Association between job stress and quality of life in nutritionists working in public hospitals in Rio de Janeiro, Brazil

Associação entre estresse no trabalho e qualidade de vida em nutricionistas que trabalham em hospitais públicos do Rio de Janeiro, Brasil

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Abstract *Occupational stress has been the object of research in different populations. The aim of this study is to analyze the association between psychosocial job stress and quality of life of nutritionists working in public hospitals in Rio de Janeiro, Brazil. Cross-sectional study in public hospitals with nutritionists working as civil servants and CLT. Psychosocial job stress was assessed through the Demand-Control-Support Questionnaire. Quality of life was assessed through the WHOQOL-Bref. The outcome was modeled by means of multiple linear regression and adjusted by covariates. Job demands were inversely associated with quality of life in the physical and environment domains. Job control was directly associated with quality of life in the psychological domain. High strain, in comparison to low strain, was inversely associated with quality of life in the physical and psychological domains. Social support was directly associated with all fields of quality of life domains. Psychosocial job stress, as expressed by psychological job demands and job control, affects self-assessed quality of life, especially in the physical domain.*

Key words *Quality of life, Nutritionists, Psychological stress, Hospitals*

Resumo *O estresse ocupacional tem sido objeto de pesquisas em diferentes populações. O objetivo deste estudo é analisar a associação entre estresse psicossocial no trabalho e qualidade de vida de nutricionistas que trabalham em hospitais públicos do Rio de Janeiro, Brasil. Estudo seccional em hospitais da rede pública do município do Rio de Janeiro, Brasil. Participaram do estudo os nutricionistas com regime de trabalho estatutário ou celetista. O estresse psicossocial no trabalho foi avaliado por meio do questionário de demanda-controle-apoio social (DCSQ). A qualidade de vida foi avaliada por meio do WHOQOL-Bref. O desfecho foi modelado por meio de regressão linear múltipla e ajustado por covariáveis. A demanda de trabalho associou-se inversamente à qualidade de vida nos domínios físico e meio ambiente. O controle do trabalho esteve diretamente associado à qualidade de vida no domínio psicológico. O alto desgaste, em comparação ao baixo desgaste, esteve inversamente associado à qualidade de vida nos domínios físico e psicológico. O apoio social esteve diretamente associado a todos os domínios de qualidade de vida. O estresse psicossocial no trabalho, expresso pelas demandas psicológicas e pelo controle do trabalho, afeta a autoavaliação da qualidade de vida, principalmente no domínio físico.*

Palavras-chave *Qualidade de vida, Nutricionistas, Estresse psicológico, Hospitais*

Introduction

In recent decades, the world of work has undergone significant changes that have affected both the organization and working conditions for labor relations. Such changes have exercised and exert a strong influence on worker's quality of life, including health professionals here, as reported by several researchers[1-3].

Among the professionals who make up the teams in the health sector, there is the nutritionist. The survey on insertion in the labor market, carried out by the Federal Council of Nutritionists, by areas of activity highlighted that nutritionists are primarily women, 94.1%. Concentrated in the age groups of 25 to 34 years (60.4%) with a predominant role in Clinical Nutrition and Collective Food (31.1%), 73.2% reporting having completed postgraduate courses, mainly specialization. However, only 42.1% of professionals have a Positions, Careers, and Salaries Plan[4], considering a job market that has required creativity, initiative and productivity from professionals.

In the study carried out among statutory nutritionists and CLT system in Rio de Janeiro, most statutory workers were in the largest age group, had the highest per capita family income, had a higher degree and another job[5]. Investigating satisfaction of nutritionists with graduates from a public university in Sergipe, wage issues and workload were the biggest reasons for dissatisfaction, 60.2% and 35.2%, respectively[6].

When an individual has a negative perception of his environment as a result of job demands and is faced with different sources of pressure in the workplace, he may feel dissatisfaction and have physical and mental health problems[7,8]. According to the theoretical model proposed by Karasek, job stress results from the combination of high psychological demands and low job control, thus characterizing high job strain.

Psychological demand contemplates the pressure of questions as to the time to perform tasks, level of concentration, interrupt tasks, waiting time for activities developed by other peers, and psychological demands in performing tasks. Control over work refers to the ability to make decisions regarding skills, authority and autonomy to make decisions about your own work. According to this model, the combination of these two components, demand and control, can generate four basic types of work experiences: high-strain (high demand and low control), active (high demand and high control), passive (low demand and low control) control) and low-strain work (low demand and high control). In view of its negative impact on human health, occupational stress has been the object of research in different populations[9].

To foster a positive concept of health, quality of life (QoL) has been operationalized as one of the most important measures. Studies addressing health-related quality of life (HRQoL) use instruments that subjectively assess QoL, and this measure has been valued as a notable health outcome[10-12]. These studies take into account the idea that one must prioritize more life in one's years over merely more years in one's life.

In the early 1990s, the World Health Organization brought together QoL scholars from different countries and set up the WHOQOL Group, and they developed tools for QoL assessment from a cross-cultural perspective. QoL was defined as "an individual's perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns" by Fleck et al.[13] (p. 179).

In the workplace, workers performing activities that require person-to-person contact have "high-contact" jobs because they deal directly with the problem of other individuals, for example, human suffering and the dying process. Moreover, work environments are potential sources of conflict[14] because there are superior-subordinate relationships as well as occupational stratification issues (based on technical expertise and social status) that cause them to feel medium and low satisfaction with their QoL job dissatisfaction, thereby affecting both their health and their QoL[11,12].

Quality of life assessment has been the object of research conducted in different groups of workers, e.g., police officers in Greece, domestic workers in Singapore, motorcycle taxi drivers and healthcare workers[15-17]. These studies have shown that stress has been associated with QoL domains. Other studies have shown that workers suffering psychosocial job stress tend to have lower QoL even if they receive social support in the workplace. In addition, lower QoL scores have been related to family income, sex, age, schooling, marital status, smoking, sleep quality and workplace[18-21]. However, few studies to date have focused on the relationship among these factors for health care workers, particularly nutritionists.

Clinical nutritionists, who work in hospital settings, provide medical nutrition therapy for patients and management nutritionists are in

charge of meal planning and preparation, cost management of dietary programs and work team. They are exposed to working conditions that make them deal with pain, suffering and feeding others. Long working hours, insufficient number of professionals in the sector, psycho-emotional exhaustion and high demand for care and some factors can be associated with psychosocial stress at work such as the urgency of time, having to respond in care to many people and inadequate working conditions[22].

In this way, heterogeneous actions and different degrees of complexity expose nutritionists to several stressors. In this context, the objective of the present study is to analyze the association between psychosocial job stress and QoL in nutritionists working in public hospitals in the city of Rio de Janeiro.

Methods

A cross-sectional study with all staff nutritionists (census) from 23 of 24 public hospitals in the city of Rio de Janeiro-RJ in 2012. One hospital was not included in the study because it was going to close down. The nutritionists work under either one of the arrangements below: civil servants (hired by the municipal council) or private workers (meal companies contracted by the Health Department of the Municipality). To calculate the sample size, we used the population of SMS nutritionists from Rio de Janeiro (n=384), an estimated 50% prevalence of Quality of Life (QoL), since estimates of the QoL situation are unknown. In this group, adding a percentage of possible losses of 10% and a confidence level of 95%, we concluded that the total number of nutritionists to be invited to the study should be 214 nutritionists. However, as we interviewed all nutritionists in hospitals, fifteen (4.9%) of the total of 306 nutritionists refused to participate in the study and one was fired during data collection. Thus, 290 nutritionists (94.75%) were assessed. Data collection took place between October 2011 and August 2012 at the target hospitals, with trained interviewers.

Dependent variables

Quality of Life Domains (physical, psychological, environment and social relationships) were evaluated by the WHOQOL-bref instrument. The scores of each domain were computed according to the algorithm developed by

the WHOQOL-Group. The values of the scores of each domain ranged from 0 to 100 points; the closest to 100, the best the scores. This instrument was adapted and translated into Brazilian Portuguese by the Brazilian Center of the QoL Group of the World Health Organization (WHOQOL-GROUP)[13] and showed good psychometric performance with Cronbach's reliability coefficient of 0.71 for domains and 0.91 for the questions[23].

Independent variable

Psychosocial job stress was measured using the reduced scale adapted by Theorell in 1988, the Swedish Demand-Control Social Support Scale (DCSQ), composed of 17 questions, addressing three dimensions proposed in the Demand-Control Model (DCM): psychological demand, control and social support in the workplace. The interaction between the dimensions psychological demand and job control defines the four categories of exposure: low-strain job (low demand and high control), considered as a reference group; passive work (low demand and low control); active work (high demand and high control) and high-strain job (high demand and low control), which was the group at most risk. The cutoff point for the scores of the dimensions psychological demand and job control, to define the quadrants, was based on the median, as well as social support in the workplace, as recommended by Alves *et al.*[24]. For demand, the cut-off point was 14 points; the jobs of respondents who scored less than or equal to 14 points were classified as low-demand jobs while the jobs of those who scored more than 14 points, as high-demand jobs. Similarly, for control, the cutoff point was 17 points and for social support in the workplace, 18 points. In addition, demand, control and social support were analyzed as continuous variables.

The following covariables were used: Sex (female and male), Schooling (undergraduate and graduate), Marital status (single, married and divorced or widowed) and Race/skin color (black, white or brown). Age, Family per capita income (minimum wage in force during the period of data collection: R$ 540) and Number of children were used as continuous covariables. Physical activity level was assessed according to the International Physical Activity Questionnaire (IPAQ)[25], classified as: (a) low (those who do not exercise and who did not meet the criteria to be included in the other categories); (b) moderate

(three or more days of high-intensity activity during at least 20 min each day; or five or more days of moderate-intensity activity and/or walking during 30 min per day; or five or more days of any combination between walking, moderate or intensity activity, reaching a minimum of 600 MET-min/week); and (c) high (high-intensity activity during three days a week, reaching a minimum of 1500 MET-min/week; or seven days of any combination between walking and moderate or high-intensity activity, reaching a minimum of total physical activity of 3000 MET. Alcohol Use Disorders Identification Test (AUDIT)[26] score was utilized to categorized as "low risk" (0 to 7 points), "risky use" (8 to 15 points), "harmful use" (16 to 19 points) and probable dependence (20 to 40 points); Smoking (non-smoker/former smoker smoker). Body Mass Index (BMI) is defined as weight calculated in kilograms divided by height in meters squared, and classified according to the cutoffs proposed by the World Health Organization for adults: normal weight (BMI 18.5-24.9 kg/m²), pre-obese (25-29.9 kg/m²) and obese (above 30 kg/m²).

Self-reported morbidities were Systemic Arterial Hypertension, Diabetes, and Hypercholesterolemia. The respondents could answer yes or no to the question "Has a doctor ever told you that you had or have". Morbidities were categorized as: "No disease"; "Presence of one"; "Presence of two or more". Overall health was self-assessed through the following question: "Generally speaking, compared to people your age, how do you consider your health status to be like?", "Very good", "Good", "Fair or poor".

Work-related variables were: Number of places where you work as a nutritionist (one/two/three or more), work arrangement (private worker/civil servant), length of employment in the municipality/company (continuous); management position (yes/no); specialty of the hospital (emergency/specialist/children's); working time (daytime work/night work).

Mean, standard deviation (SD) and minimum and maximum values were calculated for descriptive analysis. For the mean differences, the Student's T and ANOVA statistical test was used, and the variables that presented p-value <0.20, or the important variables according to the literature, were inserted in the multiple linear regression model. The variables were introduced in each WHOQOL-bref domain according to the forward method. The variables that presented p-value <0.05 remained in the final model. Residual analysis showed normal distribution and

constant variance in the linear regression of each domain. Statistical analysis was performed with Software R (R Core Team, 2017)[27].

The professionals participating in the study completed the questionnaire after reading and signing an Informed Consent form. The research project was approved by the Ethics Committee of the Municipal Health and Civil Defense Secretariat, Rio de Janeiro, under protocol number 0664.0.000.314-11.

Results

Most nutritionists were women (97.2%), with a mean age of 41 years (SD=10), married (52.4%), with children (55.1%), who self-reported as white (71.0%), with mean income of 3.7 minimum wages per capita (SD=7.0) and almost half (49%) had a postgraduate certificate or degree. As for lifestyle and health, the great majority stated that they had never smoked (82.4%) low risk for alcohol consumption (65.8%). Although 77.9% of the respondents were classified as low and moderate intensity physical activity, 52.1% of them were classified as having normal weight. Analysis of self-assessed health responses showed that 56.8% of the participants considered their health to be good and 59.6% did not report the presence of chronic diseases. As for work-related aspects, the majority worked as civil servants (79.9%), and 76.0% did night work. Mean length of employment was 13 years (SD=9.5), and 60.2% worked in only one place (Table 1).

The evaluation of psychosocial job stress, according to the quadrants, showed that 29.7% of the nutritionists were classified into both low-strain jobs and passive jobs; 23.8% into high-strain jobs, while only 16.9% were classified into active jobs. The dimensions of psychological demand, job control and social support, with a cutoff point at the median, had the following results: 55% of the respondents reported working under high psychological demand; 62.4% with high control and 61.7% with high social support. The social relationships domain had the highest score: 74.0 points (SD=17.5) while the environment domain had the lowest score: 57.8 points (SD=12.9). The scores found in the physical and psychological domains were 69.9 (SD=14.4) and 65.1 (SD=14.4), respectively (data not showing table).

Per capita income had a significant association with all QoL domains, except to the physical domain. Higher-income individuals had higher QoL scores in all domains. The race/skin color

Table 1. Socio-demographic, health and labor characteristics of nutritionists working in municipal hospitals of Rio de Janeiro-RJ, Brazil 2011/2012.

Variables	Total	Frequency	
		n	%
Sex	290		
Female		282	97.2
Male		8	2.8
Marital Status	285		
Single		99	34.4
Married		151	52.4
Divorced/widowed		38	13.2
Children	285		
None		128	44.9
Yes		157	55.1
Race/Skin color	290		
Black		25	8.6
Brown		59	20.4
White		206	71
Level of Education	290		
Undergraduate		148	51.0
Graduate		142	49.0
Smoking	286		
Has never smoked		239	82.4
Has already smoked		36	12.4
Smokes		15	5.2
Alcohol consumption	272		
Low risk		179	65.8
Risk use		58	21.3
Harmful use and probable dependence		35	12.9
Physical Activity Level	290		
Low and moderate intensity		226	77.9
High Intensity		64	22.1
BMI	286		
Normal weight		149	52.1
Overweight		93	32.5
Obese		44	15.4
Health self-assessment	289		
Very good		76	26.3
Good		164	56.8
Fair/poor		49	16.9
Chronic Diseases	290		
2 or more		21	7.3
At least one		96	33.1
None		173	59.6

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variable presented statistical significance with the psychological domain and blacks presented the highest QoL scores (68.7). Married respondents, followed by those with a postgraduate degree, had the highest scores in the environment domain (60.2 and 59.4, respectively). Younger individuals were classified as having the highest QoL scores in the social relationships domain, and those above 47 years old had the highest scores in the environment domain (59.9) (Table 2).

Table 1. Socio-demographic, health and labor characteristics of nutritionists working in municipal hospitals of Rio de Janeiro-RJ, Brazil 2011/2012.

Variables	Total	Frequency	
		n	%
Work arrangement	289		
Civil servant		189	79.9
Private worker		100	20.1
Working time	288		
Daytime work		69	24.0
Shift work		219	76.0
Workplace	289		
One place		174	60.2
Two places		95	32.9
Three or more places		20	6.9
Holds a management position	289		
None		231	79.9
Yes		58	20.1
Type of Hospital	290		
Children's hospital		71	24.5
Emergency hospital		118	40.7
Specialist		101	34.8

Source: Authors.

Table 2. Comparison of Quality of Life scores according to the physical, psychological, environment, social relationships domains and sociodemographic variables of nutritionists working in municipal public hospitals in Rio de Janeiro-RJ, Brazil 2011/2012.

Variable	Categories	Quality of Life - WHOQOL-bref											
		Physical Domain			Psychological Domain			Environment Domain			Social Relationships Domain		
		Mean	SD	p-value	Mean	SD	p-value	Mean	SD	p-value	Mean	SD	p-value
Sex*	Males	73.2	11.0	0.413	66.7	13.0	0.739	55.5	9.7	0.306	61.5	19.9	0.507
	Females	69.8	14.5		65.1	14.5		57.9	13.0		69.3	17.5	
Age** (Tercile)	<37 years	70.2	13.6	0.822	64.8	13.7	0.230	56.7	13.1	0.158	73.4	18.2	0.011
	>37 and <47 years	69.1	14.9		63.5	15.2		56.9	12.4		67.3	16.9	
	<47 years	70.3	14.8		67.0	14.2		59.9	13.0		66.5	16.8	
Level of education*	Undergraduate	69.5	13.5	0.668	65.6	14.3	0.496	56.5	12.4	0.400	68.2	16.1	0.052
	Graduate	70.3	15.4		64.5	14.6		59.4	13.1		70.0	19.1	
Per capita income (minimum wage)**	0-2.75	67.9	14.2	0.146	62.2	14.3	0.004	52.5	12.4	0.000	67.6	19.5	0.006
	2.76-4.16	69.5	13.8		63.8	13.9		57.6	10.6		65.7	16.5	
	4.17-15	72.0	15.3		68.8	14.4		62.5	13.4		73.4	16.6	
Marital status**	Single	70.9	13.4	0.692	64.3	14.1	0.704	54.5	13.2	0.002	66.8	17.7	0.236
	Married	69.3	14.8		65.8	14.3		60.2	11.7		70.3	17.1	
	Divorced/Widowed	69.5	15.6		64.4	16.2		57.5	14.6		71.1	18.7	
Children*	None	69.7	13.9	0.909	65.5	13.5	0.629	56.9	13.3	0.223	70.5	17.8	0.224
	Yes	70.7	10.5		64.7	15.1		58.8	12.5		67.9	17.4	
Race/Skin color**	Black	72.9	14.6	0.281	68.7	17.4	0.175	60.4	15.9	0.834	66.7	20.6	0.606
	Brown	70.2	15.2		65.7	12.3		56.2	12.3		72.7	14.9	
	White	69.4	14.2		64.5	14.6		58.0	12.6		68.3	17.8	

Level of statistical significance: p-value<0.20, *Student's t; **ANOVA.

Source: Authors.

For lifestyle and health variables (Table 3), self-reported health and presence of diseases were significantly associated with all domains. Individuals who self-assessed their health as "very good" and who reported not having chronic diseases had scores above 60 points in all QoL domains.

Individuals classified high intensity physical activity, when compared to low and moderate intensity ones had higher QoL scores in all domains except for the environment domain. Individuals with normal weight had higher scores in the psychological and social domains when compared to individuals classified as overweight or obese according to the BMI. In addition, individuals who had never smoked had higher QoL scores in the physical domain (70.6) when compared to smokers and former smokers.

Demand had higher scores in the social relationships domain and control had higher scores in all domains. With regard to work-related variables respondents who reported having social support in the workplace reported better QoL in all domains. Individuals who had been working in the same site for a longer period of time had higher scores in the environment domain and lower scores in the social relationships domain. The specialty of the hospital was only associated with the physical domain while work arrangement was associated with the environment. In addition, respondents in managerial positions had higher QoL scores in the social relationships domain (72.3) when compared to those who did not hold a management position (68.3) (Table 4).

In the linear regression (Table 5), in the final model, age was maintained only because it is relevant in the literature. The variables sex and schooling were not maintained because they were homogeneous in this sample.

Social support in the workplace, both in the demand-control model as a continuous variable and in the quadrants, was directly associated with all QoL domains.

With regard to the dimensions of psychosocial job stress, it was found that psychological job demand, analyzed as a continuous variable, was

Table 3. Comparison of Quality of Life scores according to the physical, psychological, environment, social relationships domains and lifestyle- and health-related variables of nutritionists working in municipal public hospitals in Rio de Janeiro-RJ, Brazil 2011/2012.

Variable	Categories	Quality of Life - WHOQOL-bref											
		Physical Domain			Psychological Domain			Environment Domain			Social Relations Domain		
		Mean	SD	p-value	Mean	SD	p-value	Mean	SD	p-value	Mean	SD	p-value
Alcohol Consumption**	Low risk	69.4	15.1	0.936	65.3	15.2	0.760	58.1	13.3	0.874	68.2	17.9	0.517
	Risky use	70.2	14.5		63.9	13.9		57.4	12.3		71.0	17.1	
	Harmful use and probable dependence	69.6	11.8		63.9	12.3		57.0	11.6		70.5	14.9	
Smoking**	Has never smoked	70.6	14.2	0.173	65.1	14.7	0.711	57.6	13.4	0.766	69.3	17.5	0.782
	Has already smoked	65.9	16.7		64.1	14.8		58.3	11.1		67.1	18.1	
	Smokes	68.3	11.0		67.8	8.5		60.0	8.1		69.4	17.7	
Self-reported health**	Very good	78.0	12.4	<0.001	71.7	13.5	0.000	61.7	13.5	0.004	73.1	15.5	0.002
	Good	69.7	12.3		65.1	13.1		57.1	13.2		69.4	18.1	
	Fair or poor	58.1	15.9		55.0	14.4		54.4	9.2		62.1	16.8	
Presence of diseases**	None	72.2	13.8	0.001	67.1	13.5	0.005	60.1	12.6	0.001	70.6	16.9	0.026
	At least 1	67.2	13.8		63.1	14.5		54.7	13.3		68.2	17.2	
	2 or more	62.8	18.3		57.7	18.1		53.6	8.8		59.9	21.5	
Physical Activity* Level	Low and moderate intensity	68.5	14.5	0.001	63.9	14.6	0.006	57.6	12.7	0.154	68.3	17.7	0.547
	High intensity	74.6	13.0		69.2	12.9		58.7	13.6		71.7	16.8	
BMI**	Normal weight	70.7	13.2	0.346	66.3	11.7	0.093	57.5	12.1	0.911	71.1	15.6	0.100
	Overweight	69.5	14.8		65.1	15.9		58.2	13.4		68.0	18.8	
	Obese	67.1	16.6		61.0	17.6		57.7	13.0		65.2	19.1	

Level of statistical significance: p-value<0.20, *Student's t; **ANOVA.

Source: Authors.

inversely associated with QoL, with a decrease in the order of one unit in the score in the physical domain and of 0.68 unit in the environment domain. Likewise, job control was directly associated with QoL in the psychological domain, where an increase in control led to an increase of 0.94 in the final score of this domain.

As for the psychosocial job stress, according to the quadrants, high-strain jobs, compared to low strain ones, were inversely associated with the physical and psychological domains. It is noteworthy that high strain led to a decrease of 5.91 points in the physical domain and 6.69 points in the psychological domain.

Discussion

In this study, there was an association between psychosocial job stress and QoL. Psychological job demands showed an inverse association with QoL in the physical and environment domains,

Table 4. Comparison of Quality of Life scores according to the physical, psychological, environment, social relationships domains and work-related variables of nutritionists working in municipal public hospitals in Rio de Janeiro-RJ, Brazil 2011/2012.

Variable	Categories	Quality of Life - WHOQOL-bref											
		Physical Domain			Psychological Domain			Environment Domain			Social Relationships Domain		
		Mean	SD	p-value	Mean	SD	p-value	Mean	SD	p-value	Mean	SD	p-value
Demand*	High	66.7	15.1	0.000	63.0	14.5	0.005	55.5	13.0	0.190	67.9	18.3	0,0003
	Low	73.9	12.4		67.7	13.9		60.8	12.1		70.5	16.4	
Control*	High	72.2	12.9	<0.000	67.8	12.8	0.000	59.3	12.1	0.030	70.8	17.1	0.019
	Low	66.0	15.9		60.6	15.9		55.5	13.7		66.2	17.9	
Quadrants**	Low strain	72.8	12.3	<0.001	69.6	12.0	0.000	60.9	11.0	0.012	70.6	15.2	0.154
	Active	69.2	14.2		64.4	12.4		56.4	11.7		70.6	19.1	
	Passive	72.5	13.1		65.4	13.7		58.4	12.5		70.0	17.6	
	High strain	63.5	16.6		59.6	17.4		54.3	15.3		64.9	18.7	
Social support in the workplace*	High support	73.0	13.6	<0.001	68.5	13.3	<0.000	60.7	12.2	<0.000	73.0	16.5	<0.000
	Low support	64.9	14.4		59.7	14.5		53.3	12.7		62.6	17.4	
Hospital Specialty**	Emergency Hospital	71.5	12.8	*0.026*	64.7	13.3	0.536	57.4	13.8	0.495	70.8	14.6	0.542
	Specialist	67.1	16.3		64.3	16.3		57.1	13.0		67.9	19.4	
	Children's Hospital	71.9	12.7		66.4	12.7		59.1	12.0		69.2	17.1	
Length of employment - municipality/company**	0 to 8.93	69.0	14.3	0.568	64.1	14.7	0.248	54.8	13.7	*0.007*	72.3	18.5	0.035
	8.94 to 16	69.5	14.1		64.0	13.8		58.2	11.1		69.1	16.2	
	16.1 to 44.26	71.1	15.0		67.0	14.7		60.6	13.0		65.8	17.6	
Management position*	None	69.6	14.7	0.427	64.7	14.6	0.379	58.0	13.2	0.108	68.3	17.8	0.850
	Yes	71.2	13.1		66.5	13.7		57.7	11.0		72.3	16.6	
Nº of workplaces**	One	69.9	14.6	0.963	64.5	14.6	0.250	57.6	12.9	0.659	68.5	18.2	0.455
	Two	69.7	14.5		65.0	14.5		58.1	12.6		69.0	16.7	
	Three or more places	70.7	13.0		70.2	11.6		60.3	11.9		73.7	16.5	
Work arrangement*	Private worker	69.2	12.8	0.539	63.7	14.1	0.222	53.6	12.6	*0.568*	69.9	18.8	0.00
	Civil servant	70.2	15.2		65.9	14.5		60.1	12.5		68.6	16.9	
Working time*	Daytime work	69.7	14.5	0.862	65.5	16.2	0.796	57.8	12.5	0.588	68.0	17.7	0.986
	Shift work	70.0	14.4		65.0	13.9		57.8	13.0		69.3	17.5	

Level of statistical significance: p-value<0.20, *Student's t; **ANOVA.

Source: Authors.

while job control was directly associated with the psychological domain. When psychosocial job stress was analyzed according to the quadrants, it was found that high-strain jobs were inversely associated with the physical and psychological domains. Social support was directly associated with all QoL domains in both forms of analysis.

Although there no previous studies with nutritionists evaluating the influence of psycho-

logical stress on QoL, the present findings were corroborated by other studies with workers. Nasermoaddeli et al.[28], when evaluating 1,392 workers from Toyama Prefecture, Japan, found an inverse association, but to a lesser extent, of psychological demand with the physical domain (β=-0.11, p<0.001). For the association with the environment domain, a similar result was found in a study by Edimansyah et al.[29], who investigat-

Table 5. Association between Quality of Life (Physical, Psychological, Environment and Social Relationships) and Psychosocial Job Stress (Demand and Control - Continuous Variables and Quadrants) of nutritionists working in municipal public hospitals in Rio de Janeiro-RJ, Brazil, 2011/2012.

Variables	Quality of Life - WHOQOL-bref							
	Physical		Psychological		Environment		Social Relationships	
	Model 1 β (CI95%)	Final Model β (CI95%)	Model 1 β (CI95%)	Final Model β (CI95%)	Model 1 β (CI95%)	Final Model β (CI95%)	Model 1 β (CI95%)	Final Model β (CI95%)
Continuous								
Demand	-1.13	-1.07	-0.61	-0.49	-0.61	-0.68	0.10	0.06
	(-1.72 – -0.54)	(-1.65 – -0.48)	(-1.20 – -0.02)	(-1.06 – 0.08)	(-1.13 – -0.08)	(-1.17 – -0.19)	(-0.62 – 0.83)	(-0.65 – 0.76)
Control	0.42	0.50	0.85	0.94	0.42	0.47	-0.10	0.07
	(-0.26 – 1.11)	(-0.19 – 1.19)	(0.17 – 1.54)	(0.27 – 1.62)	(-0.19 – 1.04)	(-0.11 – 1.06)	(-0.94 – 0.74)	(-0.77 – 0.92)
Social Support	1.02	0.98	1.12	0.99	1.14	0.84	2.04	1.95
	(0.49 – 1.54)	(0.45 – 1.51)	(0.60 – 1.65)	(0.47 – 1.51)	(0.67 – 1.61)	(0.39 – 1.28)	(1.39 – 2.68)	(1.31 – 2.59)
Quadrants								
Low strain	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Active	-2.87	-1.96	-4.57	-2.78	-3.81	-3.88	0.95	1.85
	(-7.61 – 1.87)	(-6.59 – 2.66)	(-9.29 – 0.15)	(-7.38 – 1.83)	(-8.04 – 0.42)	(-7.88 – 0.13)	(-4.81 – 6.72)	(-3.84 – 7.53)
Passive	1.66	1.56	-2.21	-2.82	-0.55	-0.91	2.32	1.45
	(-2.44 – 5.76)	(-2.42 – 5.55)	(-6.29 – 1.88)	(-6.78 – 1.15)	(-4.21 – 3.11)	(-4.33 – 2.50)	(-2.67 – 7.31)	(-3.47 – 6.38)
High strain	-5.77	-5.91	-6.31	-6.69	-2.83	-3.56	-0.24	-1.04
	(-10.26 – -1.28)	(-10.29 – -1.53)	(-10.78 – -1.83)	(-11.05 – -2.34)	(-6.84 – 1.18)	(-7.33 – 0.20)	(-5.70 – 5.23)	(-6.44 – 4.36)
Social Support in the workplace	1.26	1.12	1.33	1.18	1.34	1.05	1.98	1.92
	(0.77 – 1.76)	(0.63 – 1.61)	(0.83 – 1.82)	(0.70 – 1.67)	(0.90 – 1.79)	(0.63 – 1.47)	(1.38 – 2.59)	(1.32 – 2.52)

Considering psychosocial job stress according to demand and control as continuous variables - Physical Domain: Model 1: Association not adjusted; Final Model: Adjusted for age, physical activity level and income. Psychological Domain: Model 1: Association not adjusted; Final Model: Adjusted for age, physical activity level, income and presence of diseases. Environment Domain: Model 1: Association not adjusted; Final Model: Adjusted for age, income, presence of diseases, length of employment in the municipality/ company, marital status. Social Relationships Domain: Model 1: Association not adjusted; Final Model: Adjusted for age, income, marital status. *Considering psychosocial job stress according to the quadrants (low strain, active, passive, high strain)* - Physical Domain: Model 1: Association not adjusted; Final Model: Adjusted for age, physical activity level and presence of diseases. Psychological Domain: Model 1: Association not adjusted; Final Model: Adjusted for age, income, presence of diseases, level of physical activity and race/skin color. Environment Domain: Model 1: Association not adjusted; Final Model: Adjusted for age, income, presence of diseases, length of employment in the municipality/company, marital status. Social Relationships Domain: Model 1: Association not adjusted; Final Model: Adjusted for age, income, and marital status.

Source: Authors.

ed the same relationship in male automotive assembly workers in Malaysia and concluded that high job demands were inversely associated with QoL in that domain (β=-0.04, p=0.013). In this sense, psychological job demands, which refer to psychological demands in the development of tasks as well as concentration and time pressure, inversely affect QoL in the physical and environment domains.

For control, Nasermoaddeli *et al.*[28] also found a direct association with the psychological domain in their population (β=0.07, p<0.05); Teixeira *et al.*[11], evaluating this relationship in motorcycle taxi drivers in Jequié, Bahia, Brazil, found evidence that the individuals with high job control presented higher scores in the psychological domain when compared to those with low job control.

Despite the cultural differences between the populations and the differences inherent in each work activities the findings of the present study are congruent with the effect of psychological demands in the physical and environment domains and of control in the psychological domain. Thus, these results are the first evidence about this relationship in the health of nutritionists.

For psychosocial job stress, according to the quadrants, there was an inverse association; individuals in high-strain jobs self-referenced in the physical and psychological domains: -5.91 and -6.69 points, respectively. The same relationship between high-strain jobs and the physical and psychological domains was found by Fernandes and Rocha[12], who evaluated the psychosocial aspects of work in the QoL of teachers of municipal schools in Natal, Rio Grande do Norte. Thus, it can be inferred that there was an inverse association in the physical domain in both jobs with high psychological demands and high-strain jobs, in this population.

It is suggested that the greatest strength of association found when using the category high strain is due to the fact that this category is built by demand and control, because alone, demand, in the case of the physical domain, and the control, in the case of the domain, were associated.

The physical domain, which contains the work ability facet, presented a greater range of results, demonstrating that self-evaluation was heterogeneous in this domain. The score of 69.9 points was similar to that of Branco *et al.*[30], who obtained a score of 69.7 points and of Souza and Stancato[14] (mean score of 68.1 points), who evaluated workers from health care fields in university hospitals in southern Brazil and Campinas

(São Paulo state), respectively. However, such score was higher than the one found for Chilean nurses who had a score of 54.6[10] and community health workers in the town of Jequié, Bahia, who had a score equal to 64.0[20].

The psychological domain, with 65.1 points, includes facets relative to positive and negative feelings, thinking, learning, memory and concentration, as well as self-esteem, body image and appearance and spirituality/religion/personal beliefs. Although the populations were different, this domain had a score similar to that of the Brazilian study (63.7 points), in which health workers were evaluated in a hospital setting, and in Chile, in which nurses were evaluated (score equal to 66.6 points)[10,14]. These results may reflect the contact with the pain and suffering of others and the relationships with negative and positive feelings that are inherent in the hospital environment. This could be one of the potential factors affecting the QoL of these individuals.

The environment domain had the lowest score in the population of the present study (57.8 points). The result was similar to the one found by Souza and Stancato[14], (55.2 points), who evaluated health workers, and also similar to findings from other studies with different populations[16-18,29,30]. Working in a hospital environment exposes individuals to an unhealthy environment insofar as health workers are faced with physical, chemical, physiological, psychic, mechanical and, especially, biological risks arising from their activities[10,14]. In addition, nutritionists who work in hospitals appears that reach no decision-making power in the contexts of their activities participate little in multidisciplinary teams and have perception that are not valued[4]. This domain is composed of the facets physical security and protection; home environment; financial resources; health and social care: availability and quality; opportunities to acquire new information and skills; participation and recreation/leisure opportunities; physical environment: (pollution/noise/traffic/climate); and transportation. In this way, it should be noted that it is not only the working environment that affects the environment domain, but also other aspects of the environment in which individuals live. The fact that this population works in hospitals in different regions of the city of Rio de Janeiro, can lead to a lower score in this domain, since the different regions of the city grant access to different leisure, security and transportation opportunities.

The social relationships domain achieved the best scores compared to the other domains,

and also in other studies with a population of hospital workers[10,14]. Higher mean scores in this domain among users of basic health units in Belo Horizonte, Minas Gerais[31] and community health agents in Jequié, Bahia[20], were also found in other study[32]. This domain consists of facets such as personal relationships and social support. Rosenbluth and Hidalgo[33] considered that social interaction may be a characteristic of women who often form networks of support and social interaction. Thus, this best result may be due to the fact that our study population is mostly female.

Importantly, nutritionists work under a health care model that is centered around the figure of the doctor[34], who has the power to make decisions about health care practices, despite current efforts for multidisciplinary and interdisciplinary health care provision. Thus, it can be argued that greater autonomy and authority over their own work could influence nutritionists' QoL in the psychological domain. Thus, an integrated and cooperative work team is crucial for overall QoL.

Social support in the workplace was directly related to better QoL scores in all its domains. Rusli et al.[35] also found that social support in the workplace is important for QoL. As a third dimension added to the demand and control model, it is considered as a mediator or buffer between psychological job demands and control over individuals' work and health; it refers to co-worker social support and the network built among peers[36]. Health outcomes have been associated with the presence of social support because it directly influences the health-disease process and stress levels in crisis situations[37]. This association corroborates the importance of interpersonal relationships in the work environment and the perception of co-worker support in the workplace for the purpose of QoL.

Psychosocial job stress has traditionally been operationalized into quadrants according to the DCM. However, the categories resulting from this method, depending on how the cutoff points of the psychological demand and control scores are operationalized, may present discrepancies. The most common way to operationalize the cutoff point is to use the median according to population distribution[23]. However, some studies evaluating the association of QoL with psychosocial job stress have used continuous variables of psychological demand and job control[15]. The associations found are relevant to the knowledge of this association because psychosocial job stress was analyzed according to the quadrants while considering the variables psychological demand and control as being continuous.

Importantly, cross-sectional studies present limitations on the causal direction of the relationships found, hence they do not allow the analysis of temporality between exposure and outcome. Söderfeldt et al.[38] pointed out that one limitation of the DCM is the fact that it does not take into account specific working conditions that involve the relationship with people. Thus, this model may not be suitable in certain fields of labor.

Moreover, there are few studies addressing QoL of nutritionists[14], and no further research was found in the literature about the association between psychosocial job stress and QoL in this population. Most studies on QoL conducted in Brazil with health workers evaluated factors associated with this outcome, using differences of means in the domains[20,30]. But it is important to note that the favorable profile seen in many aspects of nutritionists may result from the healthy worker effect. There should be further research on the relationship between psychosocial job stress and each of the facets included in the QoL domains.

The present study pointed out that psychological demand and high strain are inversely associated while control is directly associated with the QoL of nutritionists. Faced with the lack of knowledge about nutritionists and their overall health, the present results provide further insights into this association in their life and permit suggest the impact about the workers of health in general. Thus, actions that can strengthen nutritionists while they perform their duties (e.g., better working conditions, greater peer interaction in a multiprofessional team and health promotion initiatives and continuous control of risk situations in the work environment) should be developed to reduce psychological demands, increase control and social support and, consequently, promote the QoL of these workers.

Collaborations

OB Aguiar designed the study. OB Aguiar and MJM Fonseca planned and carried out the collect of data. OB Aguiar and BC Canazaro contributed to analysis and interpretation of data to the writing of the drafted the manuscript. OB Aguiar, BC Canazaro, MJM Fonseca, AB Moreno and MGM Alves aided in interpreting the results and worked on the manuscript. All authors approved the final manuscript.

References

1. Dedecca CS, Trovão CJBM. A força de trabalho no complexo de saúde: vantagens e desafios. *Cien Saude Colet* 2013; 18(6):1555-1567.

2. Rosado IVM, Russo GHA, Maia EMC. Produzir saúde suscita adoecimento? As contradições do trabalho em hospitais públicos de urgência e emergência. *Cien Saude Colet* 2015; 20(10):3021-3032.

3. Liu JX, Goryakin Y, Maeda A, Bruckner T, Scheffler R. Global Health workforce labor market projections for 2030. *Hum Resour Health* 2017; 15(1):11.

4. Conselho Federal de Nutricionistas (CFN). *Inserção profissional dos nutricionistas no Brasil. Cartilha Digital 2019* [Internet]. [acessado 2020 mar 18]. Disponível em: https://www.cfn.org.br/wp-content/uploads/2019/05/CARTILHA%20CFN_VERSAO_DIGITAL.pdf?fbclid=IwAR0uypYRdbnoFbs_aR-4PIAKygN3PC4-BUFJfPCD2tszfAXtxG1y0KE1HvLs.

5. Aguiar OB, Silva TM. Características socioeconômicas, do trabalho e de saúde de nutricionistas de hospitais municipais do Rio de Janeiro. *Mundo Saude* 2017; 41(1):57-67.

6. Souza JCN, Fagundes A, Silva DG, Barbosa KBF. Education, satisfaction and professional prospects of nutrition graduates of a federal university in the Brazilian northeast. *Demetra* 2018; 13(1):5-20.

7. Munjial SM, Amiri M, Sabbarwal S. Role of Job Stress on Job Satisfaction. *Int J Manag Stud* 2019; 6(4):57-60.

8. Fonseca MJM, Juvanhol LL, Nobre AA, Griep RH, Alves MGM, Cardoso LO, Giatti L, Nunes MA, Aquino EML, Chor D. Using Gamma and Quantile Regressions to Explore the Association between Job Strain and Adiposity in the ELSA-Brasil Study: Does Gender Matter? *Int J Enviro Res Public Health* 2017; 14(11):1404.

9. Araújo TM, Graça CC, Araújo E. Estresse ocupacional e saúde: contribuições do modelo demanda-controle. *Cien Saude Colet* 2003; 8(4):991-1003.

10. Barrientos LA, Suazo SV. Quality of life associated factors in Chileans hospitals nurses. *Rev Lat-Am Enferm* 2007; 15(3):480-486.

11. Teixeira JRB, Boery EB, Casotti CA, Araújo TM, Pereira R, Ribeiro IJS, Rios MA, Amorim CR, Moreira RM, Boery RNSO, Sales ZN. Associação entre aspectos psicossociais do trabalho e qualidade de vida de mototaxistas. *Cad Saude Publica* 2015; 31(1):97-110.

12. Fernandes MH, Rocha VM. Impact of the psychosocial aspects of work on the quality of life teachers. *Rev Bras Psiquiatr* 2009; 3(1):15-20.

13. Fleck MPA, Louzada S, Xavier M, Chachamovich E, Vieira G, Santos L, Pinzon V. Aplicação da versão em português do instrumento abreviado de avaliação da qualidade de vida "WHOQOL-BREF". *Rev Saude Publica* 2000; 34(2):178-183.

14. Souza MA. Stancato K. Avaliação da qualidade de vida de profissionais de saúde em Campinas. *Rev At Saude* 2010; 12(49):154-162.

15. Alexopoulos EC, Vassiliki PT, Hristina D. Exploring Stress Levels, Job Satisfaction, and Quality of Life in a Sample of Police Officers in Greece. *Saf Health Work* 2014; 4(5):210-215.

16. Anjara SG, Nellums LB, Bonetto C, Van Bortel T. Stress, health and quality of life of female migrant domestic workers in Singapore: a cross-sectional study. *BMC Women's Health* 2017; 17(98):10-17.

17. Tzeng DS, Chung WC, Lin CH, Yang CY. Effort-reward imbalance and quality of life of healthcare workers in military hospitals: a cross-sectional study. *BMC Health Serv Res* 2012; 12(1):309.

18. Barcaui A, Limongi-França AC. Estresse, Enfrentamento e Qualidade de Vida: Um Estudo Sobre Gerentes Brasileiros. *Rev Adm Contemp* 2014; 18(5):670-694.

19. Marconato RS, Monteiro MI. Pain, health perception and sleep: impact on the quality of life of firefighters/rescue professionals. *Rev Lat-Am Enferm* 2015; 23(6):991-999.

20. Mascarenhas C, Prado FO, Fernandes M. Fatores associados à qualidade de vida de Agentes Comunitários de Saúde. *Cien Saude Colet* 2013; 18(5):1375-1386.

21. Palhares VC, Corrente JE, Matsubara, BB. Association between sleep quality and quality of life in nursing professionals working rotating shifts. *Rev Saude Publica* 2014; 48(4):594-601.

22. Santos RCL, Diez-Garcia RW. Dimensionamento de recursos humanos em serviços de alimentação e nutrição de hospitais públicos e privados. *Rev Adm Publica* 2011; 45(6):1805-1819.

23. Moreno AB, Faerstein E, Werneck GL, Lopes CS, Chor D. Propriedades psicométricas do Instrumento Abreviado de Avaliação de Qualidade de Vida da Organização Mundial da Saúde no Estudo Pró-Saúde. *Cad Saude Publica* 2006; 22(12):2585-2597.

24. Alves MGM, Braga VM, Faerstein E, Lopes CS, Junge W. Modelo demanda-controle de estresse no trabalho: considerações sobre diferentes formas de operacionalizar a variável de exposição. *Cad Saude Publica* 2015; 31(1):208-212.

25. Craig CL, Marshall AL, SjöStröM M, Bauman AE, Booth ML, Ainsworth BE, Pratt M, Ekelund U, Yngve A, Sallis JF, Oja P. International Physical Activity Questionnaire: 12-Country Reliability and Validity. *Med Sci Sports Exerc* 2003; 35(8):1381-1395.

26. Babor TF, Robaina K. The Alcohol Use Disorders Identification Test (AUDIT): A review of graded severity algorithms and national adaptations. *Int J Alcohol Drug Res* 2003; 5:17-24.

27. R Core Team. *R: A language and environment for statistical computing. R Foundation for Statistical Computing.* Vienna: R Core Team; 2017.

28. Nasermoaddeli A, Sekine M, Hamanishi S, Kagamimori, S. Associations between sense of coherence and psychological work characteristics with changes in quality of life in Japanese civil servants: a 1-year follow-up study. *Ind Health* 2003; 41(3):236-241.

29. Edimansyah BA, Rusli BN, Naing L, Mohamed Rusli BA, Winn T. Relationship of psychosocial work factors and health-related quality of life in male automotive assembly workers in Malaysia. *Ind Health* 2007; 45:437-448.

30. Branco JC, Giusti PH, Almeida AR, Nichorn LF. Qualidade de vida de colaboradores de hospital universitário do Sul do Brasil. *J Health Sci Inst* 2010; 28(2):199-203.

31. Almeida-Brasil CC, Silveira MR, Silva KR, Lima MG, Faria CDCM, Cardoso CL, Menzel HK, Ceccato MGB.Qualidade de vida e características associadas: aplicação do WHOQOL-BREF no contexto da Atenção Primária à Saúde. *Cien Saude Colet* 2017; 22(5):1705-1716.

32. Sousa MNA, Vieira TG, Barbosa ALL, Almeida KCS, Araújo LVPN, Lima MTP, bezerra ALD. Estresse, qualidade de vida e trabalho: estudo com agentes da limpeza urbana. *Rev Bras Qual Vida* 2016; 8(4); 281-295.

33. Rosenbluth C, Hidalgo C. La mujer desde uma perspectiva psicológica. In Covarrubias P, Franco R. *Chole, Mujer y Sociedad*. Nova York: UNICEF; 1978. p. 435-457.

34. Ribeiro CLR, Fela AA. Como Médicos se tonaram deuses: reflexões acerca do poder médico na atualidade. *Psi Rev* 2016; 22(2):294-314.

35. Rusli BN, Edimansyah BA, Naing L. Working conditions, self-perceived stress, anxiety, depression and quality of life: a structural equation modelling approach. *BMC Pub Health* 2008; 8:48.

36. Birolim MM, Mesas AE, González AD, Santos HG, Haddad MCFL, Andrade SM. Job strain among teachers: associations with occupational factors according to social support. *Cien Saude Colet* 2019; 24(4):1255-1264.

37. Costa DC, Sá MJ, Calheiros JM. The effect of social support on the quality of life of patients with multiple sclerosis. *Arq Neuro Psiquiatr* 2011; 70(2):108-113.

38. Söderfeldt B, Söderfeldt M, Muntaner C, O'campo P, Warg LE, Ohlson CG. Psychosocial work environment in human service organizations: a conceptual analysis and development of the demand-control model. *Soc Sci Med* 1996; 42(9):1217-1226.