

Health and Leisure of Workers of Day and Night Shifts

SALUD Y OCIO DE LOS TRABAJADORES DE LOS TURNOS DE DÍA Y NOCHE

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RESUMEN

Objetivo: analizar las diferencias en salud, ocio y trabajo según el turno de trabajo en trabajadores de la industria de Florianópolis, Brasil. **Método:** los participantes fueron 885 trabajadores en el turno de trabajo fijo (649 del turno general, 101 del primer turno, 84 del segundo turno y 51 del tercer turno). La salud se investigó utilizando el Cuestionario Internacional de Actividad Física - Forma Corta (IPAQ-SF), el Índice de Calidad de Sueño de Pittsburgh (PSQI) y el cuestionario de mañana y noche de Horne-Ostberg para actividad física, calidad del sueño y cronotipo, respectivamente. Las actividades de ocio se investigaron en función de la Escala de prácticas en el ocio (Escala de Prácticas no Lazer - EPL). Para calcular la diferencia entre medias, se utilizó la prueba de Kruskal-Wallis (Dunn o Student-Newman-Keuls post hoc) y la prueba de chi-cuadrado. En el análisis de correlación entre variables continuas, se utilizó la prueba de Spearman. Los datos se analizaron utilizando los softwares SPSS 20.0, BioEstat 5.0 y GPower 3.0. Se adoptó un nivel de significancia del 5%. **Resultados:** la edad promedio de los trabajadores fue de 31,1 (8,5) años, y el 58,0% fueron mujeres. Se identificaron diferencias significativas entre los turnos de trabajo con respecto a la calidad del sueño ($p < 0,001$), con una prevalencia del 35,6% de los trastornos del sueño en el turno de la noche. Entre estos, el 16,7% mostró características matinal y el 68,6% informó ausencia del trabajo por razones de salud en el último año. El consumo de bebidas con cafeína (33,3%) y cigarrillos (21,6%) también fue mayor entre los trabajadores del turno nocturno. Sin embargo, el tiempo en la actividad física vigorosa fue mayor, con un promedio de 75,5 minutos por semana. Además, los trabajadores del turno de noche tenían ingresos más bajos ($p < 0,001$) y buscaban un segundo trabajo para complementarlos ($p = 0,002$). Entre los temas relacionados con el ocio, se identificaron diferencias en el contenido artístico ($p = 0,046$), físico-deportivo ($p = 0,048$) y turístico ($p = 0,004$). **Conclusión:** las diferencias sustanciales en cuanto a trabajo, salud y ocio se evidenciaron en diferentes turnos, especialmente en el turno de noche. Aunque, teóricamente, hay más tiempo para las actividades de ocio, los trabajadores del turno de noche buscan un segundo empleo para la complementación de ingresos. El exceso de trabajo asociado al despertarse por la noche y los comportamientos de riesgo resultan en daños a la salud y al ocio.

(Andrade RD, Ferrari Junior GJ, Barbosa DG, Teixeira CS, Beltrame TS, Felden ÉPG, 2017. Salud y Ocio de los Trabajadores de los Turnos de Día y Noche. Cienc Trab. Sep-Dic; 19 [60]: 143-150).

Palabras clave: TURNO DE TRABAJO, SALUD LABORAL, ACTIVIDADES DE OCIO.

ABSTRACT

Objective: To analyze differences in health, leisure and work according to work shift in industry workers of Florianópolis, Brazil. **Method:** participants were 885 workers on fixed work shift (649 of the general shift, 101 of the 1st shift, 84 of the 2nd shift and 51 of the 3rd shift). Health was investigated using the International Physical Activity Questionnaire - Short Form (IPAQ-SF), the Pittsburgh Sleep Quality Index (PSQI) and the Horne-Ostberg morningness and eveningness questionnaire for physical activity, sleep quality and chronotype, respectively. Leisure activities were investigated based on the Scale of practices in leisure (Escala de Prácticas no Lazer - EPL). To calculate difference between means, the Kruskal-Wallis test (Dunn or Student-Newman-Keuls post hoc) and the chi-square test were used. In the correlation analysis among continuous variables, the Spearman test was used. Data were analyzed using SPSS 20.0, BioEstat 5.0 and GPower 3.0 softwares. A 5% significance level was adopted. **Results:** The average age of workers was 31.1 (8.5) years, and 58.0% were female. Significant differences among work shifts with respect to sleep quality ($p < 0.001$) were identified, with prevalence of 35.6% of sleep disorders in the night shift. Among these, 16.7% showed morning characteristics and 68.6% reported absence from work for health reasons in the last year. The consumption of caffeinated beverages (33.3%) and cigarettes (21.6%) were also higher among night shift workers. Nevertheless, the time in vigorous physical activity was higher, averaging 75.5 minutes per week. Furthermore, night shift workers had lower income ($p < 0.001$) and seek a second job for income complementation ($p = 0.002$). Among issues related to leisure, differences in artistic ($p = 0.046$), physical-sport ($p = 0.048$) and touristic content ($p = 0.004$) were identified. **Conclusion:** substantial differences regarding labor, health and leisure issues were evidenced in different shifts, especially in the night shift. Although, theoretically, there is more time for leisure activities, night shift workers seek for a second job for income complementation. The excess of work associated with waking at night and risk behaviors result in damages to health and leisure.

Key words: WORK SHIFT, OCCUPATIONAL HEALTH, LEISURE ACTIVITIES.

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Recibido: 12 de Septiembre 2017 / Aceptado: 14 de Noviembre de 2017.

INTRODUCTION

During the last centuries, the productive process has undergone modifications intensified with the rise of capitalism and industry. These changes led to changes in the division and forms of work organization, being no longer handmade and becoming automated. This leads, among other things, to the practice of fragmented and repetitive work. In addition, with the advent of the

industrial revolution, the work was structured with the fulfillment of the working hours, and later, such labor organization was consolidated in a right for workers.¹

With the globalization process, production speed has increased to meet the demand and market needs. This factor was essential for the expansion and division of shift work. Thus, shift work has been an alternative to provide production in industries beyond the provision of service such as safety, health, and others. It is estimated that in Europe and the United States, 14% of workers are included in the context of shift work, especially in the night shift.² Although there is no official data on the number of workers in this modality in Brazil, it is believed that this percentage is close to this value.³ Thus, the society of the twenty-first century now operates 24 hours a day.

Overall, shift work is characterized as being any work performed at a time other than the formal schedule (daytime). It can be performed in fixed shifts (morning, afternoon or evening), work rotation (scales) or compressed cycles (usually in petrochemical companies) between eight to 12 hours.³

Concerning this new arrangement in the production mode, concerns about workers' health gain strength, especially with regard to night work. In this sense, there is evidence of substantial changes in the worker's life into three major areas: metabolic processes; physical health and psychological well-being, as well as adversities related to social and family life.⁴

Recent systematic review about endogenous metabolic processes triggered by shift work, especially at night shift, revealed changes in the concentrations of melatonin, cortisol, ghrelin and leptin hormones.⁵ These hormones play an important role in homeostasis and are closely associated with circadian rhythmicity.⁶ Thus, these "disturbances" in metabolic processes result in increased risk of diabetes and insensitivity to insulin impacting negatively on the sleep-wake cycle and consequently human health.⁷

Sleep disorders as result of inversion in work routines essentially consist essentially in decreased sleep quality, insomnia and increased excessive daytime sleepiness.^{8,9} Furthermore, given the concern about disorders related to shift work, the International Agency for Research on Cancer, based on evidence from animal studies, classified shift work as a "risk factor for cancer in humans".¹⁰ Thus, night work stands out as one of the significant factors in the health-disease process in humans.

Still regarding the night work, years of trading nighttime sleep by work has reflected in gastric and intestinal damage, obesity and maintenance of habits such as smoking and alcohol consumption.¹¹ Ulhoa et al⁵ showed scientific evidence, because of research carried out in the last ten years that shift work may adversely affect eating habits and stress.

In addition, other issues such as social and family life are also associated with shift work¹² as the participation of these workers in family events is impaired, especially in the evening due to their work shift.⁴ Similarly, leisure practices, as an important cultural phenomenon, are harmed due to shift work because such activities are performed as opposed to formal work commitments (nights and weekends).¹³ Thus, many night workers have limited leisure practices.

Nevertheless, work has a great function that goes beyond the exchange of labor for pay. Through this exchange, the worker gives a meaning to life and to social relations. It is therefore an important social role that keeps people within the context of society.¹

Thus, considering work as a categorical factor in the health-disease process and the limitation in the description of leisure behavior in adults, this study aimed to analyze the differences in health issues, work, and leisure according to the work shift of industry workers of Florianópolis, SC - Brazil.

METHOD

This study is characterized as cross-sectional, and according to Gil¹⁴, as a descriptive research, because it will describe health issues and work and leisure preferences of workers. After this description, associations of these variables according to the work shift were verified.

Participants

The population considered for this study was 1.674 workers from the telecommunications segment (of these, 720 works in production and 954 in administrative sectors) of both sexes, hired under the CLT system (Consolidation of Brazilian Labor Laws), being in one of the major industries of Florianópolis (Brazil).

The company was selected due to its size and internal organization, which includes employees from different hierarchical positions and functions, and for being the only one in the region to maintain its production in four shifts, namely:

General shift: 1446 employees (492 production) and working schedule from 7:30 a.m. to 05:30 p.m.; 1st shift (morning): 78 workers, all from the production sector and working schedule from 05:50 a.m. to 02:20 p.m. from Monday through Friday and alternate Saturdays; 2nd shift (afternoon): 81 workers, all from the production sector and working schedule from 02:10 p.m. to 10:37 p.m., from Monday through Friday and alternate Saturdays; 3rd shift (night): 69 workers, all from the production sector and working schedule from 10:27 p.m. to 06:00 a.m. from Monday through Friday and alternate Sundays (data provided by the company).

Workers in this industry have working hours ranging from 36 to 44h / week, fixed shifts, divided into sectors such as administrative, consisting of the following areas: commercial, planning and development, human resources, call center, among others. Injection, assembly lines, supply, warehouse and shipping are some examples of the so-called production sectors (data provided by the company). Considering a tolerable sampling error of 4% for a population of 1,680 workers and with confidence level of 95%, the minimum sample obtained was 443 workers.¹⁵ However, the total sample for this study consisted of 885 workers of different sectors and work shifts.

Collection procedures

The sample selection was performed in two different ways according to the type of work. For workers of administrative sectors, the questionnaire was handed on the workplace and collected after its completion. As for the production sectors, it was agreed with the immediate leadership, a time on the sector's monthly meeting was given so that workers could fill the questionnaire, avoiding possible sample loss. The questionnaire response time ranged from 20 to 30 min.

Variables

The questionnaire contained demographic information such as gender, age, work shift, marital status and educational level. To

facilitate the analysis of this research, variables were divided into three blocks (work, health, and leisure).

The variables investigated and the instruments used will be presented below.

Work: Important issues regarding type of work, occupation in other paid activity, leadership position, company time, time working in the current shift, educational level and income. The latter was categorized into tertiles (low, medium and high).

Health: questions elaborated by the author such as health perception, health problems, use of medications, stress perception, presence of pathology, use of medications and sick leaves (absenteeism). Weight status was calculated from self-referred values of body weight and height to calculate BMI and categorized according to cutoff points of the World Health Organization (WHO) as normal weight / underweight ($BMI \leq 24.9 \text{ kg} / \text{m}^2$), overweight ($BMI \geq 25.0 \text{ kg} / \text{m}^2$) and obese ($BMI \geq 30.0 \text{ kg} / \text{m}^2$). The consumption of alcoholic and caffeinated beverages and smoking were also analyzed in the same way.

Physical activity issues were evaluated using the International Physical Activity Questionnaire (IPAQ - short version), prepared with support from the World Health Organization and validated in Brazil by the Center of Studies of the Laboratory of Physical Fitness of São Caetano do Sul – CELAFISCS.¹⁶ This analysis considered the time of walking, moderate and vigorous physical activity, and sedentary behaviors during the week and on weekends. The following issues related to the sleep-wake cycle investigated were also included in the health block: sleep duration, sleep quality and chronotype. Sleep duration was investigated with questions regarding sleep habits through the instrument proposed by Louzada and Menna-Barreto¹⁷, which consider the time in bed based on time to sleep and wake up. Sleep duration less than eight hours on weekdays was considered short sleep duration.

Sleep quality was subjectively assessed in relation to last month using the translated and validated for Portuguese of Brazil of the Pittsburgh Sleep Quality Index - (PSQI).¹⁸ The questionnaire consists of 19 self-administered questions and five questions answered by roommates. The latter are used only for clinical information and were not used in this study. The questions were grouped into seven components: 1) subjective sleep quality; 2) sleep latency; 3) sleep duration; 4) habitual sleep efficiency; 5) sleep disorders; 6) use of medication to sleep; 7) daytime sleepiness and sleep disorders during the day. Weights are distributed on a scale from zero (0) to three (3). The scores of these components were then summed to produce an overall score, which ranges from zero to 21, in which the higher the score, the worse the sleep quality. Scores above five indicate poor sleep quality and above ten indicate the sleep disorders.

Chronotype (individual tendency to morningness and eveningness) was investigated by questionnaire developed by Horne and Ostberg¹⁹ (HO), which has been widely used in studies in chronobiology and has been translated and validated for Brazil by Benedito-Silva et al.²⁰ It consists of 19 questions that cover different situations of the daily life and the subject is asked to point the personal preferences of time to perform such activities. The score of the questionnaire ranges from 16 to 86 and the individual is classified as: afternoon (extremely afternoon and moderately afternoon), indifferent and morning (moderately morning and extremely morning).

Leisure: The Scale of practices in leisure (Escala de Práticas no Lazer - ELP)²¹ was used to identify leisure experiences according to

contents proposed by Dumazedier²² (artistic, manual, physical, intellectual and social), Camargo²³ (tourism) and Schwartz²⁴ (virtual) of leisure. In addition to these contents, the scale includes leisure / contemplation item.^{13,22,25} To respond it, the subject should read each item and indicate the most appropriate number to the frequency that he participates in activities in his leisure time, considering "0" for "never" participates in activities and "10" for "always" participates in activities.

Data analysis

Descriptive analyses were performed (means, frequency and standard deviations). For the inferential analysis, the Kruskal-Wallis test was used, and for comparison of means among groups, the chi-square test was used through the SPSS 20.0 statistical software. In order to identify the main differences among groups, the BioEstat 5.0 software was used. The power (P) and effect (ES) of tests were verified using the GPower 3.0 software. The Spearman correlation test was used to correlate continuous variables. A 5% significance level was adopted.

Ethical aspects

The study was approved by the Ethics Committee in Research with Human Beings of University of the State of Santa Catarina - UDESC in 2014 under protocol number 801.409. So, all ethical procedures for research involving human beings were respected. Workers signed the free informed consent form accepting to participate as voluntary in the survey. Questionnaires were anonymously answered under the supervision of researchers.

RESULTS

This study analyzed variables related to health, work and leisure, of workers in different work shifts of Florianópolis, SC. The sample characterization is shown in Table 1. The average age of workers analyzed was 31.1 (8.5) years. It is noteworthy that the majority of the sample (58.2%) was composed of women with stable relationship (68.2%) and complete high school (57.7%).

Regarding the work characteristics, more effective presence of workers in the general shift (73.3%) and operational tasks (58%) was observed. On average, the working time in the company investigated was approximately five years. Multiple jobs have been identified in about 8% of the sample.

With regard to health, in general, the workers exhibited good indicators. Most of the 885 workers analyzed showed positive perception of their health (84.5%), and reported not making use of any medications (79.3%) and not being absent from work for health reasons in the last year (83.4%). Despite these good levels, sleep disorders and obesity were identified in approximately 12% of the sample.

According to results shown in Table 2, statistically significant associations of work issues among shifts were identified, among them, type of work ($p < 0.001$), performance of other paid activity ($p = 0.002$), income ($p < 0.001$) and educational level ($p < 0.001$). Differences among shifts were identified in company time ($p = 0.033$) and time in the current shift ($p < 0.001$). These differences were confirmed with the application of the effect size (ES) and test power (P). These analyses showed $ES = 0.151$ and $P = 0.974$ for company time and $ES = 0.128$ and $P = 0.905$ for time in the current shift.

Table 1.
Descriptive analysis of the sample.

Variables	Indexes
Age, years	31.1 (8.5)
Female, %	58.2
Type of work, %	
Operational	58.0
Administrative	42.0
Stable relationship %	68.2
Educational level, %	
Elementary School	9.8
High school	57.7
Higher education	22.0
Postgraduate studies	10.4
Work shift, %	
General shift	73.3
1st Shift	11.4
2nd Shift	9.5
3rd Shift	5.8
No leadership position, %	94.6
Does not carry out other paid activity, %	92.1
Time in the company, years	4.9 (5.6)
Time in the turn, months	4.8 (5.6)
No health problems,%	79.0
No use of medication,%	79.3
Positive health perception, %	84.5
Low perceived stress, %	83.6
Nutritional status, %	
Normal weight	55.8
Overweight	32.4
Obesity	11.8
No absence from work, %	83.4
Sedentary behavior on weekdays, hours	7.2 (3.2)
Sedentary behavior over the weekend, hours	5.2 (3.4)
Sleep quality, %	
Good sleep quality	34.5
Poor sleep quality	54.1
Sleep disorders	11.4
Chronotype, %	
Morning / moderately morning	26.8
Indifferent	61.8
Moderately afternoon / afternoon	11.4

%: relative frequency.

Table 3 shows the analysis of health variables according to work shift. According to presented data, it is possible to identify health risk behaviors in 3rd shift workers. Specifically, in this shift, the prevalence of smoking was 21.6% ($p < 0.001$) and 33.3% of subjects reported consuming three or more cups or glasses of caffeinated drinks per day ($p = 0.004$). Another fact worth mentioning in this shift was that 31.4% of workers were absent in the last year for health reasons ($p = 0.004$). Nevertheless, these workers spent more time in vigorous physical activities ($p = 0.001$, $ES = 0.138$; $P = 0.946$) and less time in sedentary behavior ($p < 0.001$, $ES = 0.289$; $P = 1.000$), with approximately 75 minutes and 5 hours per week, respectively. Also in relation to health issues, significant associations were identified about sleep quality ($p < 0.001$) and chronotype ($p < 0.001$). The shift with the highest percentage of workers with good sleep quality was the 2nd shift (46.2%), and more than 1/3 of 3rd shift workers had some sleep disorder (35.6%). Regarding the morningness or eveningness trend (chronotype), data indicate that 16.7% of 3rd shift workers have morning characteristics and 11.2% of the general shift had afternoon characteristics. The correlation between company time and HO score (chronotype) was significant ($p < 0.001$)

Table 2.
Variables related to workers working in different shifts.

Labor issues	Work shifts				p-value*
	General shift	1st shift	2nd shift	3rd shift	
Type of work, %					
Operational	47.6	85.1	81.0	98.0	<0.001
Administrative	52.4	14.9	19.0	2.0	
Other paid activity, %					
Yes	5.9	12.9	14.6	14.3	0.002
No	94.1	87.1	85.5	85.7	
Leadership position, %					
Yes	6.3	4.0	1.2	3.9	0.205
No	93.7	96.0	98.8	96.1	
Income %					
Low	35.0	53.8	57.9	28.9	<0.001
Intermediate	29.9	37.4	25.0	64.4	
High	35.1	8.8	17.1	6.7	
Time in the company, years	4.5(5.2)a	6.1(6.5)a.b	5.0(5.9)a.b	7.4(6.9)b	0.033
Time in current shift , years	5.2(5.8)a	4.0(5.2)b	3.0(4.1)b	4.7(5.1)a.b	<0.001
Educational level,					
Elementary School	6.5	14.9	15.5	33.3	<0.001
High school	53.6	69.3	73.8	60.8	
Higher education	26.2	12.9	10.7	5.9	
Postgraduate studies	13.7	3.0	0	0	

* Differences between groups with post-hoc Kruskal-Wallis test with Dunne chi-square test; Different letters show statistical differences.

and positive ($r = 0.165$), indicating that as morningness trend of workers increased, the company time also increased (Figure 1) No differences were found regarding sleep duration in work shifts ($p = 0.188$).

With the application of EPL in the sample, it was possible to identify the main preferences in the leisure time of workers (Figure 2). Thus, it was found that virtual activities stand out among leisure activities. This content has obtained the highest score among the other EPL contents (6.4 points), followed by social (6.1 points) and intellectual activities (5.5 points). Among activities with lower frequency, contemplation (3.7 points), tourism (3.2 points) and manual activities (2.8 points), respectively, stand out. Finally, leisure block analyses are presented in Table 4. These analyses identified significant differences among work shifts in

Figure 1.
Correlation between HO score and company time.

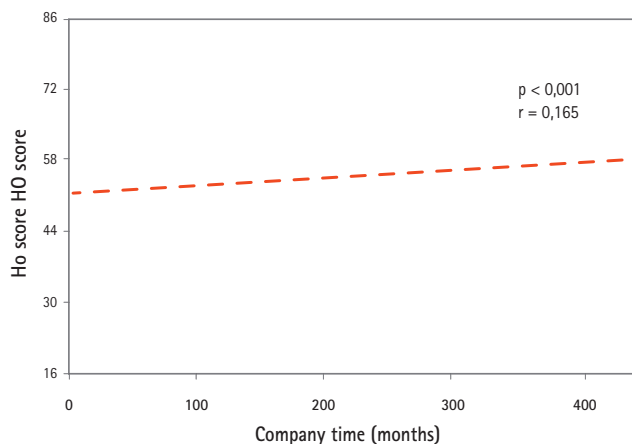


Table 3.
Variables related to the health of workers in different shifts.

Health issues	General shift	1st shift	Work shifts 2nd shift	3rd shift	p-value*
Health perception, %					
Positive	84.4	83.2	81.0	94.1	0.208
Negative	15.6	16.8	19.0	5.9	
Health problems, %					
Yes	18.2	29.7	33.3	19.6	0.001
No	81.8	70.3	66.7	80.4	
Medication use, %					
Yes	19.3	23.8	29.8	17.6	0.117
No	80.7	76.2	70.2	82.4	
Alcohol consumption per week, %					
No consumption	59.9	61.4	75.0	62.7	0.103
1 to 7 doses	36.5	33.7	19.0	37.3	
8 to 14 doses	2.8	5.0	4.8	0	
15 doses or more	0.8	0	1.2	0	
Smoking, %					
Smoker	2.6	3.0	7.3	21.6	<0.001
Occasional smoker	3.7	4.0	3.7	7.8	
Former smoker	6.7	12.0	2.4	3.9	
Not smoker	87.0	81.0	86.6	66.7	
Consumption of caffeinated beverages, %					
Never	25.4	20.8	26.2	15.7	0.004
Sometimes	47.0	43.6	51.2	37.3	
Often	15.3	15.8	15.5	13.7	
Always	12.3	19.8	7.1	33.3	
Stress perception, %					
Low stress	83.0	87.1	85.7	80.4	0.630
High stress	17.0	12.9	14.3	19.6	
Nutritional status, %					
Normal weight	56.1	56.0	56.6	51.0	0.638
Overweight	32.2	34.0	33.7	28.6	
Obesity	11.6	10.0	9.6	20.4	
Absenteeism, %					
Yes	14.2	21.8	20.2	31.4	0.004
No	85.8	78.2	79.8	68.6	
Physical activity, min/day					
Walking	35.8(68.8)	50.4(76.5)	35.2(49.5)	61.9(94.3)	0.111
Moderate	45.3(80.8)	60.1(90.4)	51.3(85.1)	63.1(120.7)	0.334
Vigorous	36.7(66.8)a	62.8(97.7)b	29.8(67.4)a,b	75.5(121.5)a,b	0.001
Sedentary behavior in the week, hours					
	7.7(3.0)a	6.1(3.6)b	5.8(3.2)b	4.7(2.4)b	<0.001
Sedentary behavior over the weekend, hours					
	5.3(3.4)	5.0(3.2)	5.7(4.0)	4.4(3.0)	0.248
Sleep duration, %					
Inadequate	70.1	75.0	59.3	73.5	0.188
Adequate	29.9	25.0	40.7	26.5	
Sleep quality, %					
Good sleep quality	36.2	29.8	46.2	6.7	<0.001
Poor sleep quality	53.6	63.8	41.5	57.8	
Sleep disorders	10.2	6.4	12.3	35.6	
Chronotype, %					
Morning /					
Moderately morning	26.7	39.6	16.5	16.7	<0.001
Indifferent	62.1	54.5	70.9	58.3	
Moderately					
Afternoon / Afternoon	11.2	5.9	12.7	25.0	

* Differences between groups with post-hoc Kruskal-Wallis test with Dunn test and chi-square; %: Relative frequency. Distinct letters show statistical differences.

Figure 2.
Average EPL score in different leisure contents.



artistic ($p=0.046$, $ES=0.159$; $P=0.985$), physical-sport ($p=0.048$; $ES=0.119$; $P=0.852$) and touristic contents ($p=0.004$, $ES = 0.178$; $P=0.996$). Dunn's post hoc test was also applied in order to better understand these differences. Thus, statistically significant difference in physical-sport content was observed between general shift and 2nd shift ($p<0.005$). In the touristic content, major differences were found between 2nd shift, general and 1st shifts ($p<0.005$). For being a more robust test, when the Dunn test was applied for artistic content, the differences between shifts disappeared. For this reason, the Student-Newman-Keuls test was applied for this content. Thus, differences were identified in this content between 2nd shift and general and 1st shifts. It is noteworthy that the 1st shift showed higher values compared to the other shifts in most cultural leisure contents. Only in intellectual and virtual contents, shifts that showed the highest values were the 3rd and 1st shifts, respectively.

Finally, leisure block analyses are presented in Table 4. These analyses identified significant differences among work shifts in artistic ($p=0.046$, $ES=0.159$; $P=0.985$), physical-sport ($p=0.048$; $ES=0.119$; $P=0.852$) and touristic contents ($p=0.004$, $ES = 0.178$; $P=0.996$). Dunn's post hoc test was also applied in order to better understand these differences. Thus, statistically significant difference in physical-sport content was observed between general shift and 2nd shift ($p<0.005$). In the touristic content, major differences were found between 2nd shift, general and 1st shifts

Table 4.
EPL contents in different shifts.

EPL	Work shifts				p-value*
	General shift	1st shift	2nd shift	3rd shift	
Manual	3.8(3.4)	4.4(3.6)	4.3(3.8)	4.0(3.7)	0.531
Artistic	2.9(2.8)a	3.1(2.8)a	2.5(3.2)b	2.4(2.8)a,b	0.046
Physical-sport	4.2(3.6)a	4.5(3.8)a,b	3.2(3.5)b	3.8(3.5)a,b	0.048
Intellectual	5.5(3.2)	5.3(3.3)	5.4(3.8)	6.0(3.6)	0.660
Social	6.1(3.0)	6.5(3.0)	5.6(3.2)	5.6(3.4)	0.205
Touristic	3.3(2.9)a	3.5(3.0)a	2.5(3.0)b	2.5(2.9)a,b	0.004
Virtual	6.6(3.2)	6.2(3.4)	6.4(3.7)	5.3(3.9)	0.140
Contemplation	3.7(3.1)	4.2(2.9)	3.4(3.3)	4.1(3.2)	0.099

* Differences between groups with the Kruskal-Wallis test and post-hoc Dunn's or Student-Newman-Keuls test. Different letters represent significant differences.

($p < 0.005$). For being a more robust test, when the Dunn test was applied for artistic content, the differences between shifts disappeared. For this reason, the Student-Newman-Keuls test was applied for this content. Thus, differences were identified in this content between 2nd shift and general and 1st shifts. It is noteworthy that the 1st shift showed higher values compared to the other shifts in most cultural leisure contents. Only in intellectual and virtual contents, shifts that showed the highest values were the 3rd and 1st shifts, respectively.

DISCUSSION

The choice for a certain work shift, a priori, should take into account the individual morningness or eveningness characteristics.²⁶ However, in practice, the choice for working at night or early in the morning is almost always accompanied by financial or social needs. This inconsistency between individual characteristics and social obligations brings damage to workers' health. The pursuit of science for the understanding of these relationships, especially with those of the night shift is not new.²⁷ However, much of the scientific literature on this area is aimed at investigating health professionals, especially nurses.²⁸ Given this gap, this study showed differences in work, health and leisure aspects with a population of industry workers from different shifts.

With regard to health issues, sleep quality is undoubtedly essential to a good quality of life and as a protective factor for numerous diseases.²⁹ Considered one of the biological rhythms essential to human life, it is believed that humans cannot survive for long periods with sleep deprivation.³⁰ This circadian rhythm (which is repeated around 24 hours) is synchronized by endogenous processes of the nervous system and with the influence of the environment (light / dark). Thus, social activities such as work at night cause a "desynchronization" in the circadian rhythm of sleep and may lead to serious impairment of physiological and psychological functions.³¹ Given the above, in this study, night shift workers showed poorer sleep quality in relation to workers from other shifts. Nevertheless, differences with regard to duration were not found. Thus, daytime sleep does not seem to be satisfactory enough to repair the waking hours in nighttime activities. In addition, in research with retired workers, Guo et al³² found that the effects on sleep quality can return to normal levels after 20 years of shift work interruption. The authors reported that the first years are the most difficult times for shift workers for the adjustment of circadian rhythms.

Another factor to be considered in this process is the chronotype of each individual. The combination of genetic elements and sociodemographic, environmental and individual factors results in the preference for afternoon or morning social behaviors.³³ In this study, differences were identified in all shifts with respect to chronotype. However, in the sample analyzed, it was found that approximately 17% of night shift workers have morning characteristics and about 12% of workers who begin their activities at 7:30 am have afternoon characteristics. This misalignment can be reflected in work yield, sleep quality, social activities and increased risk of accidents.³⁴ Accordingly, when workers were asked if they had been absent from work for health reasons in the last year, approximately 32% of shift workers confirmed absenteeism. On the other hand, in the other work shifts, this percentage was lower. Thus, working in day shifts seems to cause fewer health problems and sick leaves than night shift.

When considering the entire sample, the percentage of morning and afternoon workers is similar to the findings of Lyons et al.³⁵ In this research, the sample was composed of students from a university in southern Brazil. Researchers identified from the application of this instrument¹⁹, 32% of afternoon, 54% of intermediate and 14% of morning characteristics, unlike 11.5%, 61.8% and 26.8% of this study, respectively. Thus, the morningness or eveningness trend may influence work and even the company time. This hypothesis is supported by the correlation between HO and company time (Figure 1) and contributes to explain that the chronotype distribution of this sample is different from the general population. Anyway, shift work based on chronotype may reduce the disruption of the circadian cycle and improve sleep and the potential long-term effects on workers' health.³⁶ Also with respect to issues related to workers' health, the adoption of risk behaviors also showed differences according to work shift. Cigarette smoking, for example, was statistically different among shifts. Among night workers, 21.6% of the sample declared themselves as smokers. This index is worrying, considering that in a national survey, this prevalence was 13%, the same percentage considering only the southern states of Brazil.³⁷ In addition, one third of 3rd shift workers reported excessive consumption of caffeinated beverages. Although the consumption of this substance plays a potential role in promoting alertness during waking periods, especially for night workers, its long-term effects are unclear.³⁸ Thus, there is no reason for healthy individuals who ingest caffeine within recommended levels to increase its consumption in order to improve alertness. With regard to sedentary behavior, the main differences were identified among workers of the general shift and shift workers. Those who have their work duties in usual times (morning and afternoon) have more time in sedentary behavior on weekdays. This inequality could be explained by the fact that shift workers have a time of day available for physical activities. However, this explanation was not confirmed in the analysis of physical activities. Only vigorous physical activity showed differences between the general shift and the 1st shift. In addition, the time of vigorous physical activity among 3rd shift workers were 75.5 (121.5) minutes. This analysis stems from the subjective perception of exertion in relation to the physical activity performed. Thus, it is believed that the work performed at night requires greater physical effort when performed by day workers. In addition, the analysis of walking and moderate activity time did not confirm the same differences found in sedentary behaviors. Nevertheless, in the analysis of preferences of physical and sports activities at leisure time, differences between the general shift and the 2nd shift were identified, with indexes of 4.2 (3.6) and 3.2 (3.5), respectively, which corroborates a recent research carried out with sample of Australian adults. In this research, shift workers reported doing less physical activity during leisure time.³⁹ Thus, this relationship deserves further clarification, as other factors may be associated with sedentary behavior on weekdays, among them, sociodemographic and psychosocial characteristics and type of work performed. Trying to find answers to these relationships, Saidj et al⁴⁰ evaluated 35,444 French workers and concluded that sedentary behaviors in the work environment may be associated with physical inactivity out of it. This could suggest that the fact of having a job with sedentary features such as administrative work is not compensated with active behavior outside work. However, researchers are

careful when analyzing these relationships, and, similarly, they add that other factors may influence sedentary behavior, including socioeconomic status and educational level.

In the company analyzed, for administrative sectors, mostly composed of workers of the general shift, higher education is required, but in operational positions, usually composed of shift workers, complete high school is enough. Thus, differences among shifts were also observed with respect to educational level and income. Thus, the income of shift workers was lower, which explains the increased demand for second job to supplement family income.

These factors may also explain differences in the preferences of leisure activities, especially in the touristic content. According to Marcellino¹³, knowing new places, people, cultures and landscapes positively impact workers' health. However, despite the improvements in income conditions in recent years, with significant increase in international flights⁴¹, representing greater access to tourism, the results of this study indicate that such activity is not yet configured as a routine among lower-income workers.

Also in relation to leisure content, although no differences among shifts were found, it is noteworthy that virtual leisure contents had higher preference among workers analyzed (Figure 2). Such activities have gained prominence in recent years with advances in technology, making it a cultural content of leisure²⁴, especially with digital games, internet and recently smartphones. Experts recommend caution in the use of these resources, because the consequences of their excess use are still unclear. However, one of the most accepted hypothesis is that their uncontrolled use can cause dependence⁴², psychological problems⁴³ and social isolation⁴⁴, which is in line with objects of leisure practices that are personal and social development and fun.⁴⁵

The present study showed improvements in the description of

differences in the work characteristics and health of industry workers. In addition, the use of EPL enabled the identification of leisure preferences in its different content of industry workers. Nevertheless, the main limitation of this study is the use of subjective measures of physical activity and sleep. Thus, new research with accelerometry and polysomnography are recommended to better explain this form of work and its consequences to minimize damages to workers' health.

CONCLUSION

The meaning of shift work goes beyond a simple choice to work during the day or night. Substantial consequences on aspects related to health, leisure and work were shown. Overall, the main differences have been identified in relation to night work, with more smoking, higher consumption of caffeinated beverages, sleep disorders and sick leave due to health problems.

Theoretically, having working hours less than usual (<44 hours), could create opportunities for workers a better use of leisure activities. However, the major inequalities found among shifts were only in artistic, physical-sport and touristic content. Thus, low pay can be a determining factor in this process.

Shift workers, in general, have lower income and educational level, thus requiring a second job to supplement income. In this way, more than the time available for activities, socioeconomic factors are determinant for leisure experiences.

Therefore, further studies on issues related to the work and leisure binomial should be carried out to better understand this relationship. In addition, the company should adopt specific actions of preventive behaviors and sleep hygiene of workers, especially those who work at night.

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