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ORIGINAL ARTICLE

The quality and characteristics of sleep of hypertensive patients

Características e qualidade do sono de pacientes hipertensos

Características y calidad del sueño de pacientes hipertensos

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ABSTRACT

Objective: Analyzing the quality of sleep of hypertensive patients registered in the national registration system and monitoring of hypertensive patients. **Methods:** A cross-sectional study of quantitative and descriptive analyses with 280 hypertensive patients registered in the National Program of Hypertension and Diabetes of the Federal Government in the months from August to October 2011. Questionnaires were used which allowed for tracking sociodemographic data on hypertension and Pittsburgh Sleep Quality Index (PSQI). **Results:** The prevalence of poor sleep quality among respondents (156 hypertensive patients) and high rates of using medication for sleeping (106 hypertensive patients) was observed. Other relevant data refers to the quality of sleep among hypertensive patients using sleep medication compared to those who do not use it (p≤0.01). **Conclusion:** Individuals with high blood pressure have a negative association with sleep quality.

DESCRIPTORS

Hypertension; Sleep; Sleep Apnea Syndromes; Public Health; Health Evaluation.

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INTRODUCTION

Hypertension or High Blood Pressure (HBP) is considered a non-transmissible chronic disease, and one of the major challenges for public health around the world[1]. It accounts for about 13% of all global deaths[2]. It affects approximately 25% of the world population, with a 60% increase of estimated cases by 2025[3]. It is a common condition strongly associated with cardiovascular morbidity and mortality[4] with high social medical cost, affecting individuals in their productive stage of life[5]. Population studies show the prevalence of hypertension in Brazil from 22.3% to 43.9%[4,6-7].

Another disease with high morbidity in the population is the Obstructive Sleep Apnea Syndrome (OSAS), and it is estimated that approximately 40% of hypertensive patients and 80% of those with resistant hypertension have OSAS[8-9] and about 55% individuals with OSAS have hypertension[10].

In hypertensive patients, the prevalence of OSAS is higher than that found among the general population, and there is evidence that diagnosis is associated with concomitant hypertension. Thus, the need for combination treatment, especially in patients with resistant hypertension should be considered[11].

Indicative factors that constitute pathophysiological mechanisms of hypertension[12] closely related to the development of sleep disorders are: hyperactivity of the sympathetic nervous system and the renin-angiotensin system (RAS); increase in the relative endotelina1/nitric oxide; the use of recombinant erythropoietin; the presence of secondary hyperparathyroidism; and especially, the increase in extracellular volume[13-14].

The quality of sleep and high blood pressure are strongly influenced by lifestyle, and individuals with hypertension are more likely to have sleep disorders[15].

The most common sleep disorders are restless legs syndrome, insufficient amount of hours slept, insomnia, and obstructive sleep apnea, the latter being the most common disorder in hypertensive individuals[16].

Therefore, understanding the quality of sleep in hypertensive individuals is essential to assist in the care planning of this aspect in this population. Research that characterizes the profile of hypertensive patients in relation to the quality of sleep are scarce. Some studies have already attributed some sleep disorder as the main factor leading to the development of hypertension. In this context, there is a gap in the literature that addresses hypertension as a causal factor of sleep disorders. This study aimed at evaluating quality of sleep of hypertensive individuals registered in the national registration system and monitoring of hypertensive patients.

METHOD

A cross-sectional, quantitative and descriptive study that included hypertensive individuals registered in the National Hypertension and Diabetes Program of the Federal Government in a southern city of Santa Catarina. In total, 782 hypertensive patients were registered. A simple random sample was calculated with a sampling error of 5% and 95% significance level, which resulted in 258 hypertensive individuals. A 10% surplus to was estimated compensate for losses, totaling 284 elderly.

Inclusion criteria were: being over 18 years old, diagnosed with hypertension, registered at the health district, and being available at least once in the three attempts of home visits. Exclusion criteria were: not being registered in the health district, not being available at the time of the home visit.

Data were collected at participant's homes through a structured interview with questions related to socioeconomic data, clinical data and the Pittsburgh Index (PSQI), from August to October 2011.

To analyze socio-demographic profile, a questionnaire adapted from the Brazilian Institute of Geography and Statistics was designed.

Chart 1 shows the variables of interest of the study, composing the sociodemographic and clinical data of hypertensive patients.

Chart 1 – Variables of interest of the study - Criciúma, SC, Brazil, 2011.

Characteristics	Variables
Socioeconomic data	age, gender, marital status, ethnicity, family income, education level, height, weight, occupation, smoking and drinking habits.
Clinical data	Type and quantity of anti-hypertensive medication administered, time of hypertension diagnosis, systolic blood and diastolic blood pressure levels, type and amount of medications prescribed for sleeping.

Data such as weight and height registered into the program's health handbook were relative to the month when the medication to control hypertension was suspended, as participants were monitored monthly by the program. Blood pressure measurements were performed by trained researchers, before the start of the interviews. Sphygmomanometer (Premium) and Rappaport stethoscope (Premium) were used for the measurement of BP.

In order to investigate subjective sleep quality, we used the Pittsburgh Index (PSQI). The main purpose of this instrument is evaluating the subjective quality and the occurrence of sleep disorders. The questionnaire consists of ten questions that form seven components: 1) Subjective sleep quality; 2) Sleep latency; 3) Sleep duration; 4) Habitual sleep efficiency; 5) Sleep disturbances; 6) Use of sleep medications; 7) Daytime disturbances. Each component can vary in a scale of 0 to 3, where 0 indicates very good quality and 3 is very bad quality. The maximum score of the instrument is 21 points; a score >5 indicates that the patient is having great difficulties in at least two components or moderate difficulty in more than three components, thus, the higher the score, the worse the quality of sleep of the individual.

Data were tabulated in Microsoft Excel and analyzed using the SPSS 18.0 statistical program for Windows. The Mann-Whitney U test and chi-square Pearson with p ≤ 0.05 were used. We also calculated the *Odds Ratio* as a measure of association, with a 95% confidence interval. The research project was approved by the Research Ethics Committee of Universidade do Extremo Sul Catarinense - UNESC number 194/2011. The ethical principles of voluntary and informed participation were observed for each subject, who spontaneously signed the Informed Consent Form, authorizing the application of instruments for data collection as recommended in Resolution No. 196/1996 of the National Health Council, effective on the date the study was approved by the Research Ethics Committee.

RESULTS

The descriptive analysis of the 280 hypertensive respondents allowed us to obtain the results presented below, mapping the sociodemographic profile of the study population (Table 1), data on hypertension of respondents (Table 2), medication for sleeping correlated with components of the PSQI instrument (Figure 1), and medication for sleeping correlated to total PSQI scores (Table 3).

Table 1 – Subjects distribution according to sociodemographic variables - Criciúma, SC, Brazil, 2011.

Variables	n(%) n=280
Average age	63.0(±11.0) IC (95%): 61.70 - 64.29
Median	64.0
Gender	
Male	91(32.5)
Female	189(67.5)
Family Income	
<1 minimum wage	14(5.0)
1 to 3 minimum wages	224(80.0)
4 to 6 minimum wages	33(11.8)
>6 minimum wages	7(2.5)
Education Level	
Illiterate	20(7.1)
Literate (can read and write their name)	16(5.7)
Incomplete Primary Education	185(66.1)
Completed Primary Education	28(66.1)
Incomplete Secondary Education	5(1.8)
Complete Secondary Education	3(2.0)
Incomplete Superior Education	2(0.7)
Post-Graduate	1(0.4)
Marital Status	
Living with a companion	203(72.5)
Living with an irregular companion	2(0.7)
Does not live with a companion	2(0.7)
Does not have a companion	43(15.4)
Living alone	30(10.7)

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Variables	n(%) n=280
Occupation	
Retired	128(45.7)
Pensioner	33(11.8)
Works at home/housewife	72(25.7)
Unemployed	2(0.7)
Other	45(16.1)
Religion	
Catholic	224(80.0)
Evangelican	51(18.2)
None	2(0.7)
Others	3(1.1)
Ethnicity	
White	246(87.9)
Mixed	6(2.1)
Black	28(10.0)

The average age of the participants was 63.0 (± 11 years), the majority were females, of white ethnicity, with incomplete primary education, living with a regular companion, retired, with family income of 1-3 minimum wages, which at the time of data collection was R$545.00.

Average diagnosis time of respondents was 12.0 years (± 9.4 years). More than half of the respondents had undergone antihypertensive treatment for more than six years, and the prevalent type of treatment was the association of medication and non-medication. For antihypertensive treatment, respondents used more than three medications with daily dosage varying from two to three doses in most cases. Physical activity was barely present among respondents, 16.5% reported practicing it regularly, and 12.2% did not practice it regularly. Smoking and drinking habits were present among hypertensive respondents, 11.8% and 12.9%, respectively. When asked about their opinion on the amount of salt in their diets, almost half revealed considering it little and/or poor (Table 2).

Table 2 – Data on hypertensive respondents - Criciúma, SC, Brazil, 2011.

Variables	n(%) n=280
Diagnosis Time (Standard Deviation)	12.0(±9.4) IC (95%): 10.89 – 13.10
Treatment Time	
<1 year	9(3.2)
1 to 2 years	18(6.4)
3 to 5 years	56(20.0)
6 years	22(7.9)
>6 years	175(62.5)
Treatment Type	
Exclusively with medication	140(50.0)
Exclusively non-medication	2(0.7)
Medication + non-medication	138(49.3)

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Variables	n(%) n=280
Amount of medication/Day	
One Drug	28(10.0)
Two Drugs	64(22.9)
Three Drugs	55(19.6)
>4 Drugs	133(47.5)
Dosage/Day	
One Dose	31(11.1)
Two Doses	124(44.3)
Three Doses	110(39.3)
>4 Doses	15(5.4)
Use of Everyday Medication	
Yes	215(76.8)
No	65(23.2)
Practice of Exercise (3 or more times a week)	
Regularly	46(16.5)
Irregularly	34(12.2)
None	200(71.3)
Smoking Habits	
Yes	26(9.3)
No	190(67.8)
Sometimes	7(2.5)
Quit	57(20.4)
Alcohol Consumption	
Yes. every day	3(1.1)
Yes. on weekends	33(11.8)
No	243(86.8)
Quit/Has stopped drinking	1(0.4)
Amount of salt in diet	
Normal	112(40.1)
Little/Poor	139(49.8)
Salty	28(10.0)

Figure 1 shows the analysis of the sleeping medication compared to total score of each PSQI instrument components, which vary on a scale of 0 to 3 points and total score of the instrument vary on a scale ranging from 0 to 21 points. Data stratification of each component was conducted comparing individuals who used medication for sleeping and those who did not use them. We identified that 106 hypertensive patients used medication for sleeping, while 174 reported not using them. When comparing the averages of the components among individuals who used medication and those who did not, we found a statistical difference of p≤0.05 when compared to component 1: Subjective sleep quality. When compared to components 2: Sleep latency, 4: Habitual sleep efficiency, 5: Sleep disturbances, 6: Use of sleep medication and 7: Daytime disturbances, we observed a statistical difference of p≤0.01. Component 3: Sleep duration showed no statistical difference. In the overall score, a statistically significant difference p≤0.01 was observed when comparing the overall quality of sleep of hypertensive patients that use sleeping medication with
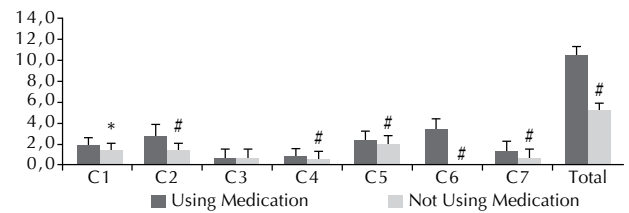
those who do not.

Figure 1 – Comparison of scores of each component of the PSQI instrument x Use of medication for sleeping - Criciúma, SC, Brazil.

Legend: C1 - Component 1 (Subjective sleep quality), C2 - Component 2 (Sleep Latency), C3 - Component 3 (Sleep Duration), C4 - Component 4 (Habitual sleep efficiency), C5 - Component 5 (Sleep disturbances), C6 - Component 6 (Use of sleep medications), C7 - Component 7 (Daytime disturbances). Total refers to the total score of the instrument, on a scale ranging from 0 to 21 points. Statistical method employed: Mann-Whitney U test. (#: p≤0.01; *: p ≤ 0.05).

Table 3 shows the relationship established between the use of medication to sleep and sleep quality. The global PSQI score showed that 156 hypertensive patients had bad sleep quality and 124 had good sleep quality. Of the 156 hypertensive who reported poor sleep quality, 97 were using medication to sleep and of the 124 who reported good quality sleep, only nine were using medication to sleep. In this analysis, when comparing sleep quality with the use of sleeping medication, the data revealed a statistical difference (p≤0.01). The probability *Odds Ratio* 21 (95% CI, 9.9-44.54) was calculated, revealing that hypertensive patients who did not use sleeping medication were 21 times more likely to have good sleep quality in comparison to hypertensive patients using sleep medication, a statistically significant difference.

Table 3 – Relationship between medication and sleep quality - Criciúma, SC, Brazil, 2011.

Relationship between Medication and Sleep Quality		Quality of Sleep		Total
		Good	Bad	
Use of Medication	Does not use it	115	59	174
	Uses it	9	97	106
Total		**124**	**156**	**280**

Statistical method employed: Pearson Chi-square test (p≤0.001).

DISCUSSION

In 2010, hypertension was responsible for the highest percentage of attributable death (13%), and the leading cause of disability, accounting for over 20% of the world rate for life years adjusted for disability in adults of 70 years of age or more, and about 15% of those between 50 and 69 years[17]. The evidence that OSAS is a key risk factor in the development of hypertension and consequent development of cardiovascular diseases is clear[18-19].

In all regions in Brazil, the prevalence of self-reported hypertension was higher among women, which may be partly justified by the greater use of health services by women, which provides them with the opportunity to receive a medical diagnosis of hypertension[20].

It was found that hypertensive individuals are more likely to develop emotional disorders such as anxiety and

depression, triggering changes in sleep, being strongly related to the hypertension risk factor for sleep disorders[21].

Studies have indicated that the presence of untreated sleep disorders, insomnia and especially OSAS are associated with an increased risk of fatal and non-fatal cardiovascular disease[22], showing a high prevalence of OSAS in hypertensive individuals, and on the other hand, hypertension is found in a large proportion of individuals with OSAS[23].

Adults with hypertension had reduced cerebral circulation in areas that are normally always active, and there is compensation with the increased blood flow to isolated areas of the brain. With time, these cerebrovascular changes could manifest with cognitive or behavioral changes including sleep disturbance, making it difficult to concentrate and resulting in fatigue[24].

A study evaluated the occurrence of OSAS in 394 hypertensive Swedish patients, revealing the occurrence of OSAS in 59% of the studied population, but elevated blood pressure was not observed in this study[11].

The worldwide prevalence of hypertension complaints and sleep disorders has increased in recent decades, and growing evidence suggests that the conditions of poor sleep is associated with increased prevalence and incidence of hypertension[25-26].

It should be noted that before establishing antihypertensive treatment, investigations about the quality of sleep need to be conducted because drug therapy can influence the onset of sleep disorders in these individuals who are already more prone to them. Often the treatment of sleep disorders contributes to better control of blood pressure levels.

Even though the literature describes the fact that hypertensive individuals are likely to have problems related to sleep, there is a lack of attention from the public health in relation to this issue because our findings are from populations that are serviced by the public health service. Thus, it is expected that these individuals receive attention often contributing to improved overall health, resulting in the reduction of public spending on maintaining the health of this population.

CONCLUSION

Considering the results of this study, it was found that hypertensive individuals have poorer quality sleep than those with normotensive individuals, and those who use sleeping medication had poorer quality of sleep compared to hypertensive patients who did not use medication.

The incidence of respondents who used medications for sleeping was high, suggesting a true analysis of how sleep quality of these individuals was being affected, possibly significantly interfering on their quality of life.

Although our findings show that hypertensive individuals have poor sleep quality, data should be treated with caution because sleep quality was not investigated prior to the diagnosis of hypertension, nor was the sleep quality of normotensive individuals of the same health region so results could be compared. It is recommended that further studies continue to clarify these aspects due to the relevance of this topic.

RESUMO

Objetivo: Analisar a qualidade do sono de hipertensos registrados no sistema nacional de cadastramento e acompanhamento de hipertensos. **Método:** Estudo transversal, quantitativo e descritivo realizado com 280 usuários hipertensos cadastrados no Programa Nacional de Hipertensão e Diabetes do Governo Federal nos meses de agosto a outubro de 2011. Foram aplicados questionários que permitiram traçar o perfil sociodemográfico, dados sobre hipertensão arterial sistêmica e Índice de Qualidade de Sono de Pittsburgh. **Resultados:** Verificou-se predomínio da qualidade de sono ruim entre os entrevistados (156 hipertensos) e altas taxas de uso de medicações para dormir (106 hipertensos). Outro dado relevante refere-se à qualidade de sono entre hipertensos que utilizam medicação para dormir comparados àqueles que não utilizam (p≤0,01). **Conclusão:** Indivíduos com hipertensão arterial sistêmica apresentam associação negativa com a qualidade do sono.

DESCRITORES

Hipertensão; Sono; Síndromes da Apneia do Sono; Saúde Pública; Avaliação em Saúde.

RESUMEN

Objetivo: Analizar la calidad del sueño de hipertensos registrados en el sistema nacional de registro y seguimiento de hipertensos. **Método:** Estudio transversal, cuantitativo y descriptivo, llevado a cabo con 280 usuarios hipertensos registrados en el Programa Nacional de Hipertensión y Diabetes del Gobierno Federal en los meses de agosto a octubre de 2011. Fueron aplicados cuestionarios que permitieron trazar el perfil sociodemográfico, datos acerca de la hipertensión arterial sistémica e Índice de Calidad de Sueño de Pittsburgh. **Resultados:** Se verificó el predominio de la mala calidad de sueño entre os entrevistados (156 hipertensos) y altas tasas de uso de fármacos para dormir (106 hipertensos). Otro dato relevante se refiere a la calidad de sueño entre hipertensos que utilizan fármacos para dormir comparados a los que no utilizan (p≤0,01). **Conclusión:** Individuos con hipertensión arterial sistémica presentan asociación negativa con la calidad del sueño.

DESCRIPTORES

Hipertensión; Sueño; Síndromes de la Apnea del Sueño; Salud Pública; Evaluación en Salud.

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