

ARTÍCULO DE INVESTIGACIÓN

DISRUPCIÓN CIRCADIANA Y SU RELACIÓN CON OBESIDAD EN LOS TRABAJADORES DE UNA INSTITUCIÓN DE SALUD DE CARÁCTER PRIVADO DE CÚCUTA

CIRCADIAN DISRUPTION AND ITS RELATIONSHIP WITH OBESITY IN THE WORKERS OF A PRIVATE HEALTH INSTITUTION IN CÚCUTA

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RESUMEN

Introducción: El cuerpo humano posee un reloj biológico el cual es un dispositivo de tiempo natural que controla el ciclo circadiano, este se encuentra conformado por cambios físicos, mentales y conductuales, y responden principalmente a la luz. Cuando este se ve afectado por factores como, no dormir bien, suelen haber alteraciones a nivel hormonal, digestivos, entre otros, que pueden llevar a que una persona desencadene obesidad y esto conlleva a aumentar el factor de riesgo de enfermedades cardiovasculares. **Objetivo:** Evaluar la relación entre la disrupción circadiana del ciclo sueño-vigilia con el riesgo de desarrollo de obesidad en los trabajadores de una institución de salud de carácter privado en el año 2023. **Metodología:** Se realizará un estudio observacional, transversal, descriptivo, no experimental. La población que participara en la investigación serán los profesionales de la salud de una institución de salud de carácter privado de la ciudad de Cúcuta. Se utilizó el cuestionario de matutinidad- vespertinidad de Horne y Östberg y la toma de medidas antropométricas.

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Resultados: En cuanto a la prevalencia de sobrepeso fue del 42.24% y obesidad 14.66%. Por otra parte, en cuanto a la disrupción circadiana se evidenció que un 56.9% tiene un cronotipo matutino moderado y un 34.38% un cronotipo intermedio, lo que significa que la mayor parte se desempeñan mejor en turnos laborales diurnos. Finalmente se evidencio que las pocas personas que dieron como resultado un cronotipo vespertino no poseen problemas de sobrepeso y obesidad, al contrario de las personas que su cronotipo fue intermedio o matutino en las cuales existen problemas de sobrepeso 42.6% y obesidad en un 14,78%. **Conclusión:** La mayoría de los trabajadores de la salud de la población estudiada que tienen alteración del ciclo circadiano presentan problemas de sobrepeso (42.24%) y obesidad (14.66%).

PALABRAS CLAVE: Ciclo circadiano, ciclo sueño-vigilia, obesidad, sobrepeso.

SUMMARY

Introduction: The human body has a biological clock which is a natural time device that controls the circadian cycle. It is made up of physical, mental, and behavioral changes, and responds to light. When this is affected by factors such as not sleeping well, there are usually alterations at the hormonal and digestive levels, among others, which can lead a person to trigger obesity, and this leads to an increased risk factor for cardiovascular diseases. **Objective:** To evaluate the relationship between the circadian disruption of the sleep-wake cycle with the risk of developing obesity in workers of a private health institution in the year 2023. **Methodology:** An observational, cross-sectional, descriptive study will be conducted, not experimental. The population that will participate in the research will be health professionals from a private health institution in the city of Cúcuta. The Horne and Östberg morning-evening questionnaire and anthropometric measurements were used. **Results:** Regarding the prevalence of overweight, it was 42.24% and obesity 14.66%. On the other hand, regarding circadian disruption, it was shown that 56.9% have a moderate morning chronotype and 34.38% have an intermediate chronotype, which means that most of them perform better in daytime work shifts. Finally, it was evident that the few people who had an evening chronotype do not have problems with overweight and obesity, unlike the people whose

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chronotype was intermediate or morning in whom there are problems of overweight in 42.6% and obesity in 14.78. %. **Conclusion:** Most health workers in the studied population who have alterations in the circadian cycle have problems with overweight (42.24%) and obesity (14.66%).

KEYWORDS: Circadian cycle, sleep-wake cycle, obesity, overweight.

INTRODUCTION

The circadian cycle is a biological clock that all humans possess, it controls the release of important hormones such as glucagon and insulin, control of feeding and sleep-wake cycle, among other functions, "this is activated mainly by light, and is controlled by having adequate sleep habits and performing activities during routine hours." Gamboa Y. Ruiz M & Arteaga Y. (2021)

Most health workers have night shifts, which causes a disruption of the circadian cycle, since they must be exposed to light and active at work while they should be resting, which causes an imbalance in the cycle, causing all functions to be altered and not occur properly, in addition, sleep will also be affected, due to the opposition of sleep hours with work hours, generating insomnia or drowsiness during working hours.

The deregulation of this cycle can lead to the development of diseases related to body weight such as overweight and obesity, since, apart from the disruption of the circadian cycle, this type of schedule also favors eating at hours when food should not be eaten.

According to the WHO (2019) "obesity is defined as the imbalance between excessive food intake and caloric expenditure", currently this is considered a public health disease, because millions of people in the world suffer from it, it is also a risk factor for the development of chronic diseases, which becomes a major problem for the health system due to its long and high cost treatment.

Healthcare workers can be severely affected by this condition due to their work schedules, as they often work at night. This can lead to a disruption of the circadian rhythm, increasing the likelihood of developing conditions such as overweight and obesity, which is associated with poor quality of life and a higher risk of developing metabolic and chronic diseases.

METHODOLOGY

An observational, cross-sectional, descriptive, non-experimental study was developed.

The population that participated in the research was 116 health professionals

from a private health institution in the city of Cúcuta, including specialist physicians, general practitioners, head nurses, nursing assistants, bacteriologists, and laboratory assistants.

To obtain the results, two data collection techniques were used, the first was the Horne and Östberg Morningness-Eveningness questionnaire that helped determine the chronotype of each participant and the second technique that was also used was taking anthropometric measurements of the target population to calculate the body mass index (BMI) and estimate the level of body fat, with the help of these methods it was possible to establish the relationship between the study variables.

The following inclusion criteria were considered: staff working night shifts, employment for more than six months. The following exclusion criteria were considered: pregnant women, personal administrative.

RESULTS

The data obtained during the research were analyzed in two stages: 1) Descriptive analysis, which consists of the preparation of tables and graphs of the percentage distribution of the categorical variables analyzed and the categories resulting from the application of the "Horne and Östberg Morningness-Eveningness Questionnaire" instrument and the anthropometric measurements obtained. 2) Inferential analysis, on the population parameters based on the

results obtained through the sample information.

Population characteristics

Table 1.Percentage distribution of gender.

Sex	Workers	%
Female	88	75.86
Male	28	24.14
	116	100

Table 1, shows the sample distribution by sex of the workers; 75.86% were female, compared to 24.14% male.

Table 2. Profession or occupation.

Occupation	Workers	%
Nursing Assistant	62	53.45
Head of nursing	22	18.97
General practitioner	11	9.48
Laboratory assistant	8	6.90
Medical specialist	8	6.90
Bacteriologist	5	4.31
	116	100

Table 2, in order from highest to lowest percentage of participation in the present study, shows that 53.45% of the workers in the sample are nursing assistants, followed by head nursing staff.

Anthropometric characteristics

Table 3. Body Mass Index (BMI, kg/m2) categories.

Category	Workers	%
Underweight	1	0.86
Healthy weight	49	42.24
Overweight	49	42.24
Obesity	17	14.66
	116	100

Table 3, indicates that the overall mean of the health workers was overweight. Regarding participants with obesity, 88.2% were grade I obese, followed by 11.7% with grade II obesity, and no participants with grade III obesity.

Characteristics of the Chronotype

Table 4. Categories according to Horne and Östberg's morningness-eveningness scale.

Level	Workers	%
Evening moderate	2	1.72
Intermediate	40	34.48
Morning moderate	66	56.90
Morning extreme	8	6.90
	116	100

In table 4, according to the score obtained in the questionnaire, a greater preference of the population for the moderate Morning chronotype is evident, followed by the Intermediate chronotype.

Table 5. Relationship between Horne and Östberg's morningness-eveningness categories and profession or occupation (%).

	Profession or occupation						
Level	Medical specialist	General practitioner	Head of nursing	Nursing Assistant	Bacteriologist	Laboratory assistant	Total
Moderate evening	0.00	0.00	0.86	0.86	0.00	0.00	1.72
Intermediate	3.45	2.59	9.48	17.24	0.00	1.72	34.48
Moderate morning	2.59	6.03	8.62	31.03	4.31	4.31	56.90
Extreme morning	0.86	0.86	0.00	4.31	0.00	0.86	6.90
Total	6.90	9.48	18.97	53.45	4.31	6.90	100.00

Table 5 presents the contingency between the morningness-eveningness categories, against the profession or occupation.

Table 6. Relationship between Horne and Östberg morningness-eveningness categories and BMI (kg/m²) (%).

	BMI categories (kg/m ²)			
Level	Healthy weight	Overweight	Obesity	Total
Moderate evening	1.74	0.00	0.00	1.74
Intermediate	20.00	10.43	4.35	34.78
Moderate morning	20.00	26.09	10.43	56.52
Extreme morning	0.87	6.09	0.00	6.96
Total	42.61	42.61	14.78	100.00

Table 6 presents the contingency between the levels of Morningness and Eveningness versus BMI, respectively. The relationships between the two main study variables are observed.

Regarding the statistical data of the inferential analysis, through the confidence intervals it is inferred that the proportion of workers with a healthy weight and those who are overweight,

significantly exceed, $P < 0.05$, those with a BMI that indicates obesity.

According to the Odd Ratio estimate with a 95% confidence interval (CI) regarding BMI, it is 1.08 times.

DISCUSSION

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Healthcare workers are significantly affected by night shift work, as their sleep-wake cycle is disrupted because during the hours when they should normally rest, they must be actively working. This situation disrupts the circadian cycle, a biological clock activated by light that allows for the secretion of different hormones, metabolic control, and other functions that ensure proper body function. The disruption of this cycle generates multiple problems, such as a slow metabolism and decreased secretion of different hormones with important functions for the body, such as satiety, mood, and various biological processes. Furthermore, due to these changes in work schedules, people consume food at inappropriate times, which favors the development of obesity. Currently, obesity is considered a global public health issue, affecting the healthcare system because it causes countless chronic diseases.

Regarding the information collected in our research, it can be observed that the majority of healthcare personnel who participated are female (75.86%), while a smaller percentage are male (24.14%). Taking into account the results obtained through the Horne and Ostberg Morningness-Eveningness

Questionnaire, it is evident that healthcare personnel tend towards a moderate morning chronotype (56.9%), that is, they prefer and feel more inclined to carry out work activities during the daytime, followed by an intermediate chronotype (34.38%), that is, they feel comfortable and have good energy to

develop their work both during the day and at night. While a smaller percentage of workers have a moderate evening chronotype (1.72%). These results can be observed that the majority of healthcare workers lean towards a morning schedule since they feel better performing their activities during this time. This leads us to believe that these people don't perform their jobs with the same attitude and aptitude during their night shifts. Furthermore, it has been determined that most of this population experiences a disruption in their circadian rhythm due to working night shifts.

Likewise, a study carried out by Rosagro F. (2019) at the Reina Sofia General Hospital in Murcia, Spain, where a sample of 64 emergency service workers was taken and the Horne and Ostberg Morningness-Eveningness

Questionnaire was applied, in order to determine the chronotype, resulting in the predominance of the intermediate chronotype 75%, followed by a morning chronotype 23.4%. Thus, it is shown that this research, like ours, shows a greater predominance of the morning and intermediate chronotypes.

On the other hand, it was possible to determine through anthropometric measurements that there is a higher prevalence of obesity and overweight in the health professionals who participated in the study. The highest percentage of overweight workers was 42.24% and obesity was 14.66%. Grade I obesity was established at 88.23%, grade II obesity at 11.76%, and no evidence of grade III

obesity was observed. This leads us to conclude that 56.9% of the personnel studied had weight problems. The prevalence of overweight and obesity in health personnel was very similar to that of the study conducted by Sánchez J. Ortiz M. Ramos L. (2020) in the Rosario University in a primary care center in Bogotá, which was carried out with a sample of 133 workers; where it was determined that 49% of the total sample presents problems of overweight and obesity. Likewise, a research carried out by Cobos K. Peña S. Ochoa A. Ordoñez J. (2022) at the José Carrasco Arteaga Hospital in Ecuador, with a sample of 202 health professionals; determined that 47% of the population was overweight, 6.9% grade I obesity and 1.5% grade II obesity.

In relation to the disruption of the circadian cycle and its association with the development of overweight and obesity, it is evident that workers who demonstrate an affinity for an evening chronotype do not present problems with their body weight, however, those who show a preference for an intermediate chronotype show a slight increase in the prevalence of overweight (10.43%) and obesity (4.35%). On the other hand, regarding the morning chronotype, a considerable increase in the presence of overweight (32.17%) and obesity (10.43%) is observed. In short, a close relationship with the disruption of the circadian cycle and the development of overweight and obesity can be determined with the aforementioned data.

CONCLUSIONS

According to the information collected, it was possible to analyze that health workers have a disrupted circadian cycle, since it is evident that most have a morning and intermediate chronotype and frequently work at night, affecting their sleep-wake cycle and their ability to perform their duties adequately and satisfactorily.

The analysis shows that the prevalence of overweight among healthcare workers is 42.24% of the population, and the prevalence of obesity is 14.66%. This can lead to the development of chronic and metabolic diseases that have a significant impact on public health and negatively affect a person's quality of life, resulting in poor performance at work, in social life, and in the family.

In conclusion, it was determined that the majority of healthcare workers with circadian rhythm disturbances are overweight and obese. This is due to their morning chronotype, in most cases, and their work hours are often night shifts. We agree that circadian rhythm disturbance is closely related to metabolic problems, as evidenced by research conducted on workers at this important private institution in the city of Cúcuta, Norte de Santander.

CONFLICT OF INTEREST

The authors declare that they have no conflicts of interest.

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