

Psychological demand and control of the work process of public university servants

Denise Cristina Alves de Moura¹
Rosangela Maria Greco¹
Heloisa Campos Paschoalin¹
Luciana Fernandes Portela²
Cristina Arreguy-Sena¹
Alfredo Chaoubah³

Abstract *This cross-sectional research aimed to analyze the psychological demand and work control self-reported by the Education Administrative Technicians of a public university. This is a complete sample selection consisting of 833 Education Administrative Technicians who self-completed a questionnaire with questions structured in 2013/2014. A descriptive bivariate analysis was performed with the calculation of psychosocial stress at work, using the Demand-Control Model quadrants categorized as: low-demand work (low-demand and high-control), reference group, passive work (low-demand and low-control), active work (high-demand and high-control), high-demand (high-demand and low-control) – group with the highest exposure. The study complies with all ethical and legal research requirements involving human beings. There was a predominance of the category of workers performing passive work (n = 319, 39.7%), low work demand (n = 274, 34.1%), high work demand (n = 116, 14.4%) and active work (n = 95, 11.8%). There were contributions from the investigation on the health of these workers insofar as they provided a diagnosis of the category. There is a recommendation for such data to support interventions to empower them and retailer jobs.*

Key words *Workers' health, Work conditions, Professional exhaustion*

¹ Faculdade de Enfermagem, Universidade Federal de Juiz de Fora. Campus Universitário Centro de Ciências da Saúde/ Faculdade de Enfermagem, Martelos. 36036-330 Juiz de Fora MG Brasil. denisematipo@yahoo.com.br

² Escola Nacional de Saúde Pública, Fiocruz. Rio de Janeiro RJ Brasil.

³ Departamento de Estatística, UFJF. Juiz de Fora MG Brasil.

Introduction

In the last four decades, some researchers have turned their attention to the study of work psychosocial factors. Thus, theoretical and methodological proposals were developed to support investigative models^{1,2}. Among the theoretical models that evaluate stress at work are the Demand-Control Model (DCM)² and the Effort-Reward Imbalance (ERI)³.

Karasek proposed a model that emphasizes the way work is organized and that involves two realms, namely, demand and control. Demand is understood as work requirements of a psychological nature, time, speed, productivity and conflicts over contradictory demands. Control refers to workers' power over work, characterized by the possibility of autonomy, decision-making and cognitive abilities^{2,4-6}.

In 1988, Johnson and Hall included another realm in the model, namely, social support, which refers to the interaction between colleagues and bosses in the cooperation for the accomplishment of work, which can contribute to reduced workers' wear and health risks⁷.

Currently, two different instruments in their respective Brazilian versions are used in the country for the Demand-Control Model, and they are: "Job Content Questionnaire (JCQ)" and the reduced scale called the Swedish Demand-Control-Social-Support Scale (DCS), developed by Theorell in 1988^{2,4,5,8,9}.

Stress at work is the result of the combination of high psychological demand, low work process control and low social support from peers and bosses at the workplace^{2,10-12}.

In the tertiary sector of the economy, which is responsible for services, we find university workers who, because they work in the public sector, are often devalued and considered by the population to be inefficient, disinterested and privileged because they have steady job^{13,14}. However, these workers may also be subjected to poor working conditions, with levels of demand and control over work that can lead to psychosocial stress at work, suffering and sickness^{14,15}.

Thus, considering that working and living conditions interfere in workers' health-disease process, this study aimed to analyze the psychological demand and control of work of Education Administrative Technicians (TAEs) from a Public university of the state of Minas Gerais.

Methods

This is a cross-sectional study with full selection composed of the population of Education Administrative Technicians (TAEs) from a public university of Minas Gerais that is part of a broader investigation, called "*Education Administrative Technical Workers: Working and Life Conditions*" (English free translation from the Portuguese).

The following were considered to be eligible: full-time active TAEs from the university that is the setting of the research, of the Juiz de Fora campus. The following were considered ineligible: workers absent due to medical leave, qualification/training leave and travelling to another institution. Of the 1,154 eligible workers, 833 (72.2%) adhered to the study.

A structured questionnaire was used, containing the following sociodemographic variables: age, gender, schooling, marital status, family income in minimum wages.

Issues related to the characteristics and working conditions surveyed were: number of jobs, working hours, weekly workload, university working time, night work and unhealthy, painful and dangerous work, besides issues about psychological demand, work process control and social support through the Brazilian version of the reduced scale of stress at work (Demand-control social support Model). The Summarized Demand-Control Model scale contains 17 questions previously validated for Brazilian Portuguese, with five for assessing demand, six for evaluating control and six for social support^{2,5,16}.

Data collection was performed through the application of self-administered questionnaires delivered to participants, in the institution where they worked. Servants completed the questionnaire only after reading and signing the Informed Consent Form (ICF).

Occupational and sociodemographic characteristics were selected as independent variables, and the Demand-Control Model variables as dependent variables. Data were addressed in the *Statistical Package for the Social Sciences* (Software SPSS®) version 20. Data analysis was performed using descriptive and bivariate statistics of socioeconomic and demographic data, work characteristics, social support, stress at work and characterization according to the activities developed.

The formulation of the Demand-Control Model (DCM) quadrants was used to calculate the psychosocial stress at work, which defines the following categories: low-demand work (low demand and high control), reference group for psychosocial stress at work; passive work (low demand and low control), which can cause reduced ability to solve daily work problems; active work (high demand and high control) are those that enable the worker to develop competences and abilities in their work; high demand (high demand and low control), a group with the highest exposure to stress at work^{2,5,10,11}.

The scores of each realm were obtained by adding the scores of answers and, later, dividing them into two categories from the median, according to Alves et al.¹⁷. With regard to the demand, the cutoff point was 14 points and workers that obtained results of 5 to 14 points had their jobs classified in the low-demand, and values above 14 points were ranked in the high-demand category. With respect to control, the cutoff point was 17 points, and those individuals who obtained a total score between 6 and 17 points were classified as having low-control at work and those with scores above 17 points were classified under high-control at work. Similarly, the cutoff point for social support at work was 17 points, classifying individuals with scores up to 17 points as with low-social support and those above 17 points with high-social support.

We considered a significant association between the variables studied when p-value was ≤ 0.05 according to the chi-square statistical test. The reference group was the low requirement category and the exposure group was the high requirement category (stress at work) in the bivariate analyses.

The Ethics and Research Committee of the university approved the aforementioned project, meeting the fundamental ethical and scientific requirements for conducting research with human beings. In 2013, this same Committee authorized the extension of the research schedule.

Results

Results show that the population of this study consisted of 51.5% of men, with the mean age of workers of 46.1 years (standard deviation ± 10.9 years and variability from 22 to 72 years). Regarding schooling level, 54.4% had postgraduate degrees, and as for marital status, 63.7% of the workers were married or had a stable union.

Regarding the economic classification, 45.8% of workers reported receiving between five and ten minimum wages.

The labor characteristics made it possible to identify that 83.9% of workers had only one job, 82.8% worked fixed hours and 79.1% had a weekly workload ≤ 40 hours. As for length of service, 63.9% had more than ten years of employment. Regarding work shifts, 82.8% of workers did not work at night and 38.3% reported receiving additional wages because they performed dangerous, distressing or unhealthy activities.

TAEs' main activities and posts were characterized as follows: administrative activities (33.9%), specialized technical support (28.2%), health-related activities (25.5%) and logistical support (12.2%).

With regard to demand, control and social support at work, 73.8% of workers showed low-demand and 26.2%, high-demand. Regarding control, 54.1% had low-control and 45.9% had high-control. Most workers showed high-social support (77.4%) and low-social support at work (22.6%) (Table 1).

Table 2 shows the distribution of TAEs in the Demand-Control Model quadrants. The category of quadrants that included the largest number of workers was passive labor, which combined low-demand and low-control (39.7%), followed by low-demand, characterized by low-demand and high-control (34.1%). High-demand work (high-demand and low-control) included 14.4%

Table 1. Characterization of TAEs according to the psychological demands, control and social support at work, dichotomized in the distribution median - Juiz de Fora, 2015 (N = 833)*.

Variables	Absolute frequency (n)	Relative frequency (%)
Demand		
Low	597	73.8
High	212	26.2
Control		
Low	440	54.1
High	373	45.9
Social Support		
Low	184	22.6
High	630	77.4

* Differences in n totals are due to information losses for some variables. Data not reported below 3%.

of workers of the study population. On the other hand, the group with the lowest number of workers was active work, characterized by high psychological demand and high control over work, with 11.8% of workers.

The socioeconomic and demographic variables and DCM quadrants that maintained association with significance were schooling ($p = 0.001$) and monthly income ($p < 0.001$) (Table 3). This study did not show any association with statistical significance between the variables gender, age and marital status and the DCM quadrants.

Variables related to work characteristics and DCM quadrants that were associated with significance were number of jobs ($p = 0.001$), working hours ($p = 0.012$), weekly workload ($p < 0.001$), night work ($p < 0.001$) and time of service ($p = 0.002$) (Table 3). The additional variable for working with unhealthy, dangerous and distressing activities and DCM quadrants were not significantly associated ($p = 0.27$).

Workers with schooling up to full secondary education, low wages, single job, day work, steady shift, weekly workload ≤ 40 hours focused on passive work. The variable length of service at the university for those with lower length of service (1 to 5 years) concentrated in the low demand category.

Table 4 shows the distribution of the study population according to DCM quadrants and social support. The social support variable was significantly associated with DCM quadrants ($p < 0.001$).

It can be noted that the category of quadrants that included the largest number of workers was passive work associated with high social support ($n = 259$, 42.2%). However, regarding low social support, the category of quadrants that included the largest number of workers was high-demand ($n = 62$; 34.4%), which combines high-demand and low-control, and is the exposure group. The group with the lowest number of workers in

Table 2. Characterization of TAEs according to DCM quadrants – Juiz de Fora, 2015 (N = 804)*.

Variables	Absolute frequency (n)	Relative frequency (%)
Demand-Control Model		
Passive work ($\downarrow D \downarrow C$)	319	39.7
Low-demand ($\downarrow D \uparrow C$)	274	34.1
High-demand ($\uparrow D \downarrow C$)	116	14.4
Active-work ($\uparrow D \uparrow C$)	95	11.8

* Differences in sample size are due to loss of information.

Table 3. Comparison between sociodemographic and occupational variables and the DCM quadrants. TAEs – Juiz de Fora, 2015 (N = 833).

	Low demand ($\downarrow D \uparrow C$)	Active work ($\uparrow D \uparrow C$)	Passive work ($\downarrow D \downarrow C$)	High demand ($\uparrow D \downarrow C$)	p value*
Schooling (up to Full Secondary School)	44 25.6%	12 7.0%	83 48.3%	33 19.2%	0.001
Income 1 to 5 minimum wages	63 25.4%	22 8.9%	113 45.6%	50 20.2%	< 0.001
Single job	231 34.6%	66 9.9%	275 41.2%	96 14.4%	0.001
Day work	240 36.5%	66 10.0%	271 41.2%	81 12.3%	< 0.001
Steady work shift	227 34.6%	73 11.1%	274 41.7%	83 12.6%	0.012
Workload ≤ 40 hours	218 34.9%	55 8.8%	270 43.2%	82 13.1%	< 0.001
Length of service: 1 to 5 years	84 44.7%	13 6.9%	74 39.4%	17 9.0%	0.02

* Chi-square test.

the low social support category was active work (high-demand and high control over work), with $n = 23$ (12.8%).

Discussion

Data showed that, in the studied population, a proportional distribution of men and women was noted among workers, and while the difference was small between genders (51.5% and 48.5%, respectively), men predominated. However, we should outline women's work, because in addition to paid work, women still have to devote part of their time to domestic work, to caring for their children and other family members, which can lead to an overload of activities for such workers¹⁸⁻²⁰.

Regarding schooling, 54.4% of the workers had a postgraduate degree, which can be explained by the fact that they work in a public university, have a steady employment, compete for the proportion of vacancies allocated to servants for postgraduate studies that are offered at this university, which encourage their participation in the training process and the development of additional competences.

A study carried out with administrative technicians of a State Higher Education Institution revealed that workers' improved level of education is a positive aspect for the quality of life at work. However, when workers' education level exceeds that required for their jobs and their remuneration is not compatible with their educational background, demotivation, decreased productivity, conflicts with the manager may emerge, among other aspects²¹.

The Demand-Control Model quadrants category that included the largest number of people was passive work (39.7%), which combined low-demand and low-control, which is the second most problematic exposure to health, since it does not allow workers to develop further and propitiates a gradual atrophy of skills learning^{12,22}.

There is evidence of association between stress at work with various outcomes using the DCM, such as hypertension^{17,23}, insomnia²⁴, migraine²⁵, coronary disease²⁶, obesity²⁷, mental disorders²⁸, among others.

In a research conducted in the Pró-Saúde Study, which associated DCM with hypertension in a female population, there was a higher prevalence of hypertension among the group with passive work (28.3%), showing the impact on the health of these workers¹⁷.

On the other hand, the Longitudinal Study on Adult Health (ELSA Brazil), carried out with public servants from five universities, observed that individuals with passive, active and high-demand work were more likely to have a diagnosis of migraine when compared to individuals with low demand work²⁵.

Results similar to this study were found among workers from Finland, where passive work was also predominant in 34% of men and 33% of women²⁹.

However, different results were found with public servants from the Whitehall II study in London, Helsinki Health Study and the Study with Japanese Public Servants, which associated stress at work with adverse health and obesity behaviors. In London, men with passive work were more likely to be physically inactive; the same outcome was found with women in Helsinki.

Table 4. Comparison between the social support variable and the DCM quadrants. TAEs – Juiz de Fora, 2015 (N = 794)**.

Categories	Low Social Support	High Social Support	p-value*
Low demand (↓D ↑C)	38 21.1%	235 38.3%	< 0.001
Active-work (↑D ↑C)	23 12.8%	71 11.6%	
Passive work (↓D ↓C)	57 31.7%	259 42.2%	
High demand (↑D ↓C)	62 34.4%	49 8.0%	
Total	180 (100%)	614(100%)	

* Chi-square test. ** Differences in sample size are due to loss of information.

In addition, London women exposed to passive work were less likely to consume alcoholic beverages and smokers³⁰.

In addition, low-control over the work process and low-demand, that is, the category of passive work, can behave as a discouraging factor, contributing to the increase of job dissatisfaction³¹.

The lack of challenging situations that are relevant to workers can lead to decreased production of the individual and a lower capacity to produce solutions for the activities and problems faced in the daily work life^{2,32}.

Reducing control over work and increasing work demand negative influence on private life were the most important factors associated with reduced work capacity³³.

By associating the sociodemographic and economic variables with the DCM variables, we obtained significant associations with schooling and monthly income. In the category of schooling (until secondary education) and income in minimum wages “from one to five minimum wages” and “from five to ten minimum wages” were concentrated in the passive work category. On the other hand, low demand work prevailed in the income range of “more than ten minimum wages”. Therefore, workers with schooling up to full secondary education and with lower income strata have less control over the work process.

Studies with nursing workers corroborated this study, since a higher frequency of workers in the passive work and high demand categories was identified among subjects of this research, non-graduates and those with lower per capita income. This is to say that both categories involve work with low control. In the study, low-control workers were 1.67 times more likely to develop minor psychiatric disorders when compared to high-control workers, showing how low-control work is harmful to health³⁴.

On the other hand, while workers in this study showed predominantly passive work, they have high social support (77.4%) and only 22.6% of them had low social support when working with employees and bosses. Low social support can negatively affect workers’ health^{5,35}.

In an investigation with hospital workers (public servants) using the DCM, social support and burnout to identify the length of sickness-related absenteeism according to Sick Leave (LTS), a 2.04 increase in the expected LTS days due to low colleague support was noted, which presupposes that, regardless of whether it is related to passive work or not, low social support can contribute to sickness³⁶.

Repeated occupational stress and low work social support among British public servants of the Whitehall II study increased the risk of major depressive disorder (MDD), which demonstrates the relevance of social support at work²⁸.

A survey carried out in France on annual health care costs and sick leave related to work-related stress concluded that the economic effect of work stress-derived illnesses contribute to the formulation of public policies with emphasis on preventive actions³⁷.

Study limitations

Among the limitations of this study, we can mention that the fact that the population studied has a public job, is part of the university, characterized as being a tertiary sector service and having a steady job in the labor market does not allow data to include the general population, although it allows comparisons with populations with similar characteristics.

The type of design used is also a limitation of the study, since cross-sectional studies do not allow the establishment of a temporal relationship between events, that is, causality cannot be assigned to the exposure-outcome relationship³⁸.

Another limitation inherent to this study is the different ways of assessing exposure to stress found in literature. In other words, there are multiple ways to categorize psychological demand and control scores. In addition to the formulation of quadrants, it is common to use the continuous forms of the model’s realms³⁹, the demand-control ratio, in addition to the logarithmic formulations of subtraction⁴⁰. It may be that the different categorization methods found in literature have hampered the comparison of studies^{38,41}.

Final considerations

When analyzing the psychological demand and control of TAEs’ work of a public university in the state of Minas Gerais, it was possible to identify that the category of passive work predominated among the study population.

The positive aspects of this research are: socio-demographic heterogeneity and employment stability, which contributed, respectively, to the variability of social determinants of health in this population and to the possibility of monitoring workers in the long term and to the variety of oc-

cupations performed by the TAEs, since it is appropriate for the theoretical model used in this research (Demand-Control Model Social Support).

As contributions to the health of these workers, interventions are suggested so that these workers become agents of change in the work processes they perform and so be responsible for the decisions made in their daily work routine. Jobs re-adaptation is suggested, considering the results found in this research, according to the four DCM quadrants, so that workers can perform activities that are appropriate to their profiles.

In order to be able to think about public policies in universities, in addition to epidemi-

ological studies such as this one, it is important to carry out research with qualitative approaches to verify workers' perceptions about their work process, to answer questions that include human beings complexity, verticalizing in subjective aspects. In addition, it is necessary to involve the higher levels of the university and unions of the professional categories in order to raise people's awareness on the necessary changes.

Thus, we emphasize that this study is the first stage of a broader research that intends to support a prospective cohort study, which may contribute to remedy some of the hardships shown above and enable other analyses and discussions on TAEs' health.

Collaborations

DCA Moura participated in the project, collection, analysis and interpretation of data, the writing of the paper, its critical review and approval of the version to be published. RM Greco participated in the project's design, analysis and interpretation of data, the writing of the paper, its critical review and approval of the version to be published. HC Paschoalin, LF Portela and C Arreguy-Sena participated in the analysis, interpretation of data and writing of the paper. A Chaoubah participated in the project and data analysis.

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