index (PSQI) is a validated questionnaire that investigates sleep quality in the last month(14, 15)The ICSP is a self-administered, practical, brief and accessible questionnaire. It is considered the standard instrument for the evaluation of sleep quality. Although it does not provide a diagnosis, it is used for screening the population to be studied, clinical monitoring of sleep disorders, impact on the progression of mental disorders, response to treatment and epidemiological and clinical studies.(15).

The Questionnaire has 24 items, composed of 19 self-assessment questions and 5 questions directed to the roommate or bed partner, with only the first 19 being used to obtain the overall score.(6,15)The 19 items are divided into 7 components which are: sleep quality, sleep latency, total sleep duration, habitual sleep efficiency, sleep disturbances, use of sleeping medication and daytime dysfunction.(6, 14–16).

The 7 components are scored from 0 to 3 and the total sum of the scores of these components gives an overall score that varies between 0 and 21 points, where a score less than 5 is called "No sleep problems", between 5 to 7 "Deserves medical attention", between 8 and 14 "Deserves medical attention and treatment" and when the score is 15 or more, "there is a serious sleep problem". Therefore, a higher score indicates lower quality of sleep.(6, 15, 16).

The PSQI was developed by Buysse et al. and was validated in 1989 in the United States.(15), was validated in Spanish by Royuela and Macías, and validated in Colombia by Escobar-Córdova in 2005(16–18).

Buysse et al. found an internal consistency of 0.83 (Cronbach's alpha) for the 19 items. The test-retest consistency for the overall ICSP score in both groups was significantly correlated. For validation, the ICSP compares favorably with the results of the polysomnography, observing that a score > 5 presented a sensitivity of 89.6% and specificity of 86.5% to indicate severe sleep problems. They concluded that the ICSP is useful for psychiatric clinical research and care activities.(15).

Royuela and Macías translated the Pittsburgh Sleep Quality Index by Buysse et al. into Spanish, obtaining an internal consistency, with Cronbach's alpha, of 0.81 in the clinical population, and 0.67 in the student sample. Regarding test-retest reliability, no significant differences were obtained, with the exception of sleep duration. Regarding validation, it was compared with the clinical diagnosis as a "gold standard", finding a sensitivity of 88.63% and specificity of 74.99%, with a Kappa index of 0.61.(15).

Escobar-Córdoba and Eslava-Schmalbach, performed the content validation of the Spanish version of the ICSP, reaching a consensus on a Colombian version (VC). They obtained a Cronbach alpha coefficient of 0.78 for the global scale; while for each component they found reliability coefficients higher than 70%. The criterion and concurrent validation of the test showed that the ICSP-VC is capable of finding differences in scores between subjects with clinical characteristics of poor sleepers, users of hypnotics and older adults.(15).

Rosales et al. determined the degree of excessive daytime sleepiness and sleep quality in a population of Peruvian students, using, among others, the Pittsburgh Sleep Quality

Index Spanish version, for which they measured the internal homogeneity of the instrument, finding a Cronbach's alpha coefficient greater than 0.50.(15).

Jiménez-Genchi et al. obtained a reliability coefficient of 0.78 for the ICSP in a sample of psychiatric patients. In the factor analysis, two factors were obtained: sleep quality per se and sleep duration, which explained 63.2% of the inertia. They concluded that it is a reliable instrument for the evaluation of sleep quality in the Mexican population.(15).

As mentioned above, there are Spanish versions of the ICSP, but since there is no psychometrically validated version in our population, it is necessary to conduct such research. The standardized instrument will be used for the detection and assessment of sleep disorders at a clinical level, as well as for clinical and epidemiological research, considering the high prevalence of sleep problems.(15).

For the above reasons, we recommend the ICSP for research work in Ecuador; however, considering that medical consultations in the public health system have a limited time frame, this may not be the most appropriate instrument to be used at this level.

Conclusion

- Sleep disorders are complex pathological entities, whose comprehensive approach involves knowledge of the incident factors, clinical symptoms and treatment principles, after evaluation by a specialty (family medicine, neurology or others) that offers advanced treatment, when the case requires it.
- At the primary care level, it is essential to investigate sleep disorders, given their significant global prevalence and the impact of new technologies on the sleep-wake cycle.
- Research by the Public Health System and Academia is essential to understand the reality of sleep disorders in Ecuador and to generate public policies that improve their approach and, consequently, the quality of life of patients.

Conflict of interest

The authors declare that they have no conflicts of interest that could compromise, in whole or in part, the results of this work or its publication.

Authors' contribution statement

JLI and AIQS conceived the research idea, delimited the content of the review and carried out the non-systematic search to build the database of articles.

CBS and KGP designed the first draft, AIQS supervised and corrected the first draft and second draft.

CEMP, CBS and KGP made final corrections, JLI and AIQS approved the final manuscript.

Bibliographic References

1. Álvarez García HB, Jiménez Correa U. Psychological intervention in sleep disorders: an updated review. Rev Clin Contemporánea. 2020;2(11):1–13. Available at: https://www.revistaclinicacontemporanea.org/art/cc2020a9

2. Sateia MJ. International classification of sleep disorders-third edition highlights and modifications. Chest. 2014;146(5):1387–94. Available at: https://pubmed.ncbi.nlm.nih.gov/25367475/

3. Izquierdo AY, Pascual FH, Monteiro GC. Sleep disorders. Medicine. 2019;12(72):4205–14.Available at: https://www.medicineonline.es/es-trastornos-del-sueno-articulo-S0304541219300290

4. Osorio Alonso MJ. Sleep disorders. Rev El Farm.2019; 582:12–22. Available at: https://dialnet.unirioja.es/servlet/articulo?codigo=7228895

5. Carrillo-Mora P, Barajas-Martínez KG, Sánchez-Vázquez I, Rangel-Caballero MF. Sleep disorders: what are they and what are their consequences? Rev la Fac Med la UNAM. 2018;61(1):6–20.Available at: https://www.scielo.org.mx/scielo.php?script=sci_arttext&pid=S0026-17422018000100006

6. Ojeda-Paredes P, Estrella-Castillo DF, Rubio-Zapata HA.Sleep quality, insomnia symptoms and academic performance on medicine students. Research in medical education. 2019;8(29):36–44. Available at: https://www.scielo.org.mx/scielo.php?script=sci_arttext&pid=S2007-50572019000100036

7. Miranda Nava G. Sleep disorders[Sleep disorders]. Rev Med and Research. 2018;6(1):74–84. Available at: https://medicinainvestigacion.uaemex.mx/article/view/18989

8. Medina Ortiz O, Araque-Castellanos F, Carlos Ruiz-Dominguez L, Riaño-Garzon M,Bermúdez V. Sleep disorders as a result of the Covid-19 pandemic. Rev Peru Med Exp Public Health. 2020;37(4):195–201. Available at: http://www.scielo.org.pe/scielo.php?script=sci_arttext&pid=S1726-46342020000400755

9. Jerez Magaña AA, Lara Girón JC. Sleep disorders - Regional guidelines for diagnosis and treatment of sleep disorders. 1toEd. Jerez Magaña AA, Lara Girón

JC, editors. Clinical Practice Guide. Guatemala: Grunenthal and HUMANA; 2016. 371 p. Available at: https://www.researchgate.net/publication/281422833_Guias_Regionales_de_Trastornos_del_Sueno

10. Pérez-Carbonell L, Gómez-Siurana E, Aguilar-Andújar M, Díaz-Román M, Fernández-Arcos A, Gaig C, et al.Sleep-related movement and behavioral disorders in adults. Rev Neurol. 2020 Nov;71(10):377–86. Available at: https://pubmed.ncbi.nlm.nih.gov/33145749/

11. Suardiaz-Muro M, Morante-Ruiz M, Ortega-Moreno M, Ruiz MA, Martín-Plasencia P, Vela-Bueno A. Sleep and academic performance in university students: a systematic review. Rev Neurol. 2020;71(2):43–53.Available at: https://svnps.org/wp-content/uploads/2020/09/rendimientoby020043.pdf

12. Gallego SV. An approach to sleep disorders in medical studentsApproaching sleep disorders in medical students. Medicentro Electrónica. 2020;24(3):683–91. Available at: http://scielo.sld.cu/scielo.php?script=sci_arttext&pid=S1029-30432020000300682

13. Lira D, Custodio N. Sleep disorders and their complex relationship with cognitive functions. Rev Neuropsiquiatr. 2018;81(1):20.Available at: http://www.scielo.org.pe/scielo.php?script=sci_arttext&pid=S0034-85972018000100004

14. Palma JA. Diagnostic protocol for sleep disorders. Med. 2015;11(73):4409–13.Available at: https://www.sciencedirect.com/science/article/abs/pii/S0304541215000207

15. Moon-Solís Y, Robles-Arana Y, Agüero-Palacios Y. Validation of the Pittsburgh Sleep Quality Index in a Peruvian sample. A Salud Ment. 2015;31(2). Available at: https://www.semanticscholar.org/paper/VALIDACIÓN-DEL-ÍNDICE-DE-CALIDAD-DE-SUEÑO-DE-EN-UNA/4f7f6669880eab7154f5c1578b7814fe849b727f

16. Satizábal Moreno JP, Marín Ariza DA. Sleep quality of nursing staff. Health Sciences. 2018;16(especil):75–86. Available at: https://dialnet.unirioja.es/servlet/articulo?codigo=6526696

17. Hederich-Martínez CC-DCC, Caballero-Domínguez CC. Validation of the Maslach Burnout questionnaireBurnout Inventory-Student Survey (MBI-SS) in the Colombian academic context. CES Psicol. 2016;9(1):1–15. Available at: https://repository.ces.edu.co/bitstream/handle/10946/4150/Factores%20Asociado

s%20Síndrome%20Burnout.pdf?sequence=2&isAllowed=y

18. Vilchez-Cornejo J, Quiñones-Laveriano D, Failoc-Rojas V, Acevedo-Villar T, Larico-Calla G, Mucching-Toscano S, et al. Mental health and sleep quality in students from eight faculties of human medicine in Peru. Rev Chil Neuropsiquiatr. 2016 Dec;54(4):272–81.Available at: https://www.scielo.cl/scielo.php?script=sci_arttext&pid=S0717-92272016000400002

Anatomía Digital

ISSN: 2697-3391
Vol. 7 No. 1, pp. 120 – 139, January - March 2024

www.anatomiadigital.org