

HEALTH STATUS AMONG WORKERS FROM A CATERING COMPANY: ASSOCIATION BETWEEN SUBJECTIVE AND OBJECTIVE MEASURES

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Abstract

Introduction: The work environment is crucial for health promotion, making it essential to conduct health assessments of workers to reduce absenteeism and ensure safe workplaces. **Objectives:** Characterize subjective health measures (occupational stress, self-perception of health, occupational motivation) and examine their association with objective health measures (BMI, blood pressure, basal glucose, basal cholesterol) among workers in a catering company. **Method:** A total of 163 participants from a Portuguese catering company were included. Subjective measures were collected via an Microsoft Forms questionnaire, and objective indicators were measured by trained nurses. Data was collected in March 2023 and analyzed using descriptive statistics, cluster analysis, and logistic regression in SPSS. **Results:** Showed 43.6% of participants reported high work-related stress, 84% felt physically better than the previous year, and there was satisfaction across all dimensions of professional motivation. Significant differences were found between occupational stress and satisfaction with supervision, physical environment, benefits, participation, and intrinsic factors. **Conclusion:** Characterizing the health status of participants was useful for guiding activities of the occupational health department, aligning with existing epidemiological studies. Addressing occupational stress in organizations is crucial, as it affects employee motivation and productivity. No significant differences were found between objective and subjective health measures.

Keywords: Non-Communicable Diseases; Chronic Diseases; Occupational Health; Health promotion, Health Prevention.

Introduction

Disease prevention and health promotion

The global burden of major non-communicable diseases (NCDs) such as stroke, cancer, chronic respiratory diseases, and diabetes extends beyond individual suffering to impact not only the quality of life of affected individuals and their families but also the broader socio-economic fabric of nations. Evidence strongly suggests that addressing modifiable risk factors is pivotal in reducing this burden. Prevention strategies are therefore of paramount importance (WHO, 2008).

NCDs, also known as chronic diseases, are characterized by their prolonged duration and arise from a complex interplay of genetic, physiological, environmental, and behavioural factors (WHO, 2022).

In Portugal, the latest data reveals a significant prevalence of NCDs, with cardiovascular diseases claiming 17.9 million lives annually, followed by cancer (9.3 million), chronic respiratory diseases (4.1 million), and diabetes (2.0 million) (WHO, 2022).

Chronic diseases have long been recognized as a global health challenge (Conn *et al.*, 2009; Geneau *et al.*, 2010; Strong, Mathers, Leeder, & Beaglehole, 2005). Unhealthy lifestyle practices, including malnutrition, inadequate nutrition, physical inactivity, excessive alcohol use, smoking, poor dietary choices, and physical inactivity significantly contribute to the burden of chronic diseases and affect population health outcomes (Sorensen *et al.*, 2011; WHO, 2002; Ng *et al.*, 2020). These interventions can substantially reduce the risk of various health issues, including an 80% reduction in premature heart disease, an 80% decrease in the risk of stroke, an 80% lower risk of type 2 diabetes, and a 40% decrease in the risk of cancer (WHO, 2009).

Furthermore, these chronic diseases share common modifiable risk factors, including alcohol consumption, body mass index (BMI), smoking, an unhealthy diet, and physical inactivity. These factors, all within an individual's control, are collectively responsible for more than two-thirds of these diseases (Ng, 2020; World Health, 2014; Beaglehole, 2011; Kearns, 2014).

Analyzing a report on the primary causes of death in Portugal, with data from 2015, it was possible observe that circulatory system diseases accounted for 29.8% of deaths, followed by malignant neoplasms at 24.5%, diseases of the respiratory system at 12.4%, and endocrine, nutrition, and metabolic diseases at 5.3% (INE, 2017b).

The most recent statistics for Portugal, published in 2023 for the year 2021, indicated that circulatory system diseases continue to be the leading cause of death, with 25.9% in 2021, a slight decrease from 2017 (INE, 2023). Malignant tumour diseases accounted for about 22.1% of deaths in 2021, showing a decrease compared to 2017 (INE, 2023). The COVID-19 pandemic, which swept the world, became the third leading cause of death in 2021, accounting for 10.4% (INE, 2023). Respiratory system diseases ranked as the fourth most common cause of death in 2021 at 8.2%, also demonstrating a decrease compared to 2017 (INE, 2023).

Occupational health promotion

To effectively promote the health of the workforce, it is essential to focus on occupational health, an interdisciplinary field (Council, 1989). The work environment plays a fundamental role in promoting health and preventing disease (WHO, 2004), and it is considered essential to carry out health assessments of the working class, promoted by employers, in order to reduce absenteeism and guarantee safe and healthy workplaces. Internationally, workplaces have been recognized as important settings for health promotion, as they cover a substantial part of the adult population and offer an ideal platform for health initiatives (Hymel *et al.*, 2011; Services, 2010; Sorensen *et al.*, 2011). Workplace-focused programs have the potential to reach a wide audience that may not engage in other health promotion efforts (Goetzel & Ozminkowski, 2008). In addition, workplaces allow for the customization of health programs and messages to meet the specific needs of various industries and demographic groups (Cancelliere *et al.*, 2011; Conn *et al.*, 2009; Hymel *et al.*, 2011; Kirk-Brown & F. Brown, 2003). In short, the workplace is an ideal setting for diagnosing and providing structured and planned activities to improve workers' health (WHO, 2009).

Occupational Stress

Actually, there have been several changes in the world of work, with increasing evidence that psychosocial stress at work is associated with a greater risk of various health problems (Barreto & Figueiredo, 2009; Sorensen *et al.*, 2011)

Stress at work can be conceptualized in two theoretical models, the job strain model (Karasek, 1979) (the combination of high job demands and low job control) and the effort-reward imbalance (ERI) model (Siegrist, 1996) (the combination of high effort and low rewards, in terms of salary, appreciation, job security and promotion prospects). In both models of occupational stress, the prevalence of chronic diseases such as coronary heart disease, stroke and diabetes is predicted in large-scale cohort studies. An additive effect of job strain on the risk of coronary heart disease has previously been established. It is also reported that occupational stress can influence average life expectancy by 0.6 to 0.8 years less without chronic diseases from age 50 to 75, respectively, compared to those without job strain (Sørensen *et al.*, 2022).

Self-Perception of Health

Self-perceived health is defined as an individual's perception of their current physical condition a measure that has been useful for research. Higher levels of perceived health status were found to be related to robustness, social support, and self-care practices. Age, health promotion activities, the ability to tolerate stress and health related hardiness a were also related to better perceived health status (Brooks, 2008). Older people more frequently reported their health as poor and very poor compared to those younger than 25 years of age (Kaleta, Polanska, Dziankowska-Zaborszczyk, Hanke, & Drygas, 2009)

In addition, men seem to have a poorer perception of their health status compared to women, after adjustment for confounders. A self-perceived poor health status may have some association with the existence of one or more chronic diseases (Barreto & Figueiredo, 2009).

Occupational health and well-being

There is a growing intention on the part of companies to increasingly recognize that their employees are fundamental to achieving organizational success together (Kother, 2000). Studies show that companies that are concerned about the happiness and well-being of their employees provide an organizational climate that stimulates a feeling of satisfaction in employees, leading them to carry out their activities with greater commitment, quality and creativity. The success of organizations can lie in the individuals who are part of it, if they are happy in the work they do (Fisher, 2010).

Health and well-being at work has a strong and significant impact on employee behaviour, reducing their intention to leave the company. The more the company takes care to provide a healthy work environment that is exciting and interesting, the more committed employees will be, with more organizational citizenship behaviours and less intention of leaving the company (Rodrigues, 2021).

The aims of this study were: to characterize health status among workers from catering company; and to study the association between their subjective (occupational stress, self-perception of health status, occupational motivation) and objective (body mass index, systolic and diastolic blood pressure, basal blood glucose, basal cholesterol) measures.

Materials and Methods

Study design/type

This is a descriptive cross-sectional study as information was collected on everyone at a point in time on the frequency and distribution of variables related to the process of the population under study (Buchalla, 2017).

Population and Sample

This study was carried out in one of the largest catering companies in Portugal, with individuals from the greater Porto and Lisbon areas. The individuals who took part in the study had the following workplaces: the company's head office and delegation, where they perform administrative and office duties; the catering units where individuals perform operational duties (cooks, canteen workers, kitchen assistants, among others). In this sense, considering having participants from all the company's functions and also from the north and south of the country, making a more heterogeneous sample.

The sample for this study was obtained through convenience sampling. This sampling technique is characterized by being non-probabilistic and non-random and is used to create samples according to the ease of access to individuals. From all population (n=3.200), 163 volunteered to take part in this study.

Data collection

Subjective measures

This study took place during the COVID-19 pandemic (May 2021). During this period, physical contact with individuals was restricted, and thus some indicators were collected digitally through a questionnaire on Microsoft forms.

The food consumption data was collected in person by nutritionists duly trained for this purpose and, in cases where this was not possible, it was collected by telephone interview. The tool used was a Food Frequency Questionnaire (FFQ) related to the last 3 months that was validated for the Portuguese population (Lopes, Aro, Azevedo, Ramos, & Barros, 2007). To study the individuals' food consumption, it was necessary to convert the consumption frequencies indicated in the FFQ into g and mg of each macro and micro-nutrient, as well as the food groups. This conversion was carried out by the Instituto de Saúde Pública da Universidade do Porto (ISPUP). To understand adherence to the Mediterranean dietary pattern, the Mediterranean Diet Score (MDS) was used. For the MDS, it was necessary to calculate the median consumption of the following food groups: leguminous, cereals, fruit and oilseeds, vegetables, meat and meat products, dairy products, alcohol and the ratio of monounsaturated fatty acids to saturated fatty acids. These values were then analyzed, with the study population's consumption of each of the food groups below the median getting a score of 0 and values

equal to or above the median consumption getting a score of 1. Alcohol, on the other hand, had the opposite score, i.e. consumption values below the median got a score of 1 and above the median 0. By the sum of these values, a score between 0 and 8 was obtained for each participant. The closer it is to 8, the better is these individuals' adherence to the Mediterranean dietary pattern (Trichopoulou *et al.*, 1995).

All participants had to formally register for the program and then receive a link in their email to access the digital questionnaire that would collect the following data below: socio-demographic (age, sex, geographical area, academic qualification, No. adults in the household, No. children in the household, No. of elderly in the household); life style (commuting time home-work, smoking habits, average hours sleep per night, sleep quality and chronic diseases, physical activity habits (International Physical Activity Questionnaire (IPAQ) (Hagströmer *et al.*, 2006)), eating habits questions (meals per day, meal location and commensality); occupational stress (Questionnaire of Occupational Stress – General Version (QSO-VG) (Gomes, 2010); self-perception of health status (Questionnaire Self-assessment of health and physical well-being); occupational motivation (S20/23 questionnaire of Melià e Peiró in 1989 (Dias Pocinho & Costa Garcia, 2008).

Objective measures

The objectively measured health status indicators: body mass index, abdominal circumference, systolic and diastolic blood pressure, baseline blood glucose and baseline blood cholesterol were collected in person, by qualified and trained nurses, in the occupational health office of the catering company.

The weight and height indicators were assessed with the individuals barefoot (without socks), with minimal clothing and light, so that it was possible to see their body position. To measure height, the subjects stood in an anatomical position with their legs, buttocks and head against the stadiometer, their face facing forward in the Frankfurt plane. The stadiometer holder was positioned on the individual's head to press down on their hair. The health professional who was measuring stood exactly in front of the measuring equipment, which was taken to the nearest centimetre on a scale of 0.1cm (Lohman *et al.*, 1988). About weight, duly calibrated scales were used, placed on a flat floor, and the individuals were placed in an anatomical position with their faces in the Frankfurt plane, and the weight value was recorded on a 0.01kg scale (Lohman *et al.*, 1988).

A digital monitor sphygmomanometer was used to measure the participants' systolic and diastolic blood pressure. Initially, the measurement was explained to the participants. When taking the measurement, the nurses made sure that the participants did not have a full bladder, did not exercise, did not drink alcohol, coffee or smoke in the 30 minutes before the measurement. The participants were then asked to remove their shirts so that the cuff could be placed firmly about 2 to 3 cm above the cubital fossa, centring the inflatable bag over the brachial artery (Mancia *et al.*, 2007).

To carry out the peripheral glucose and basal cholesterol measurements, the nursing team used the following protocol: explaining to the participants the measurements they were going to take and their respective critical limits, connecting the measuring device and checking that it was calibrated and ready for use, putting on sanitized gloves, disinfecting the participant's digital pulp of choice with absorbent cotton soaked in 70% alcohol and waiting for it to dry, checking the validity of the test strip after inserting it into the device. After inserting the test strip into the device, avoiding touching the reagent part, lance the digital pulp and collect a drop of blood on the reagent strip, for the glycemic reading, wait the necessary time for the device to take the reading, finally press the puncture site enough to stop the bleeding, take the glycemic index reading and clean the patient's finger with absorbent cotton soaked in 70% alcohol and then dry it. The same measuring equipment was used for these two measurements, only the strips with reagents for basal glucose testing and the strips with reagents for basal cholesterol differed (Reis, 2021).

Data Analysis

All data collected in this study were analyzed using IBM SPSS® version 24 software.

A database was created with the subjective and objective measured health status indicators of all participants. This database was anonymized, cleaned, and structured.

Initially, a descriptive statistical analysis was carried out to find out the main characteristics of the participants in the study, through mean, standard deviation (cardinal variables), and the number of individuals and percentages (nominal variables). This characterization included socio-demographic variables (age, gender, geographical area, educational qualifications, number of adults, children and elderly people in the household) and lifestyle variables (commuting time, smoking habits, average hours of sleep per night, quality of sleep, chronic illnesses, physical activity habits, food consumption). Next, the individuals under study were characterized in terms of the variables under study: occupational stress, self-perception of health status and occupational motivation.

In order to verify the objective health status of the individuals under study, the objective measures were also characterized using the mean and standard deviation. To enable a more detailed analysis of the data, these indicators were characterized and parameterized according to current bibliography.

Abdominal circumference was divided between men and women into the Normal and High categories respectively (DGS, 2013a, 2017). BMI was analyzed according to the categories Leanness, Normoponderal, Pre-obesity, Obesity (DGS, 2013a) Systolic Blood Pressure and Diastolic Blood Pressure were categorized as Optimal, Normal, Normal-high, Hypertension-I, Hypertension-II, Hypertension-III (DGS, 2013b). Basal Blood Glucose was analyzed according to the categories Normal, Pre-diabetes, Diabetes (DGS, 2011). Basal Blood Cholesterol was categorized as Normal and High (DGS, 2017)

To verify the homogeneity among the individuals under study and achieve a division into groups with similar characteristics, a cluster analysis was conducted using Z-scores of the variables that study topics such as occupational stress, self-perception of health status and occupational motivation. It was possible to divide the individuals into two cluster groups. The groups were characterized based on sociodemographic characteristics (age; sex; geographic area; academic qualifications; no adults, children and elderly in household), and their possible associations were studied using the Mann-Whitney statistical test due to the variables being nominal. To understand the potential existence of an association between the two cluster groups and the variables study regarding occupational stress, self-perception of health status, and occupational motivation, a Mann-Whitney test was conducted.

There was also a characterization of the two cluster groups concerning objective measures, and their association was assessed using Mann-Whitney tests (categorical variables) and chi-square tests (cardinal variables).

Finally, a logistic regression was conducted involving characterization variables under study by the two cluster groups with the aim of understanding the differences between the groups of clusters in relation to the characterization variables such as: gender, educational qualifications, geographical area, age, quality of hours of effective sleep, chronic diseases suffered, smoking habits, health indicators collected (objective measures).

Ethical Approval

The present study was approved by the data protection and the ethics committees of the University of Porto in July 2019 (Report n°83/CEUP/2019). All individuals willing to participate received information about the purpose of the study, so that they could give their written consent.

Results

Participants' characterization

Analyzing the data described in Table 1, it was possible to observe that the participants in this study had an average age of 40.41 (sd:10.57) years, 84.1% were female, 64.6% were from the north of Portugal and 36.2% had higher education qualifications. Most individuals had no smoking habits (80.4%), and referred quality of sleep hours to be good (54%). A high proportion of participants (74.2%) reported not suffering from any chronic disease.

Table 1. Socio-demographic and life style characterization of the participants – working age adults from a catering company, 2021

Characterization	
Total (n)	163
Socio-Demografic	
Age (in years)	
Mean (Std Deviation)	40.41 (10.57)
Sex (%)	
Female	84.1
Male	15.9
Geographical Area (%)	
North	64.6
South	35.4
Academic qualifications (%)	
1st Cycle	4.3
2nd Cycle	11.0
3rd Cycle	18.4
Secondary	25.2
Post-Secondary	4.9
Higher Education	36.2
No. Adults in the household (n)	
Mean (Std Deviation)	2.33 (0.99)
No. of children in the household (n)	
Mean (Std Deviation)	0.79 (0.95)
No. of elderly household (n)	
Mean (Std Deviation)	0.18 (0.49)
Life Style	
Commuting time Home-Work (min)	
Mean (Std Deviation)	57.32 (41.24)
Smoking Habits (%)	
No	80.4
Yes	19.6
Average Hours Sleep per Night (h)	
Mean (Std Deviation)	6.66 (1.09)

Sleep Quality (%)					
	Excellent				5.5
	Very Good				14.7
	Good				54.0
	Bad				24.5
	Very Bad				1.2
Chronic Diseases (%)					
	Hypertension				7.4
	Hypercholesterolemia				4.9
	Occupational stress				6.7
	None previous				74.2
	Diabetes+1other				2.5
	+ 1 of the above				4.7
Physical Activity Habits					
	Mean (Std Deviation)				129.28 (117.08)
Lowest (N (%))	14 (100)	Moderate	0	High	0
Food Consumption (Mediterranean Diet Score - MDS)					
	Mean (Std Dev)				4.23 (1.72)
Tercil 1 Mean (Std Dev)	2.41 (0.76)	Tercil 2 Mean (Std Dev)	4.54 (0.50)	Tercil 3 Mean (Std Dev)	6.50 (0.83)

When analyzing the values obtained in relation to occupational stress, it was possible to observe that most individuals (43.7%), indicated that in general their professional activity causes them high stress. In terms of their perception of health status, individuals generally reported feeling worst than in the previous year, except for their physical function, which indicates a slight improvement. Additionally, in terms of their overall state of health, they reported feeling better than in the previous year (Table 2). In terms of motivation, they were satisfied (Table 2).

Table 2 Occupational Stress, Self-perception of health status and Occupational Motivation - working age adults from a catering company, 2021

Total (n)		163		
Occupational Stress	Mean (Std Dev)	N (%)		
		Stress-free	Moderate Stress	High Stress
In general terms my professional activity provokes me	2.34 (0.88)	25 (15.3)	67 (41.1)	71 (43.6)
1.Relationship with users	0.92 (1.024)	89 (54.6)	73 (44.8)	1 (0.6)
2.Relationship with supervisors	1.51 (1.044)	47 (28.8)	109 (66.9)	7 (4.3)
3.Relationship with colleagues	1.50 (1.096)	50 (30.7)	104 (63.8)	9 (5.5)
4. Overload of work	1.20 (1.078)	69 (42.3)	90 (55.2)	4 (2.5)

Total (n)		163		
Occupational Stress	Mean (Std Dev)	N (%)		
		Stress-free	Moderate Stress	High Stress
5. Career and remuneration	1.36 (0.986)	54 (33.1)	107 (65.6)	2 (1.2)
6. Family problems	1.40 (1.022)	53 (32.5)	106 (65.0)	4 (2.5)
7. Work conditions	1.36 (1.059)	57 (35.0)	101 (62.0)	5 (3.0)
Self-perception of health status	Mean (Std Dev)	N (%)		
		worst	Little better	Best
1. Physical Function	27.52 (3.30)	26 (16)	137 (84)	0
2. Physical performance	17.27 (3.29)	163 (100)	0	0
3. Pain	4.71 (2.20)	163 (100)	0	0
4. General health	15.93 (2.18)	163 (100)	0	0
5. Vitality	12.00 (1.71)	163 (100)	0	0
6. Social Function	6.09 (0.86)	163 (100)	0	0
7. Emotional performance	17.27 (3.28)	163 (100)	0	0
8. Mental health	16.68 (1.82)	163 (100)	0	0
9. Health status	117.47 (8.81)	0	0	163 (100)
Occupational Motivation	Mean (Std Dev)	N (%)		
		Dissatisfied	Indifferent	Satisfied
1.Satisfaction with supervision	5.29 (1.04)	7 (5.5)	5 (3.9)	116 (90.6)
2.Satisfaction with the physical environment	4.95 (1.14)	12 (10.1)	7 (5.9)	100 (84)
3.Satisfaction with the benefits	4.48 (0.98)	13 (16)	13 (16)	55 (67.9)
4.Intrinsic satisfaction	4.99 (1.00)	8 (7.19)	6 (5.4)	98 (87.5)
5.Satisfaction with participation	5.17 (0.90)	4 (3)	15 (11.3)	114 (85.7)

Analyzing the characterization of the individuals under study at the level of their health status in Table 3, it is observed that most of them were within the parameters considered normal. It should be noted that 23.4% of the study sample were obese, 0.6% had diabetes and 46.3% had high cholesterol.

Table 3. Health status objective measures - working age adults from a catering company, 2021

Objective Measures							
Abdominal Circumference (cm)	Mean (Std Dev)	N (%) Men			N (%) Women		
		Normal	High	Normal	High		
	87.99 (14.65)	6 (24.0)	19 (76.0)	54 (39.7)	82 (60.3)		
Body Mass Index (BMI) (kg/m)	Mean (Std Dev)	N (%)					
		Leanness	Normoponderal	Pre-Obesity	Obesity		
	26.91 (5.23)	2 (1.3)	77 (48.7)	42 (26.6)	37 (23.4)		
Systolic Blood Pressure (mmHg)	Mean (Std Dev)	N (%)					
		Optimal	Normal	Normal -High	Hypertension- I	Hypertension - II	Hypertension -III
	128.88 (16.61)	44 (27.3)	41 (25.5)	39 (24.2)	30 (18.6)	4 (2.5)	3 (1.9)
Diastolic Blood Pressure (mmHg)	Mean (Std Dev)	N (%)					
		Optimal	Normal	Normal -High	Hypertension- I	Hypertension - II	Hypertension -III
	83.83 (44.99)	74 (46)	30 (18.6)	25 (15.5)	28 (17.4)	2 (1.2)	2 (1.2)
Basal Blood Glucose (mmol/L)	Mean (Std Dev)	N (%)					
		Normal	Pre-Diabetes	Diabetes			
	96.58 (22.11)	155 (96.30)	5 (3.1)	1 (0.6)			
Basal Blood Cholesterol (mmol/L)	Mean (Std Dev)	N (%)					
		Normal	High				
	201.41 (49.41)	86 (53.8)	74 (46.3)				

Table 4 is the result of the cluster analysis, having obtained 2 clusters of individuals with the following division: cluster 1 with 73 participants. cluster 2 with 90 participants. Analysing the Mann-Whitney test values shown in Table 4, there were no statistically significant differences in the self-perceived health status variables between the two groups. However, there were statistically significant differences between relating to occupational stress and occupational motivation, being cluster 1 characterized by higher stress and lower motivation and cluster 2 by lower stress and higher motivation.

Table 4. Comparison of individuals by cluster based on: Occupational Stress, Self-perception of health status, Occupational Motivation - working age adults from a catering company, 2021

	Cluster 1	Cluster 2	P*
N (%)			
Participants Distribution	73 (44.79%)	90 (55.21%)	
Occupacional stress			
1.Relationship with users:			
Stress Free	18 (24.7%)	71 (43.6%)	<0.001
Moderate Stress	54 (74%)	19 (21.1%)	
High Stress	1 (1.4%)	0 (0%)	
2.Relationship with supervisors:			
Stress Free	2 (2.7%)	45 (50%)	<0.001
Moderate Stress	64 (87.7%)	45 (50%)	
High Stress	7 (9.6%)	0 (0%)	
3.Relationship with colleagues:			
Stress Free	6 (8.2%)	44 (48.9%)	<0.001
Moderate Stress	59 (80.8%)	45 (50%)	
High Stress	8 (11%)	1 (1.1%)	
4. Overload of work:			
Stress Free	10 (13.7%)	59 (65.6%)	<0.001
Moderate Stress	59 (80.8%)	31 (34.4%)	
High Stress	4 (5.5%)	0 (0%)	
5. Career and remuneration:			
Stress Free	1 (1.4%)	53 (58.9%)	<0.001
Moderate Stress	70 (95.9%)	37 (41.1%)	
High Stress	2 (2.7%)	0 (0%)	
6. Family problems:			
Stress Free	5 (6.8%)	48 (53.3%)	<0.001
Moderate Stress	64 (87.7%)	42 (46.7%)	
High Stress	4 (100%)	0 (0%)	
7. Work conditions:			
Stress Free	4 (5.5%)	53 (58.9%)	<0.001
Moderate Stress	64 (87.7%)	37 (41.1%)	
High Stress	5 (6.8%)	0 (0%)	
Self-Perception of Health Status			
1.Physical Function			
Worst	15 (20.5%)	11 (12.2%)	0.150
Little Better	58 (79.5%)	79 (87.8%)	
Best	0 (0.0%)	0 (0.0%)	
2. Physical performance			
Worst	73 (100%)	90 (100%)	1.000
Little Better	0 (0.0%)	0 (0.0%)	
Best	0 (0.0%)	0 (0.0%)	

Self-Perception of Health Status			
3. Pain			
Worst	73 (100%)	90 (100%)	1.000
Little Better	0 (0.0%)	0 (0.0%)	
Best	0 (0.0%)	0 (0.0%)	
4. General health			
Worst	73 (100%)	90 (100%)	1.000
Little Better	0 (0.0%)	0 (0.0%)	
Best	0 (0.0%)	0 (0.0%)	
5. Vitality			
Worst	73 (100%)	90 (100%)	1.000
Little Better	0 (0.0%)	0 (0.0%)	
Best	0 (0.0%)	0 (0.0%)	
6. Social Function			
Worst	73 (100%)	90 (100%)	1.000
Little Better	0 (0.0%)	0 (0.0%)	
Best	0 (0.0%)	0 (0.0%)	
7. Emotional performance			
Worst	73 (100%)	90 (100%)	1.000
Little Better	0 (0.0%)	0 (0.0%)	
Best	0 (0.0%)	0 (0.0%)	
8. Mental health			
Worst	73 (100%)	90 (100%)	1.000
Little Better	0 (0.0%)	0 (0.0%)	
Best	0 (0.0%)	0 (0.0%)	
Occupational Motivation			
1.Satisfaction with supervision			
Dissatisfied	4 (5.5%)	3 (3.3%)	0.012
Indifferent	33 (45.2%)	25 (27.8%)	
Satisfied	36 (49.3%)	62 (68.9%)	
2.Satisfaction with the physical environment			
Dissatisfied	9 (12.3%)	3 (3.3%)	0.037
Indifferent	34 (46.6%)	38 (42.2%)	
Satisfied	30 (41.1%)	49 (54.4%)	
3.Satisfaction with the benefits			
Dissatisfied	9 (12.3%)	4 (4.4%)	<0.001
Indifferent	28 (38.4%)	18 (20%)	
Satisfied	36 (49.3%)	68 (75.6%)	
4.Intrinsic satisfaction			
Dissatisfied	5 (6.8%)	3 (3.3%)	0.034
Indifferent	40 (54.8%)	38 (42.2%)	
Satisfied	28 (38.4%)	49 (54.4%)	
5.Satisfaction with participation			
Dissatisfied	1 (1.4%)	3 (3.3%)	0.014
Indifferent	42 (57.5%)	31 (34.4%)	
Satisfied	30 (41.1%)	56 (62.2%)	

*Mann-whitney Test

Table 5 provides the characterization of the two cluster groups according to the studied sociodemographic variables and their differences. Comparing the sociodemographic characteristics of Cluster 1 and Cluster 2, it was observed that Cluster 2 had more individuals from the south, and sleep better. From table 5, it was found that there are significant differences only at the level of geographic area and effective sleep quality variable.

Table 5. Comparison of individuals by clusters distribution based on Sociodemographic indicators - working age adults from a catering company, 2021

	Cluster 1	Cluster 2	P
Sex (n)			
Female	66	72	0.082
Male	7	18	
Academic Qualifications (n)*			
Up to elementary school	23	32	0.547
Secondary and post-secondary education	22	27	
Higher education	28	31	
Geografic Area			
North	55	51	0.014
South	18	39	
Age (n)*			
20-30 years	17	18	0.188
31-40 years	25	29	
41-50 years	23	20	
51-63 years	8	23	
Quality Effective sleep (n)*			
Very Good	13	20	0.034
Good	34	54	
Bad	26	16	
Chronic Diseases (n)			
Yes	16	15	0.423
No	52	69	
Smoking Behaviour (n)			
No	59	73	0.844
Yes	15	17	

*All analyses performed with Q2, except for academic qualifications, age and quality of effective sleep with Mann-Whitney Test

A comparison was made between the two clusters and the objective measures collected, and it was observed that there were no statistically significant differences.

Finally, a logistic regression was conducted with all the variables previously under study and the clusters, revealing significant differences only in the geographic area variable (north), age (31-40; 41-50; 51-63), and sleep quality (excellent and very good) between the two groups of clusters under study. It can be seen that the individuals in cluster 2 are mostly older, have a better quality of effective sleep, smoke less, are from the south of Portugal, have lower academic qualifications and are more male than those in cluster 1.

Discussion

When analysing the results obtained regarding occupational stress, it is evident that 43.6% of the respondents stated that, overall, their activity causes high stress while 41.1% felt moderate stress.

Further breakdown by categories reveals that individuals mostly report moderate levels of stress in parameters such as relationship with supervisors (66.9%), relationship with colleagues (63.8%), overload work (55.2%), career and remuneration (65.6%) family problems (65.0%) and working conditions (62.0%). Participants indicated higher stress levels in parameters such as: relationship with colleagues (5.5%), relationship with supervisors (4.3%), and working conditions (3.0%).

Interestingly, the parameter relationship with users causes less stress to employees, with 54.6% reporting feeling stress-free in this aspect.

After analyzing the literature on the application of this questionnaire, in similar populations we can conclude that we obtained very similar results, because in most of the categories analyzed, it was possible to notice that the individuals reveal a low level of stress or moderate stress (Saveca, 2020).

About the analysis of the self-perception of health status, it was possible to conclude that when we analyzed parameter by parameter, the individuals reported feeling worse, but at the level of health status in general, they reported feeling better. We can also point out that after analyzing the results, the self-perceived state of health indicator proved to be unreliable for us, since the employees overall indicated that they felt in poorer health than what we can see in objective measures.

In terms of occupational motivation, we can see that most employees are satisfied, and the parameter that they feel least satisfied with is the satisfaction with benefits.

According to the theory of occupational motivational (Kerr *et al.*, 2009) the intrinsic satisfaction of the worker is considered as a motivating variable for the worker and in this study 98% of the participants are satisfied with this parameter, which means that they see in the company opportunities for growth and career advancement feeling good professionally (Baruch & Holtom, 2008; Cooper & Barton, 2015; Iordanoglou, 2007).

It is important for a company to have high levels of satisfaction, as we verified, since this way its employees are less likely to get sick, are more efficient, motivated, and productive, in addition to reducing organizational turnover (Cooper & Barton, 2015).

The results of this study corroborate other studies in which occupational variables related to organization, process, and working conditions are strongly correlated with burnout and a negative organizational climate (Kim *et al.*, 2009; Stansfield & Marmot, 2000; Stride *et al.*, 2007). Therefore, decreased occupational motivation can cause and intensify the onset of chronic stress in teams. (Cooper & Barton, 2015)

When we look at the parameter of physical activity (PA), we see that in this study it is at the lowest level according to the IPAQ scale.

When comparing this study with others, we found similar results, as physical activity is generally below the recommended level in the working age population, according to the (Cooper & Barton, 2016) vast majority of working age individuals have low rates of physical activity and this can be explained by lack of time and the perceived cost of facilities being common barriers to PA in the workplace.

It can be concluded that the impact of culture on PA in the workplace and the well-being of individuals is directly related, for this reason companies should invest in a culture that promotes physical activity, thus promoting the well-being of their employees and their company.

After analyzing the results obtained in terms of health indicators, it is possible to conclude that the population analyzed is mostly within normal parameters.

The study population has a high prevalence of abdominal circumference above the reference values for both females and males, It was observed that 76.0% of men in this population have an abdominal circumference above 94cm. and 60.3% of women above 80 cm. As described in similar scientific studies. this population is characterized as having a high presence of abdominal adiposity (dos Santos Alves *et al.* 2012).

Analyzing the BMI, we noticed that 48.7% of the individuals are normal weight. 26.6% are pre-obese and 23.4% are obese.

The literature describes that the prevalence of obesity in the Portuguese population is high, with about 50% of adults suffering from overweight (pre-obesity and obesity) (Pinto,2015). Looking at the results we see that 26.6% of individuals are pre-obese and 23.4% are obese, meaning that exactly 50% of the study population is overweight. corroborating this study with similar studies supports the findings and conclusions presented.

These results in terms of health indicators can be explained by the fact that the adherence to the Mediterranean dietary pattern using the MDS indicator is low, 4.23.

If we analyse the results obtained in this study regarding anthropometric data. physical activity, and dietary intake. we can understand that this population is prone to overweight and obesity. Many individuals in this population have a significant deposition of abdominal fat. All these factors result from the fact that their dietary intake is somewhat distant from the Mediterranean dietary pattern, and they also engage in physical exercise well below the expected level. In similar studies. active populations tend to exhibit quite similar behaviours, and these risk factors should be addressed to prevent the onset of chronic diseases (dos Santos Alves *et al.* 2012).

At the level of blood pressure, whether systolic or diastolic, most individuals are in the optimal or normal parameters.

In the Basal blood glucose parameter 96.3% of the individuals are in the normal range, with only 3.1% registered as pre-diabetes and 0.6% (1 individual) revealed to be diabetic.

About basal cholesterol 53.8% of the individuals are within the normal range and 46.3% of these have high cholesterol values.

High levels of stress lead to demotivation and can be related to the onset of some chronic illnesses or minor changes in an individual's state of health. The comparative analysis between clusters 1 and 2 in terms of occupational stress and occupational motivation shows that there are significant differences. Cluster 1 is mostly moderately stressed in the categories studied and consequently in terms of motivation indicates feeling indifferent in the categories studied. while cluster 2 is mostly free of stress in the categories studied and satisfied in terms of motivation.

In this sense, we can conclude that work-related stress can affect workers' motivation. Motivation for work is a predisposition that leads individuals to become more involved in the institutions and organizations where they perform their work duties. When workers are stressed, their motivation to work and to serve others can be affected, resulting in loss of productivity or presenteeism. Studies show that stress factors are responsible for 6% of the variation in motivation (Jiang *et al.* 2021).

Limitations

This study was carried out during the COVID-19 pandemic, with limited direct contact with participants and the activities having to be reformulated.

Conclusions

After analysing the results obtained, it can be concluded that the population under study is generally characterized by feeling moderate occupational stress in the various categories studied. With regard to the parameter of self- perceived state of health, it can be understood that individuals in most of the categories under study reported feeling worse than the previous year. In terms of professional motivation, most individuals reported feeling satisfied in the various categories studied.

It was also possible to conclude that the population studied was fairly homogeneous, although it was possible to divide it into 2 groups of clusters. This division led to the conclusion that there were statistically significant differences between the categories that make up occupational stress and occupational motivation. In terms of self-perceived state of health, there were no statistically significant differences. Regarding the study of objective measures, there were no statistically significant differences between the cluster groups.

We believe that these studies are essential and that companies should adopt them and carry them out on a regular basis, since by adopting them, they can find out their status in relation to such important issues as the organizational climate, the health and well-being of their employees and thus adopt measures and policies capable of retaining their employees, retaining talent and increasing their productivity.

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