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ORIGINAL

Labor fatigue and work organization in a food factory, Aragua-Venezuela, 2023

Fatiga laboral y organización del trabajo en una fábrica de alimentos, Aragua-Venezuela, 2023

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ABSTRACT

The objective was to evaluate work fatigue and work organization in a food factory, in the state of Aragua, 2023. Research with a quantitative, field, descriptive, cross-sectional and correlational scope approach. The population was 135 workers and the sample was 101 workers, obtained by snowball sampling. The Yoshitake questionnaire (1978) modified by INSAT 1987 was applied. The statistical programs IBM SPSS ® Statistics Version 25 and EPIDAT were used. The sample was characterized using descriptive statistics and correlated by applying the chi-square and p-value tests. Results: The average age was 42,59 years, predominantly female; 44,6 % single; 52,5 % live with their partner.; 51,5 % have secondary education; the family burden is less than or equal to three members in 61,4 %; working workforce 80,2 % all under rotating shift schemes; 63,4 % have a length of service greater than 16 years; the travel time to the workplace is less than 30 minutes in 56,4 %; 62,38 % presented fatigue, in this group, 84,13 % with general symptoms of fatigue, followed by 9,52 % with mental fatigue, and 6,35 % physical fatigue. It is concluded that 62,4 % present mixed type work fatigue. Women, workers, those who live far away and those who worked shifts are more affected. There are no statistically significant differences between socio-occupational characteristics, shift work and the presence of fatigue.

Key words: Fatigue; Food Production; Occupational Health; Working Conditions and Occupational Health.

RESUMEN

El objetivo fue evaluar la fatiga laboral y organización del trabajo en una fábrica de alimentos, en el estado Aragua, 2023. Investigación con enfoque cuantitativo, de campo, descriptiva, corte transversal y alcance correlacional. La población fue de 135 trabajadores y la muestra de 101 trabajadores, obtenida por muestreo bola de nieve. Se aplicó el cuestionario Yoshitake (1978) modificado por INSAT 1987. Se utilizaron los programas estadísticos IBM SPSS ® Statistics Versión 25 y EPIDAT; se caracterizó la muestra mediante estadística descriptiva y se correlacionó aplicando la prueba del chi-cuadrado y p-valor. Resultados: La media de edad fue 42,59 años, predominando el sexo femenino; 44,6 % solteros; 52,5 % convive con su pareja.; 51,5 % posee educación media; la carga familiar es menor o igual a tres integrantes en 61,4 %; fuerza laboral obrera 80,2 % todos bajo esquemas a turnos rotativos; 63,4 % posee un tiempo de servicio mayor a 16 años; el tiempo de traslado al centro de trabajo es menor a 30 minutos en 56,4 %; 62,38 % presentaba fatiga, en este grupo, 84,13 % con síntomas generales de fatiga, seguido de 9,52 % con fatiga mental, y 6,35 % fatiga física. Se concluye que 62,4 % presenta fatiga laboral del tipo mixto. Siendo más afectados las mujeres, los obreros, los que viven alejados y los que trabajaban por turnos. No existen diferencias estadísticamente significativas

entre las características sociolaborales, turnicidad y la presencia de fatiga.

Palabras claves: Fatiga Laboral; Producción de Alimentos; Condiciones de Trabajo y Salud Ocupacional.

INTRODUCTION

In the context of the workplace, the conditions under which one works have a direct impact on one's physical and mental health. These conditions represent a significant area of influence for the worker, who can maintain a healthy state of mind and body by performing well and exerting effort in their work. Reinforcing the description provided previously, namely that negative interactions in the workplace can give rise to biochemical and neurohormonal changes, behavioral and emotional disorders that present a risk of mental or physical illness. In contrast, when these factors are in equilibrium, work fosters a sense of mastery and self-esteem, enhances motivation, work capacity, satisfaction, and improves health. (p.14)[1]

This definition implies a dynamic interaction between the individual and the working conditions, with the objective of maintaining satisfaction and ease in the performance of one's duties, However, with the advent of globalization, competitive processes, and the necessity for companies to meet production demands, changes have been imposed on working conditions that have the potential to pose risks to workers' health. Among these risks, although they are not physically visible, the most dangerous are psychosocial risks. Other aspects, such as working hours under shift work, have been primarily associated with signs and symptoms such as circadian rhythm alteration and fatigue. Consequently, circadian rhythm alteration impairs work performance due to the subsequent sleep deprivation, resulting in difficulty concentrating, reacting, and remembering. Additionally, workers experience diminished capacity to adapt to new situations due to the chronic fatigue to which they are subjected. Fatigue is defined as a subjective sensation of exhaustion, accompanied by a lack of energy and a tendency to avoid exertion. It can develop during physical or mental activity and tends to persist even after periods of rest.[2]

The presence of fatigue in people is dependent on both physical and mental exertion that causes discomfort, impairs their ability to react, and results in a lack of motivation to perform any task. This pathology can manifest in various ways, with potential consequences that can lead to further complications in the body. Additionally, it can result in accidents and weakness. Among the factors that contribute to work fatigue, and more specifically physical fatigue, are the incorrect organization of work; factors dependent on the individual himself, such as visual defects, pre-existing skeletal injuries and unsatisfactory ergonomic conditions and work environments.[3]

There are multiple consequences of labor fatigue, from the physical point of view, fatigue affects the worker's performance, as well as mentally their cognitive skills and abilities may be affected in terms of memory, attention and concentration. In the workplace, it can have a negative impact on organizational dynamics, employee performance, and therefore productivity.

In light of the aforementioned considerations, the objective of this study is to evaluate labor fatigue and work organization in a food factory in the state of Aragua in 2023.

METHOD

A quantitative, field-based, descriptive, cross-sectional, correlational study was conducted. The research was carried out in a Venezuelan food factory. The population was 135 workers, and the sample size was 101 participants (CI: 95 % Error: 0,5 %), the type of sampling was snowball. The Yoshitake Subjective Symptoms of Fatigue Questionnaire (1978) version 5, modified by INSAT in 1987, was employed as a data collection instrument. The instrument permits the identification and classification of fatigue and comprises 30 questions with dichotomous answers (Yes/No) that address three dimensions: The questionnaire comprises 30 questions, divided into three sections: 10 questions for mixed-type fatigue, 10 for mental fatigue, and 10 to characterize subjective symptoms of physical fatigue.[4]

The rating is expressed according to the following formula:

PSF = [N°. of items Yes / N°. of total items] • 100.

A state of fatigue is presumed to be present when 23 % (7 symptoms) is reached in women and 20 % (6 symptoms) in men. To determine the type of fatigue, the frequency of items is analyzed and compared between the different types. The instrument was identified with alphanumeric coding in order to maintain the confidentiality of the participants and to ensure that only the authors had access to the data. Data collection was carried out between June and August 2023 in the food company.

The statistical analysis was conducted using IBM® SPSS® Statistics Version 25 statistical software. The sample was characterized by descriptive statistics, and each of the independent variables corresponding to

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the socio-labor characteristics was correlated with the dependent variable, which was the determination of fatigue. The latter was assessed using the chi-square correlation coefficient test. The possible bias of this study was the factors of the family or community environment of the workers, which depending on the perception of each one could influence the answers of the Yoshitake Subjective Symptoms of Fatigue questionnaire, as well as the underlying pathologies.

RESULTS

Table 1 presents the sociodemographic and labor characteristics of the study group. The mean age of the participants was 42,59 ± 8,24 years, allowing for the grouping of individuals into two categories: those under 43 years of age and those 44 years of age and older. The average family workload was 3,02, while the average length of service was 15,37 years, and the average time to get to work was 35,40 minutes. Of the total number of respondents, 54,5 % were over the age of 44. In the second position, the female sex is in the majority with a percentage of 58,4 %. Another factor to consider is marital status. Of the respondents, 44,6 % indicated that they were single, while 52,5 % reported living with a partner. In terms of educational attainment, 51,5 % of respondents have completed diversified education, 13,8 % have obtained higher technical education, and 22,8 % have completed university education. On the other hand, 61,4 % of the family burden is less than or equal to three members. The labor force is predominantly blue-collar, comprising 80,2 % of the total workforce. Furthermore, 80,2 % of workers are engaged in rotating shifts. In terms of seniority, 63,4 % of the respondents have accumulated more than 16 years of service. Finally, 56,4 % of the workers spend less than 30 minutes commuting to work.

Table 1. A socio-labor characterization of workers in a food factory in Aragua, Venezuela, in 2023

Variable	Characteristic	Frequency	%
Age	Equal to or less than 43 years old	46	45,5 %
	44 years old or more	55	54,5 %
Sex	Male	42	41,6 %
	Female	59	58,4 %
Marital Status	Single	45	44,6 %
	Married	33	32,7 %
	Divorced	3	3,0 %
	Cohabitant	20	19,8 %
Cohabitation with a partner	Cohabits with partner	53	52,5 %
	Does not cohabit with partner	48	47,5 %
Educational attainment	Basic	2	2,0 %
	Intermediate	52	51,5 %
	Higher Technician	24	23,8 %
	College	23	22,8 %
Family burden	3 or less	62	61,4 %
	4 or more	39	38,6 %
payroll type	Worker	81	80,2 %
	Employee	20	19,8 %
Rotating Shifts	yes	81	80,2 %
	No	20	19,8 %
Seniority	Less than 15 years	37	36,6 %
	Over 16 years	64	63,4 %
Commuting	Less than 30min	57	56,4 %
	Over 30min	44	43,6 %

Table 2. Fatigue and type of fatigue identified in a food factory, Aragua- Venezuela 2023

		Fatigue (n=101)		Type of Fatigue (n= 63)					
				Mixed Fatigue		Mental Fatigue		Physical Fatigue	
		f	%	f	%	f	%	f	%
Fatigue	yes	63	62,38 %	53	84,13 %	6	9,52 %	4	6,35 %
	No	38	37,62 %						
Total		101	100 %						

Regarding the identification of subjective symptoms of fatigue and the type of fatigue identified, table 2 shows that fatigue was present in 62,38 % (n: 101) of the workers; likewise, it was evident that the predominant type of fatigue was type 1 or general symptoms of fatigue with 84,13 % (n: 63), followed by mental fatigue in 9,52 % (n: 63) and finally physical fatigue in 6,35 % (n: 63).

Table 3. Identification of the type of fatigue according to socio-labor characteristics in a food factory, Aragua-Venezuela, 2023

Variable	Characteristics	Type of Fatigue					
		Mixed Fatigue		Mental Fatigue		Physical Fatigue	
		f	%	f	%	f	%
Age	Equal to or less than 43 Years Old	26	49,06 %	5	83,33 %	2	50,00 %
	44 years old and over	27	50,94 %	1	16,67 %	2	50,00 %
	Total	53	100,00 %	6	100,00 %	4	100,00 %
Sex	Male	22	41,51 %	0	0,00 %	1	25,00 %
	Female	31	58,49 %	6	100,00 %	3	75,00 %
	Total	53	100,00 %	6	100,00 %	4	100,00 %
Marital Status	Single	23	43,40 %	2	33,33 %	1	25,00 %
	Married	17	32,08 %	3	50,00 %	2	50,00 %
	Divorced	1	1,89 %	0	0,00 %	0	0,00 %
	Cohabitant	12	22,64 %	1	16,67 %	1	25,00 %
	Total	53	100,00 %	6	100,00 %	4	100,00 %
Cohabitation with partner	Cohabits with Partner	29	54,72 %	4	66,67 %	3	75,00 %
	Does not cohabits with partner	24	45,28 %	2	33,33 %	1	25,00 %
	Total	53	100,00 %	6	100,00 %	4	100,00 %
Educational Attainment	Intermediate	31	49,20 %	0	0,00 %	3	4,80 %
	Higher Technician	11	17,50 %	2	3,20 %	1	1,60 %
	College	11	17,50 %	4	6,30 %	0	0,00 %
	Total		84,10 %		9,50 %		6,30 %
Family Burden	3 or less	28	44,40 %	5	7,90 %	1	1,60 %
	4 or more	25	39,70 %	1	1,60 %	3	4,80 %
	Total		84,10 %		9,50 %		6,30 %
Payroll Type	Worker	44	69,80 %	1	1,60 %	4	6,30 %
	Employee	9	14,30 %	5	7,90 %	0	0,00 %
	Total		84,10 %		9,50 %		6,30 %
Rotating Shifts	yes	47	74,60 %	1	1,60 %	2	3,20 %
	No	6	9,50 %	5	7,90 %	2	3,20 %
	Total		84,10 %		9,50 %		6,30 %
Seniority	Less than 15 years	21	33,30 %	5	7,90 %	0	0,00 %
	Over 16 years	32	50,80 %	1	1,60 %	4	6,30 %
	Total		84,10 %		9,50 %		6,30 %
Commuting	Less than 30min	25	39,70 %	5	7,90 %	2	3,20 %
	Over 30min	28	44,40 %	1	1,60 %	2	3,20 %
	Total		84,10 %		9,50 %		6,30 %

Table 4. Socio-labor characteristics and statistical correlation with the presence of fatigue in a food factory, Aragua-Venezuela, 2023

Variable	Characteristics	Fatigue (n=63)	%	No Fatigue (n=38)	%	P	Chi square
Age	Equal to or less than 43 Years Old	33	32,7 %	13	12,9 %	0,11	
	44 years old and over	30	29,7 %	25	24,8 %		3,15
	Total	63	62,4 %	38	37,6 %		
Sex	Male	23	22,8 %	19	18,8 %	0,26	
	Female	40	39,6 %	19	18,8 %		1,77
	Total	63	62,4 %	38	37,6 %		
Marital Status	Single	26	25,7 %	19	18,8 %	0,51	0,73
	Married	22	21,8 %	11	10,9 %	0,68	0,38
	Divorced	1	1,0 %	2	2,0 %	0,65	0,27
	Cohabitant	14	13,9 %	6	5,9 %	0,59	0,61
	Total	63	62,4 %	38	37,6 %		

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Cohabitation with Partner	Cohabits with partner	36	35,6 %	17	16,8 %	0,31	
	Does not cohabits with partner	27	26,7 %	21	20,8 %		1,46
	Total	63	62,4 %	38	37,6 %		
Educational Attainment	Intermediate	34	33,7 %	18	17,8 %	0,66	0,63
	Higher Technician	14	13,9 %	10	9,9 %	0,82	0,21
	College	15	14,9 %	8	7,9 %	0,94	0,98
	Total	63	62,4 %	38	37,6 %		
Family Burden	3 or less	34	33,7 %	28	27,7 %	0,07	
	4 or more	29	28,7 %	10	9,9 %		3,88
	Total	63	62,4 %	38	37,6 %		
Payroll Type	Worker	49	48,5 %	32	31,7 %	0,59	
	Employee	14	13,9 %	6	5,9 %		0,61
	Total	63	62,4 %	38	37,6 %		
Rotating Shifts	Yes	50	49,5 %	31	30,7 %	0,98	
	No	13	12,9 %	7	6,9 %		0,07
	Total	63	62,4 %	38	37,6 %		
Seniority	Less than 15 years	26	25,7 %	11	10,9 %	0,30	
	Over 16 years	37	36,6 %	27	26,7 %		1,55
	Total	63	62,4 %	38	37,6 %		
Commuting	Less than 30min	32	31,7 %	25	24,8 %	0,20	
	Over 30min	31	30,7 %	13	12,9 %		2,16
	Total	63	62,4 %	38	37,6 %		

Tabla 5. Distribución de respuestas al Cuestionario de Síntomas subjetivos de Fatiga de H. Yoshitake (1978) versión 5, por sexo, en una fábrica de alimentos, Aragua-Venezuela, 2023

Nro.	Queation	Male (n=23)				Female (n=40)			
		Yes		No		Yes		No	
		f	%	f	%	f	%	f	%
1	Do you feel heaviness in the head?	8	34,8 %	15	65,2 %	15	37,5 %	25	62,5 %
2	Do you feel body fatigue?	20	87,0 %	3	13,0 %	30	75,0 %	10	25,0 %
3	Do you feel tired legs?	19	82,6 %	4	17,4 %	29	72,5 %	11	27,5 %
4	Do you feel like yawning?	18	78,3 %	5	21,7 %	25	62,5 %	15	37,5 %
5	Do you feel confused, dazed?	6	26,1 %	17	73,9 %	8	20,0 %	32	80,0 %
6	Do you feel eyestrain?	15	65,2 %	8	34,8 %	29	72,5 %	11	27,5 %
7	Do you feel stiffness or clumsiness in your movements?	0	0,0 %	23	100,0 %	6	15,0 %	34	85,0 %
8	Do you feel sleepy?	19	82,6 %	4	17,4 %	32	80,0 %	8	20,0 %
9	Do you become restless when standing?	10	43,5 %	13	56,5 %	19	47,5 %	21	52,5 %
10	Do you feel like lying down?	17	73,9 %	6	26,1 %	27	67,5 %	13	32,5 %
11	Do you have difficulty thinking?	6	26,1 %	17	73,9 %	11	27,5 %	29	72,5 %
12	Do you get tired when you talk?	1	4,3 %	22	95,7 %	7	17,5 %	33	82,5 %
13	Are you nervous?	1	4,3 %	22	95,7 %	4	10,0 %	36	90,0 %
14	Do you feel unable to focus?	2	8,7 %	21	91,3 %	7	17,5 %	33	82,5 %
15	Do you feel unable to pay attention to anything?	1	4,3 %	22	95,7 %	7	17,5 %	33	82,5 %
16	Do you forget things easily?	6	26,1 %	17	73,9 %	19	47,5 %	21	52,5 %
17	Have you lost your self-confidence?	2	8,7 %	21	91,3 %	5	12,5 %	35	87,5 %
18	Do you feel anxious?	10	43,5 %	13	56,5 %	15	37,5 %	25	62,5 %
19	Do you maintain incorrect body positions?	13	56,5 %	10	43,5 %	30	75,0 %	10	25,0 %
20	Do you lose patience easily?	6	26,1 %	17	73,9 %	20	50,0 %	20	50,0 %
21	Do you suffer from headaches?	5	21,7 %	18	78,3 %	19	47,5 %	21	52,5 %
22	Do you feel numbness in your shoulders?	8	34,8 %	15	65,2 %	24	60,0 %	16	40,0 %
23	Do you have back pain?	19	82,6 %	4	17,4 %	30	75,0 %	10	25,0 %

24	Do you have difficulty breathing?	2	8,7 %	21	91,3 %	6	15,0 %	34	85,0 %
25	Are you thirsty?	17	73,9 %	6	26,1 %	19	47,5 %	21	52,5 %
26	Do you feel grogginess?	5	21,7 %	18	78,3 %	12	30,0 %	28	70,0 %
27	Do you feel your voice hoarse?	6	26,1 %	17	73,9 %	7	17,5 %	33	82,5 %
28	Are your eyelids trembling?	5	21,7 %	18	78,3 %	9	22,5 %	31	77,5 %
29	Do your legs or arms tremble?	5	21,7 %	18	78,3 %	3	7,5 %	37	92,5 %
30	Do you feel sick?	3	12,5 %	21	87,5 %	8	20,0 %	32	80,0 %

Table 4 provides a detailed account of the sociolabor characteristics in relation to the presence of fatigue, accompanied by a comprehensive analysis of the statistical correlation. Table 3 presents a comprehensive overview of the distribution of sociolabor characteristics and the identified types of fatigue. Thus, 52,4 % were under 43 years of age, 63,5 % were female, 41,3 % were single and 57,1 % lived with their partner, while 54 % of the individuals with fatigue had a high level of education; 54 % had a family of 3 or less members, 77 % of the fatigued individuals were workers and 22,2 % were employees; 79,4 % worked under shift work, and 58,7 % had more than 16 years of seniority. Finally, 50,8 % had a commute time of less than 30 minutes. For all sociolabor variables, type 1 fatigue or general fatigue symptoms (mixed fatigue) predominated. Table 5 shows that women were more likely to report symptoms related to attention, visual fatigue, speech fatigue, and grogginess.

CONCLUSIONS

The study concluded that 62,4 % of the population exhibited work fatigue, with a clear prevalence of the mixed type. Female workers exhibited greater fatigue levels. Regarding the type of payroll, blue-collar workers are more fatigued than employees and workers who have a longer commute time from home to the workplace. A greater proportion of workers on rotating shifts report feeling fatigued. There were no discernible variations in sociolabor characteristics, shiftiness, and the presence of fatigue.

RECOMMENDATIONS

- Implement mental health programs in the work center, which allow monitoring and timely channeling of those cases with psychosocial risk factors.
- Apply instruments to evaluate psychosocial dimensions, such as the ISTAS21 instrument, which evaluates six psychosocial dimensions: psychological demands; active work and development possibilities; insecurity; social support and quality of leadership; dual presence; and esteem.
- Evaluate and optimize factors associated with the work environment.
- Promote active breaks for food factory workers.
- Encourage activities aimed at recreation outside of work.
- It is recommended that the application of job satisfaction questionnaires be considered in this population.

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CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

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