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ARTÍCULO DE INVESTIGACIÓN

SLEEP QUALITY IN COGNITIVELY IMPAIRED PATIENTS

CALIDAD DEL SUEÑO EN PACIENTES CON DETERIORO COGNITIVO

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ABSTRACT

Cognitive impairment is becoming more prevalent, mainly due to the ageing population and in patients with cognitive impairment, sleep disturbances affect their quality of life. To evaluate the quality of sleep in patients diagnosed with cognitive impairment. An observational descriptive cross-sectional study was conducted at the National Institute of Neurology and Neurosurgery that included 41 patients. To assess sleep quality, the Horne and Ostberg Morning-Evening Questionnaires, the Pittsburgh Sleep Quality Index, and the Epworth Sleep Scale were applied. Purposive sampling and a non-parametric analysis of the results were used. The study showed that 12/41 (29.3%) of the patients had pathological sleepiness, 7/41 (17.1%) were treated with anticholinergic drugs, of which more than 85% had abnormal sleep quality. Treatments with sleeping pills reduced alertness in 30% of patients. Approximately 40% (16/41) of the patients were affected by delayed recall. Most of the patients with cognitive impairment studied have a deterioration in the quality of sleep, which indicates that in these patients the prolongation of the sleep latency and the existence of alterations during it induces them to take drugs to fall sleep, explaining the dysfunction during the day and, therefore, the affectation in the field of attention, where the anticholinergic load plays an important role none reducing the hours of sleep and causing dysfunctions during the day.

Keywords: cognitive impairment, sleep quality, insomnia, anticholinergic load.

RESUMEN

El deterioro cognitivo es cada vez más frecuente debido principalmente al envejecimiento poblacional y en los pacientes con deterioro cognitivo las alteraciones del sueño afectan su calidad de vida. Evaluar la calidad del sueño en pacientes diagnosticados con deterioro cognitivo fue el objetivo de esta investigacion. Se realizó un estudio de tipo observacional descriptivo de corte transversal, en el Instituto Nacional de Neurología y Neurocirugía que incluyo 41 pacientes. Para evaluar la calidad del sueño se aplicaron los Cuestionarios de Matutinidad-Vespertinidad de Horne y Ostberg, el Índice de Calidad de sueño de Pittsburg y la Escala de sueño de Epworth. Se utilizó un muestreo intencional y un análisis no paramétrico de los resultados. El estudio mostró que 12/41 (29.3%) de los pacientes tenían somnolencia patológica, 7/41 (17.1%) tenían tratamientos con medicamentos con carga anticolinérgica, de los cuales más del 85% tenían calidad de sueño anómala. Los tratamientos con somníferos disminuyeron la atención en un 30% de los pacientes. Aproximadamente un 40% (16/41) de los pacientes tenían afectado el recuerdo diferido. Los pacientes con deterioro cognitivo evaluados presentan en su mayoría un deterioro en la calidad del sueño, lo cual indica que en estos pacientes la prolongación de la latencia del sueño y la existencia de alteraciones durante el mismo, los induce a tomar fármacos para conciliar el sueño, explicando la disfunción durante el día y por tanto, la afectación en el ámbito de la atención, donde juega un papel importante la carga anticolinérgica al reducir las horas de sueño y provocar disfunciones durante el día.

Palabras clave: deterioro cognitivo, calidad de sueño, insomnio, carga anticolinérgica.

INTRODUCTION

Sleep is a circadian biological phenomenon composed of several phases or states. This phenomenon is not unique to humans or other mammals, it has been demonstrated animals ranging from the elephants to fruit flies. There are several that try to explain why the evolution of so many animal species has preserved this function. Some of them state that sleep is useful for the consolidation of memory, the elimination of waste substances through the lymphatic system and to counteract the excitotoxicity resulting from long hours in a waking state (Lira & Custodio, 2018).

Sleep as a phenomenon has a number of peculiarities: 1) reduced consciousness and reactivity to external stimuli, 2) it´s an easily reversible process (which distinguishes it from other pathological states such as stupor and coma), 3) it is associated with immobility and muscle relaxation, 4) it usually occurs with a circadian (daily) periodicity, 5) during sleep individuals acquire a stereotyped posture, and 6) the absence of sleep (deprivation) induces various behavioural and physiological changes; and also generates a cumulative sleep "debt" that is not recovered (Lira & Custodio, 2018).

Despite the above, insomnia is one of the most common problems in the elderly, some have identified it as an important public health problem, linked to modernity, associated with changes in lifestyle and socio-economic conditions. It is more common in women. In older adults, it is associated with the presence of other morbidities and contributes to a decrease in functionality at this stage of life (Perez et al, 2015).

None the main functions of sleep include: the restoration or conservation of energy, the elimination of free radicals accumulated during the day, the regulation and restoration of cortical electrical activity, thermal regulation, metabolic and endocrine regulation, synaptic homeostasis, immune activation, memory consolidation, among others. In fact, certain stages of sleep are necessary for rest and better performance of activities the next day, while other stages contribute learning and memory formation (Lira & Custodio, 2018).

In summary, several vital activities that take place during sleep help people to maintain a good state of health and allow the body to function optimally. On the other hand, not getting enough sleep can be detrimental; for example, children and young people of learning age may have serious problems with academic performance, adults of working age may have a higher probability of accidents, and the elderly may have lower cognitive performance (Lira & Custodio, 2018; Perez et al, 2015).

Older people are at risk of a variety of sleep disorders ranging from insomnia to circadian rhythm disorders. There are a large number of factors that contribute to the occurrence and need to be taken into account, especially when faced with the complaints of those who suffer from them (Cepero et al, 2020).

Seven out of 100 people develop symptoms of insomnia, and it´s more common in psychologically vulnerable people, in those who have already developed insomnia in the past, with a family history, in poor health and with problems that cause pain. There are a large number of nosological entities that favor them, either through themselves or through their pharmacological management, which modify sleep patterns and cause insomnia. According to Cepero et al, 2020; neurological diseases are the ones that most frequently cause insomnia, since 66.7% of patients complain of this disorder, followed by respiratory diseases (59.6%), gastrointestinal problems (55.4%), that cause pain (48.6%), and cardiovascular (44.1%). In old age, insomnia should be considered as a combination of different factors (Cepero et al, 2020).

Current research has shown that sleep is regulated by various stimulating substances and brain neurotransmitters: dopamine and norepinephrine, histamine, orexin, glutamate; inhibitory substances and neurotransmitters in the brain: GABA, adenosine, glycine; and regulatory substances and neurotransmitters: acetylcholine, serotonin and melatonin, which can be affect in various disorders (Franco et al, 2012; Rios et al, 2019).

It estimated that around 40% of patients with Alzheimer's disease have sleep disturbances, the most common of which are: insomnia, fragmented sleep with prolonged nighttime awakenings; and in more advanced stages, excessive daytime sleepiness. The severity of sleep disturbance varies with the type of dementia and generally increases as the disease progresses. However, people with moderate dementia have more sleep disturbance than those in early and advanced stages (Minmin et al, 20020).

A bidirectional relationship has been described between sleep disorders and cognitive decline (Franco et al, 2012). Sometimes it is difficult to distinguish whether the cognitive deterioration in patients with dementia is solely due to sleep disorders, whether it´s also due to the summation factor of comorbidities and polypharmacy or if it´s only the neurodegenerative disease itself that causes dementia and sleep disorders (Lira & Custodio, 2018).

It has been shown in patients with Alzheimer's that sleep disorders contribute to cognitive deterioration and other neuropsychiatric symptoms, probably associated with a delay in the circadian rhythm, an effect also observed in patients with Parkinson's disease (Farfán et al, 2021). On the other hand, poly-pharmacy has been showed to contribute in the functional decline of patients with said disease, and attempts made to establish its relationship with cognitive decline. It seems that the commitment to activities of daily living, which measures functionality, is a consequence of cognitive impairment, at least temporarily. Subsequently, activities of daily living engagement decrease the amount of entertainment activities and social interaction, activities that shown to protect against cognitive decline (Fratiglioni et al, 2004).

One can not fail to mention the complex relationship between insomnia, benzodiazepines and dementia. Various publications suggest that patients who chronically use benzodiazepines have twice the risk of developing dementia, especially those between 50 and 65 years of age. In addition, attention is draw to the dose and half-life of the drugs used, since greater exposure to them increases the risk of developing dementia (Chen et al, 2012).

On the other hand, REM sleep disorder is considered a risk factor for the development of dementia. It has been hypothesised, not proven, that the deposition of tau protein in structures of the reticular formation may trigger sleep disorders, many years before the onset of symptoms of neurodegenerative diseases. This is interest, because the changes in sleep are specific, and could serve as a biomarker for early diagnosis. Sleep disorders in older adults without dementia, but already with amyloid beta accumulation include NREM sleep disorders, with an increased in the number of interruptions, and poorer objective and subjective sleep quality (Liu et al, 2019).

Sleep disorders have a significant impact on patients with cognitive impairment. At the National Institute of Neurology and Neurosurgery, in the neurology service, has a group of patients with cognitive impairment whose sleep quality is unknown, and if this influences their cognitive impairment. Such information would be useful, since it constitutes a line of approach for the treatment of cognitive impairment and improve the quality of life of patients. Once the patients with affected sleep quality have been identify, they can be referred to a sleep disorders consultation for study and treatment. For these reasons, the authors of this research set out as an objective, to evaluate the quality of sleep in patients diagnosed with cognitive impairment.

MATERIALS AND METHODS

Context and classification of the study: A cross-sectional descriptive observational study.

Ethical principles: The study was conduct according to the principles reflected in the Helsinki Declaration, as well as the recommendations of the World Health Organization and the Cuban regulations on Good Clinical practices. Written informed consent was requested after explaining the objectives of the research and the importance of their participation, guaranteeing the anonymity of the information and the possibility of withdrawing from the study if they so wished, without any repercussions regarding the need for subsequent medical attention.

Universe: The patients with cognitive impairment who attended the National Institute of Neurology and Neurosurgery, Havana, Cuba, between the months of June 2021 and January 2022 were taken as the sample. The patients were chose using the following selection criteria:

Inclusion criteria: Patients of both sexes and adequate level of education (that would allow them to understand and respond to the questionnaires) with a diagnosis of cognitive impairment older than 55 years, and patients with suspected cognitive impairment, either refer by themselves or by their family, who attended the National Institute of Neurology and Neurosurgery in the period in question.

Exclusion criteria: Cases in which there was severe major cognitive impairment that made it difficult to understand the questionnaire, patients with hearing or visual difficulties, who were unable to write, and those who could not be contact during the study. Patients who presented a cognitive impairment

score, assessed through the MoCA, higher than that with major cognitive impairment were classify as having severe major cognitive impairment and were not included in the study.

Sampling technique: An intentional sampling was carried-out, with which 41 patients were chose.

Data collection methods and instruments: The research was develop in different stages. Initially, all patients who attended during the study period and who met the aforementioned inclusion criteria were explained what the research consisted of, and those who agreed to participate in the study signed the informed consent. Following this, through the medical interview, the necessary information was collect in the data collection model. Subsequently, the MoCA test (Montreal Cognitive Assessment) (www.mocatest.org) (Delgado & Behrens, 2019) was apply, and if this did not show as results that the patient presented severe major cognitive impairment (MoCA less than 10 points), they proceeded to apply it.

The Horne and Ostberg Morningness-Eveningness questionnaires, the Pittsburgh Sleep Quality Index and the Epworth Sleep Scale. Finally, according to the drug treatment that the patient has stated in the questioning, the anticholinergic risk scale in the elderly is applied. All the questionnaires used are instruments validated in Spanish (Sandoval et al, 2013; Luna et al, 2015; Horne, 1976; Turlan & Serra 2020) and are in the process of validation in Cuba. Data collection was through medical interview.

Study variables: The variables used in the study were: Age; Sex; Education level (Elementary, Secondary, Pre-university, University); No. Of cohabitants (One, two, three, four); Sleep quality (Normal Sleep, Pathological Sleep); Degree of sleepiness (Normal sleep, Medium sleepiness, Abnormal sleepiness, possibly pathological); Circadian rhythm (Extreme Morning, Moderate Morning, Intermediate, Moderate Evening, Extreme Evening); Degree of cognitive impairment (Mild cognitive impairment, Progressive cognitive impairment, Major cognitive impairment) and Anticholinergic burden (No anticholinergic effect, Moderate anticholinergic effect, Strong anticholinergic effect).

Evaluation of the questionnaires: The processing of the results was carry out using a statistical package of Microsoft Excel 2013, where a database was prepared with the information collected from the questionnaires and the data collection models from which tables and graphs were made. The information was analyze through descriptive statistics using absolute and relative frequency.

To assess the presence or absence of cognitive impairment, as well as its intensity, the MoCA (Montreal Cognitive Assessment) questionnaire (Delgado & Behrens, 2019) was use. To calculate the score in this test, different values are assign depending on the sphere.

The visuospatial/executive sphere has five (5) points, identification three (3) points, attention six (6) points, language three (3) points, abstraction two (2) points, deferred memory five (5) points and orientation six (6) points, for a total of 30 points, with a score of 26-30 absence of cognitive impairment, 25-20 presence of mild cognitive impairment, 19-14 progressive impairment and 13-0 points, major cognitive impairment according to the scoring method of said instrument.

To classify the anticholinergic load according to the Anticholinergic Risk Scale in the Elderly (Turlan & Serra, 2020), a score from zero (0) to three (3) points is assigned, with 0 being the patient who does not take any medication that causes anticholinergic effect and three (3) points the patient who takes drugs that cause very strong anticholinergic effect according to said scale. The sum of points results in a greater or lesser risk of suffering anticholinergic adverse effects. It should be take into account that the use of multiple anticholinergic drugs carries a higher risk of adverse events.

The Morningness-Eveningness questionnaire (Rudolph et al, 2008) is score in a range of 16-86 points, with 16-30 points being extreme evening, 31-41 moderate evening, 42-58 intermediate, 59-69 moderate morning and 70-86 extreme morning points.

The Pittsburgh Questionnaire (PSQI) (Luna et al, 2015) contains a total of 19 aspects, grouped into 10 questions. The 19 questions are combine to form seven areas: subjective sleep quality, sleep latency, duration, efficiency of habitual sleep, sleep disturbances, use of hypnotic medication, and daytime dysfunction. Each aspect is evaluated with a range between 0 and 3 points, I feel 0 easy, while 3 severe difficult within their respective area. The score of the seven areas is finally added to give an overall score that ranges between 0 and 21 points, where 0 indicates ease of sleeping and 21 indicates severe difficulty in all areas, in addition, sleep is classified as normal from 0 to 5 points and from 6 to 21 points as pathological sleep.

The Epworth scale (Sandoval et al, 2013) it is evaluate according to the total score that can vary between 0 and 24, determining the degree of drowsiness and the possible diagnosis: snoring, narcolepsy, hyperosmia or insomnia.

Statistical analysis: For the processing of the results, the statistical package of Microsoft Excel 2013 was use, where a database was prepared with the information collected from the questionnaires and the data collection models from which tables and graphs were made.

To assess the normality of the data, the Shapiro-Wilk test was used, setting a significance level of $p<0.05$. Said evaluation was carried out using the statistical software Statistic version 10. Given the absence of a normal distribution for several of the variables and the number of cases evaluated, it was decide to carry out a non-parametric statistical analysis with the facilities offered by said program. To determine the correlation between the variables, the Spearman Rank Order test, the Gamma test and the Kendall Tau test were use. To determine the difference between independent groups of cases, the Mann-Whitney U test was use. The significance level for the entire analysis was set at 0.05. For the graphing of some of the results, the statistical program Graph Pad Prism version 5 was use.

RESULTS AND DISCUSSION

The predominance of the female sex with respect to the male in the patients with cognitive impairment included in the study became evident, with females between 55-79 years representing more than 40 % (table 1).

Table 1. Socio-demographic characterization of the patients studied

Age	Women		Men		Total	
	AF	RF	AF	RF	AF	RF
55-74	19	46.34	3	7.32	22	53.66
75-94	12	29.27	7	17.07	19	46.34
Total	31	75.61	10	24.39	41	100.00

AF absolute frequency, RF, relative frequency

Among the patients studied in the period there is predominance of those who suffer from cognitive impairment, constituting more than 60% of the total number of patients (Table 2).

Table 2. Distribution of cognitive impairment according to gender

Cognitive decline	Women		Men		Total	
	AF	RF	AF	RF	AF	RF
Mild	12	37.50	6	18.75	18	56.25
Progressive	18	58.06	3	7.32	21	65.63
Major	1	3.13	1	3.13	2	6.25
Total	31	78.05	10	24.39	41	100.00

AF absolute frequency, RF relative frequency

Depressive symptoms and cognitive impairment have a moderate prevalence in women. Some authors (Figueroa et al, 2021; Solis & Vargas, 2018) suggest that it is due to the role of women in modern society where they have to divide their time to perform multiple tasks, often under conditions of psychological stress, which increases synaptic pressure to which their neurons are subject, bringing with them disorders in cellular metabolism.

It is known that women have a greater hereditary predisposition than men to hypercholesterolemia, and several studies associate it, at least indirectly, with the appearance of neurodegenerative diseases (Solis & Vargas, 2018). This coincides with the results of the present investigation where it was founded a relationship between the female gender and cognitive impairment.
There is a directly proportional relationship between age and the degree of cognitive impairment (assessed by the MoCA) (Table 3, Figure1), which can be explained by the fact that, from the age of 60, degenerative changes occur in the brain. The brain and spinal cord lose weight and neurons (atrophy), neurons transmit stimulation more slowly, waste products accumulate in the Central Nervous System in the form of plaques and neurofibrillary tangles, and lipofuscin accumulates in the brain the nervous tissue. All these changes have an influence on the patient slowly losing cognitive functions (Rabelo et al, 2019).

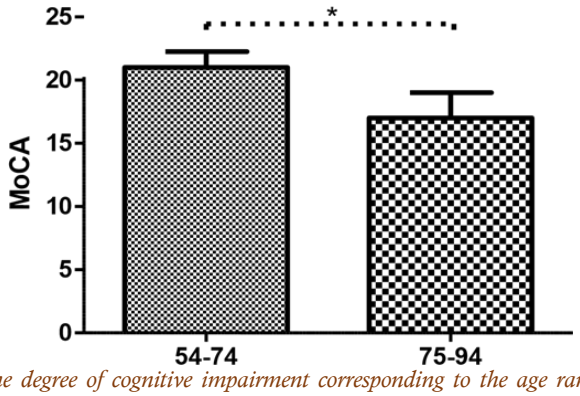

Fig. 1. *Comparison of the degree of cognitive impairment corresponding to the age ranges studied. The figure shows the median and interquartile range for both groups. *Mann-Whitney U Test: 114.5, p< 0.0137.*

It should be note that more than half of the patients in this study presented progressive or greater cognitive decline, two categories that clearly distance themselves from cognitive decline according to age, which is a phenomenon that is part of physiological aging.

Table 3. Distribution according to age and cognitive impairment

Age	Cognitive decline			
	AF	RF	Median	IQR*
55-74	22	53.66	21	3
75-94	19	46.34	12	4
Total	41	100.00	-	-

AF absolute frequency, RF relative frequency
**IQR: interquartile range between the Q3 and Q1 quartiles*

More than 80% of the patients with cognitive impairment studied in the period have abnormal sleep according to the Pittsburgh scale (Table 4), of which more than 60% are female, and the Table 5 show that there is a greater number of moderate morning patients, representing more than 65% of the total.
It was evidenced that patients who live with others turn out to be more morning than those who live alone, a result that can be explained by the fact that, in homes, the elderly, are the ones who generally deal with domestic tasks such as waking up the children to go to school, preparing it, taking them to the study centers and picking it up, preparing some meals, among other functions (Ruiz et al, 2019). The progression of age occurs changes in sleep patterns that imply a decrease in REM sleep and in the hours of sleep in a general sense.

Table 4. Distribution of sleep quality according to sex

Sleep quality	Women		Men		Total	
	AF	RF	AF	RF	AF	RF
Normal sleep	5	12.20	3	7.32	8	17.85
Abnormal sleep	26	63.41	7	17.07	33	80.49
Total	31	75.61	10	24.39	41	100.00

AF absolute frequency, RF relative frequency

Table 6 shows that 24.39% of the women presented abnormal sleepiness and 4.88% of the men also, so that of the total number of patients included in the study, 29.27% presented abnormal sleepiness and 21.95% normal, which represents that 51.22% of the patients presented involvement. Practically one out of every three patients presented abnormal daytime sleepiness; one of the main causes of this could be obstructive sleep apnea associated with possible pathologies such as obesity and diabetes mellitus. The higher the score in sleep disturbances, the greater daytime sleepiness in the patients who participated in the investigation, according to the results of the application of the Epworth test.

Table 5. Distribution of the Morningness-Eveningness chronotype according to sex

Cronotype*	Women		Men		Total	
	AF	RF	AF	RF	AF	RF
Extreme morning	3	7.32	1	2.44	4	9.76
Moderate morningnees	22	53.66	6	14.63	28	68.29
Intermediate	6	14.63	3	7.32	9	21.95
Total	31	75.61	10	24.39	41	100.00

AF absolute frequency, RF relative frequency

**The moderate or extreme evening categories are not reflect because there were no patients in them*

As expressed by Velasco et al 2019, the following symptoms have been detect for not having a continuous and restful sleep: significant impairments in daytime functioning (excessive sleepiness), fatigue, mood problems, as well as cognitive complaints. Nocturnal awakenings probably contribute to the daytime fatigue and excessive daytime sleepiness that many patients complain of sleep fragmentation can be seen at any stage of sleep, although it is more frequent in phases of superficial sleep, therefore, the patient and/or or (even more frequently) the patient's companion complains of very exaggerated and even violent movements during sleep (Velasco et al, 2019). It has been postulated that the mechanisms involved in wakefulness are altered in the disease, and multiple latency studies show frequent intrusions of REM and NREM sleep (Huang et al, 2021).

Table 6. Distribution of degree of daytime sleepiness according to sex

Daytime sleepiness	Women		Men		Total	
	AF	RF	AF	RF	AF	RF
Normal	15	36.59	5	12.20	20	48.78
Mean	6	14.63	3	7.32	9	21.95
Anomalous	10	24.39	2	4.88	12	29.27
Total	31	75.61	10	24.39	41	100.00

AF absolute frequency, RF relative frequency

It has been suggested that sleep favors the consolidation of memory, due to the fact that during it the information that has been acquired during periods of wakefulness is processed to reestablish communication between various parts of the brain, which makes it possible to better guide the individual later, as well as better quality in all their cognitive functions (Acosta, 2019).
The research results show a proportional relationship between the deterioration of sleep quality (Table 7) and the anticholinergic load. The study yielded as a result that the groups of patients with anticholinergic load and without anticholinergic load differ significantly. Older people, in general, do not sleep less than the rest of the population, but rather sleep differently. With age, a redistribution of sleep occurs throughout the 24 hours, caused both by the temporary disorganization of physiological functions and by the decrease and/or absence of external synchronizers, which translates into a shorter duration of night sleep and an increase in the tendency to sleep during the day (D´Hyver, 2018). When drugs with an anticholinergic load are associated in their treatment, many of which are antihistamines and benzodiazepines, they have a sedative effect that helps in the conciliation of sleep and in that it´s more repairing (McCleery & Sharpley, 2020).

Table 7. Distribution of the anticholinergic load according to sleep quality

Sleep quality								
Anthicolinergic load	**Normal**		**Anormal**		**Total**		**Median**	**IQR***
	AF	**RF**	**AF**	**RF**	**AF**	**RF**		
With load	1	14.29	6	85.71	7	17.07	7	3
Without load	7	20.59	27	79.41	34	82.93	13	4
Total	8	19.51	33	80.49	41	100.0	-	-

AF absolute frequency, RF relative frequency
**IQR: interquartile range between the Q3 and Q1 quartiles*

The pharmacological groups taken by surveyed patients with anticholinergic load were benzodiazepines, tricyclic antidepressants, antihistamines, antiparkinsonian drugs, and muscle relaxants. Many of these had more than one medication with such a charge. Regarding the anticholinergic load in the elderly, different considerations have been made, including polypharmacy (the prescription of five or more drugs for chronic use for at least 6 months) (McCleery & Sharpley, 2020).
But in clinical practice, no consensus has yet been generated, since a person with multiple pathologies, for example coronary disease, type I diabetes mellitus and hypertension requires, at least, the use of two drugs to control each disease and, in this context, the safety of the therapy is difficult (McCleery & Sharpley, 2020). Due to this the term appropriate polypharmacy was created, where medications are evaluated by individualizing each patient.
The investigation showed as a result that the anticholinergic load is directtly related to the dysfunction during the day (data not shown for simplicity). The use of anticholinergics is consider inappropriate even in healthy older adults (Cabral & Goyret, 2019). It´s estimate that between 2 and 12% of patients with suspected dementia do not have a dementia syndrome and actually suffer from side effects of the medications they consume, a situation that worsens with polypharmacy.
Polypharmacy, in turn, increases anticholinergic action (McCleery & Sharpley, 2020; Jee et al, 2020). It has been suggested that in the elderly there is a risk of establishing a vicious circle consisting of the need for treatment causing side effects that require the addition of anticholinergic treatment, which in turn will lead to new side effects (Cabral & Goyret, 2019). The loss of cholinergic function with age leaves little "reserve", in the face of which the use of anticholinergic drugs can cause the symptomatic threshold to be exceed, causing false diagnoses of dementia or cognitive impairment.
When comparing the results of the investigation with other studies such as those by Rojas et al, 2019, it was evidence that the prolonged use of benzodiazepines has been relate to a greater risk of dementia or cognitive impairment. This relationship could be due to the fact they can be prescribe to treat subtle changes in behavior that could manifest years before the recognition of dementia, such as anxiety or

insomnia. The use of anticholinergic drugs is common in older people, even with cognitive impairment (Ward & Pase, 2020).
As result of the investigation, the directly proportional relationship between the anticholinergic load and the Pittsburgh scale was evidenced (Figure 2). It´s important to note that the anticholinergic load of the drug is defined by its affinity for the muscarinic receptor, so the higher the load, the greater the risk of cognitive impairment and confusion (Rojas et al, 2019; Ward & Pase, 2020).

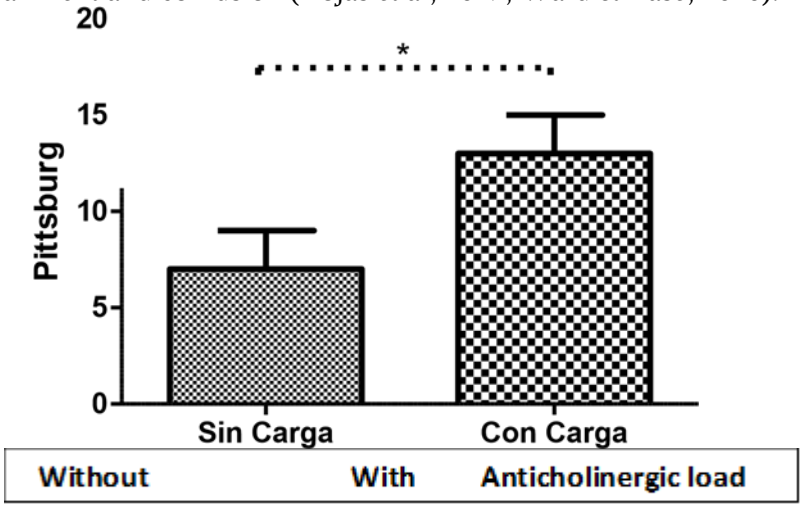

***Fig. 2**. Comparison of sleep quality according to the Pittsburg scale between patients with and without anticholinergic load. The figure shows the median and interquartile range for both groups *Mann-Whitney U Test: 57.00, p< 0.0321*

At the level of the central nervous system, since muscarinic receptors mediate mechanisms of attention, learning, and short-term memory, the use of anticholinergic agents can cause deterioration of cognitive function, and even precipitate the appearance of delirium (McCleery & Sharpley, 2020). Cognitive adverse effects of anticholinergic drugs in these patients depend on the total anticholinergic burden, baseline cognitive function, and individual pharmacokinetic and pharmacodynamic variability. The metabolism and excretion of these drugs decrease with age (McCleery & Sharpley, 2020; Cabral & Goyret, 2019).
Treatments with sleeping pills decrease attention in 30% of patients (Table 8). Among the results of this study is the existence of a directly proportional relationship between attention (according to the MoCA) and the use of sleeping medications (according to the Pittsburgh) (Table 8, Figure 3). Patients who take sleeping pills receive less attention the next day, as they have daytime sleepiness, fatigue, lack of memory and concentration, and emotional lability (Fuentes et al, 2022).

Table 8. Distribution of the use of sleeping medication according to the affectation of the sphere of care

Medication (Pittsburg)	Attention (MoCA)			
	AF	RF	Median	IQR*
No	29	70.73	4	2.00
Sí	12	29.27	3	2.25
Total	41	100.00	-	-

AF absolute frequency, RF relative frequency
**IQR: interquartile range between the Q3 and Q1 quartiles*

In clinical practice, multiple drugs with potential anticholinergic effects are used. From 20 to 50% of older patients are prescribed some drug with anticholinergic effect, which are used in the treatment of urinary incontinence, peptic ulcer, irritable bowel syndrome, depression, tremor or sedation, for

which they can present multiple adverse reactions in the central and peripheral nervous system, such as decreased intestinal motility, blurred vision, tachycardia, xerostomia, xeroderma, urinary retention, constipation, impaired cognitive function, and delirium (Lucey et al, 2019).

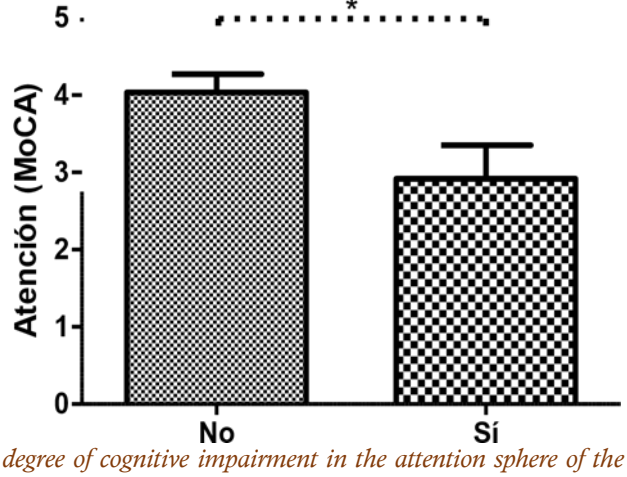

Fig. 3. *Comparison of the degree of cognitive impairment in the attention sphere of the MoCA test according to the use of sleeping medications The figure shows the median and interquartile range for both groups *Mann-Whitney U Test: 102.5, p< 0.0374*

The analysis of the correlations between the variables yielded several significant results. An inversely proportional relationship was detected between age and cognitive impairment (Spearman Rank Order Correlation Test, SRO:-0.3527) and educational level (SRO:-0.4451). In the analysis by spheres of the MoCA questionnaire, it was found that age was specifically inversely related to language (SRO:-0.3171), delayed recall (SRO: -0.3457) and visuospatial-executive (Gamma Correlation Test, GTC:-0.2630). The educational level, for its part, was directly correlated with the visuospatial executive spheres (Kendall Tau correlation test, TCKT:0.2546), attention (TCKT:0.3296) and delayed recall (TCKT:0.2756).

It was also found that the female gender was related to a worse quality of sleep (TCKT:0.2251) being the spheres of sleep latency (TCKT:0.2496) and the use of medications (TCKT:0.2534) the causes of said relationship.

For its part, the anticholinergic load was related to poor sleep quality (SRO:0.3505), being the spheres of duration (SRO:0.3419) and dysfunction during (SRO:0.3690) the day the most affected.

Daytime sleepiness measured by the Epworth scale increased simultaneously with the intensity of the disturbances during sleep determined by the Pittsburgh test (TCKT:0.3445).

Regarding the relationship between the spheres of the MoCA and the Pittsburgh questionnaire, it was found that the sphere of attention is being affected by the consumption of sleep medications (SRO:-0.3635) in these patients. In addition, it was found that the higher the subjective quality of sleep, the greater the orientation (SRO:0.3083). It was also found that the higher the consumption of sleep medications, the greater the sleep latency (SRO:0.3144) and the greater the dysfunction during the day (SRO:0.3816). In addition, he it also highlighted that the greater the sleep medication, the greater the number of disturbances (TCG:0.4630) during sleep, which in turn affects the subjective quality of sleep (TCG:0.7273) and the duration (TCG:0.3441).

It is important to mention that the main limitation of this study is that the number of patients with cognitive impairment in the study is small, so the representation and scope are relatively low.

CONCLUSIONS

The patients with cognitive deterioration evaluated have a deterioration in the quality of sleep in their majority. The results indicate that in these patients the prolongation of sleep latency and the existence of disturbances during it, lead them to take drugs to sleep, which explains the dysfunction during the day and therefore the affectation in the sphere of attention. In this result, the anticholinergic load plays an important role by reducing sleep hours and causing dysfunction during the day.

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