Health Behaviors and Occupational Stress of Brazilian Civil Servants Living in an Urban Center

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Background *Occupational stress and unhealthy lifestyles are common characteristics of urban workers. The association between health behaviors and job stress of urban Brazilian civil servants was studied.*

Methods *A cross-sectional study included 893 workers. Health markers, the dependent variables, were: Fruit/vegetable (FV) and alcohol (A) intake, physical activity (PA), including at work (PAW), smoking (S), BMI $\geq$ 25 Kg/m^2. Occupational stress, assessed by Job Stress Scale-Brazilian version, classified employees into: High-strain, Low-strain, Active, and Passive. Prevalence rates and multivariate Poisson models were adopted.*

Results *On average, employees (mean age = 40.2 years; 69.1% female) reported healthy lifestyle factors: FV (56%); PA (59.7%); S (13.3%); however, 49.4% were overweight. Compared to low-strain, high-strain workers reported higher PAW; passive workers lesser PA and higher PAW. After adjusting for socio-demographics and work characteristics, the occupational stress dimensions were no longer associated to health behaviors.*

Conclusions *Our results do not support the hypothesis of an effect for occupational stress on urban employees' health behaviors.* Am. J. Ind. Med.

KEY WORDS: urban health; health behaviors; lifestyle; job strain; stress; overweight; exercise; smoking; alcohol; nutrition

INTRODUCTION

The world is rapidly urbanizing with significant changes in people's living and working conditions, lifestyles, social behavior, and health. Rising levels of diabetes, obesity, and other chronic conditions have attracted considerable attention and a wide variety of interventions are being implemented. Objectives include achieving a healthy diet, increased physical activity, tobacco control, and reduced stress whether at the individual level or at the workplace [WHO, 2011].

The workplace has long been identified as promising for health promotion [Niknian et al., 1991; Landsbergis et al., 1998; Salmon et al., 2000; Campbell et al., 2002; Noblet, 2003; Beresford et al., 2007; Devine et al., 2007]. Job characteristics can be used to identify potential target groups for preventive initiatives. A large literature shows differences by occupational categories. For example, less-skilled workers

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have been more likely than higher status occupational groups to experience higher mortality and morbidity rates for chronic degenerative conditions such as cardiovascular disease (CVD) [Niknian et al., 1991; Kaplan and Keil, 1993; Landsbergis et al., 1998; Salmon et al., 2000; Campbell et al., 2002]. Occupational categories may show differences in health-related behaviors such as diet and physical activity that contribute to chronic disease [Burton and Turrell, 2000; Devine et al., 2007].

Besides occupational categories, reviews of the literature have identified a range of psychological, environmental, and social factors that may influence a person's propensity to engage in healthy eating and regular physical activity [Burton and Turrell, 2000; AlQuaiz and Tayel, 2009; Nomura et al., 2010]. Among these determinants, the most common individual-level barrier to healthy diet is the lack of willpower [AlQuaiz and Tayel, 2009], and the cost of healthy foods [Pawlak and Colby, 2009]. Likewise, the ''lack of time'' due to work commitments and responsibilities is one of the most commonly reported barriers to participation of physical activity [Burton and Turrell, 2000; Craig et al., 2002; Kouvonen et al., 2005; Toscos et al., 2011].

Evidence has been accumulating that adverse psychosocial job characteristics predict CVD. In occupational stress research, the job demand-control model is currently the most prevailing model that demonstrates such evidence. This model posits that a worker with a combination of high psychological job demands and low control over his/her job (i.e., job strain) has a risk of developing an illness [Tsutsumi et al., 2003]. Additionally, the job strain could influence the willingness or the ability of workers to engage in a health-enhancing behavior, thus influencing CVD risks [Hellerstedt and Jeffery, 1997; Wemme and Rosvall, 2005].

To our knowledge, there are few studies on healthy behaviors and job strain with workers in urban settings. Urban settings are an important context to consider because population density may provide a foundation of stressors from which to examine the possibly additive effect of job strain. However, available studies show mixed or inconclusive results between occupational stressors and healthy behaviors (such as healthy diet, alcohol intake, smoking, and physical activity) [Landsbergis et al., 1998; Ng and Jeffery, 2003; Tsutsumi et al., 2003; Nomura et al., 2010].

The purpose of this study was to examine the putative association of job stress and health behaviors among 893 urban dwellers who were civil servants from a public institution in Minas Gerais, Brazil, as part of ''*Move-se Hemominas Study*''. The framework we used to examine the link between job strain and health behaviors was the demand-control model [Karasek, 1985; Theorell et al., 1988; Alves et al., 2004]. We focused on job stress characteristics because these may be more amenable to intervention with occupational health staff than individual lifestyle factors [Landsbergis et al., 1998; Schwarzer, 2008; Gimeno et al., 2009].

MATERIALS AND METHODS

Design and Study Population

The ''*Move-se Hemominas Study*'' is an occupational component of an extensive population-based project named ''*Saúde em Beagá Study*'' conducted by the *Urban Health Observatory of Belo Horizonte* at the Federal University of Minas Gerais, Brazil.

The occupational survey was conducted with the aim to investigate the lifestyle characteristics of urban workers, job stress by the demand-control model, and social and neighborhood factors, which could shape health-related behaviors. We administered the stress scale use at work (*Job Stress Scale*—JSS), Theorell's version, translated and adapted to Portuguese by Alves et al. [2004] in this sample of civil servants. Data for the analysis came from four workplace units of the public institution, carried out from September to November 2009.

The Hemominas Foundation is a government agency of Hematology and Hemotherapy of the state of Minas Gerais, which serves two purposes. First, it is the state blood bank meeting the international norms of hemosurveillance and second, it is the reference institution for the diagnosis and treatment of patients with hemoglobinopathies (especially sickle cell) and bleeding disorders (hemophilia) [Rodrigues et al., 2008]. The Foundation acts as a network, with administration and technical coordination located in Belo Horizonte and have 23 regional units that enable the donation and provision of blood components to meet the society demand throughout the state of Minas Gerais. It has a diversity of occupational groups including professional, administrative, technical, and lower level employees. For the purposes of this study, we decided in conjunction with institutional leadership to restrict the sample to sites located in the Belo Horizonte City and units located in the surroundings of 50 miles (100 km) of the capital, because of their similar characteristics, regarding function and employees.

Out of a list of 1,133 eligible and active workers provided by the Institution in the selected centers, 893 agreed to participate (78.8% response rate). Most of them (85.5%) worked in Belo Horizonte City units; with the rest who worked at minors units, in three inner cities of state (Betim, Sete Lagoas, and Divinópolis). Eligibility consisted of workers at least 18 years old, had worked for at least three months at the facility, were not students, and were present (e.g., not on vacation). The study was approved by the Institutional Review Board of Hemominas

Foundation (number 228/2009), and written informed consent was obtained from all participants.

Data Collection

Data collection followed several steps planned during several meetings in each site. Eligible workers were invited and enrolled upon scheduling of the interview in accordance with each unit. Workers were then presented with a disclosure and consent form. Consenting individuals were then provided a self-administered questionnaire instrument regarding the occupational stress and other working variables. They also underwent to a face-to-face interview carried out by trained interviewers that included information on socio-demographics, lifestyle, social determinants, health conditions, and self-perception of neighborhood environment. Finally, anthropomorphic measurements were obtained which included weight and height measurement and bioelectrical impedance analysis as described below.

Body mass was measured using a Tanita Ironman InnerScan® (Model BC553) digital scale to the nearest 0.1 kg. Height was measured by a portable stadiometer (Compact Wood®) with a maximum length of 2 m and an accuracy of 0.1 cm. After these two measures, body mass index (BMI) was calculated by dividing body mass by the square of height. Body fat assessed by bioelectrical impedance (Biodynamics® 450 model) was estimated as described in detail elsewhere [Kyle et al., 2004]. All the measurements were checked by trained nutritionists.

At the end of the interview, participants received a ''pocket guide'' on the *Ten Steps to Healthy Eating* provided by the Brazilian Ministry of Health [MS, 2011] with his/her anthropometric information and an individual health orientation.

Variables Collected

Dependent variables

The following outcomes were examined: (a) Overweight and obesity as defined by the BMI $\geq$ 25 kg/m^2 [WHO, 2000]. (b) consumption of fruits and vegetables, using the following questions: ''*How many days a week do you usually eat fruit?*''; ''*How many days a week do you usually eat cooked greens and vegetables, such as kale, carrot, christophine (chayote), aubergine (eggplant) or courgette (zucchini), without counting potato or manioc (cassava)?*'' From the responses given, a single indicator of regular fruit and vegetable intake was created, using a cut-off of consumption on five or more days a week of them; (c) physical activity: Measured by a question framed as any practice of physical activity in the last 12 months (coded as yes or no); (d) active at work, framed as ''*Do you walk a lot and also carry heavy loads at workplace*''; (e) smoking status (coded as current and former/never), and (f) alcohol consumption, defined by ''*Do you drink alcohol?*'' treated as a dichotomous variable.

Independent Variables

Assessment of occupational stress

Occupational stress was assessed using the Brazilian's short version of the psychological and control demand scale (JSS), Theorell's version, which has 11 questions, which was translated and adapted to Portuguese by Alves et al. [2004]. This instrument has already been tested and used in other studies in Brazil [Alves et al., 2004, 2009; Sampaio et al., 2009; Aguiar et al., 2010].

The control and demand dimensions were presented in a Likert-type scale (1–4), ranging between ''*frequently*'' and ''*never/rarely*''. A value between 1 (least frequent) and 4 (most frequent) was attributed to each response given by participants. Each of the dimensions includes a question with a reverse meaning (For two items, *enough time* and *repetitive work*, scores are reversed) (Appendix).

Both scores of the ''demand'' and ''control'' dimensions were dichotomized at their medians (13 and 16, respectively). Based on the combination between less/more demand and less/more control, participants were sorted into the four quadrants of work environment classification: *Low strain* (low demands and high control), *active* (high demands and high control), *passive* (low demands and low control), and *high strain* groups (high demands and low control) [Virtanen et al., 2007].

Potential confounders

To assess the independent effect of job strain, multivariate analyses included the following variables:

Socio-demographic variables selected as potential confounders were: Gender, age (younger than 35 years, 35–44 years, 45–54 years, and older), marital status (with partner vs. not), and education ($<$8 years; 9–12 years, and $>$12 years).

Other job characteristics: The current occupation was defined through two questions involving type of work and its features. Then, the occupations were classified according to the *Brazilian Classification of Occupations* [CBO, 2002], based on *International Standard Classification of Occupations* [Andreotti et al., 2006; ISCO, 2010]. Individuals were then classified into three categories based on the Erikson–Goldthorpe–Portocarrero scheme of structural classes [Erikson and Goldtorpe, 1992] as ''*professionals and, managerial positions*'', including professionals (higher level) or other high-ranked employees (e.g., doctors and managers); ''*routine non-manual work*'', which

had a large proportion of administrative staff and technical; and, ''*manual workers*'', encompassing janitors, security personnel, drivers, or other similar jobs. The monthly per capita income from work (at the time of interview) was coded in <3, 3–5, and >5 minimum wages. Additionally, ''weekly working hours'' (coded as ≤40 hr/week or >40 hr/week), ''overtime work'' (by question ''*Do you work beyond their scheduled work hours?*''), ''shift work'' (by ''*Do you work on a shift work system*?''), ''no have breaks at work'' (''*Don't you get pauses during your work journey?*''), and ''*Do you adopt positions that may cause muscle pain*'' *in or outside*''*at work*'' which was coded as Often/Sometimes, Rarely/Never.

Statistical Analysis

The internal consistency of the JSS was calculated using Cronbach's alpha and compared to other studies carried out in Brazil, and minimum values for considering that different items consistently evaluate a same construct were used according to Rowland et al. [1991], Bland and Altman [1997], Alves et al. [2004], and Sanne et al. [2005] for group comparisons.

Descriptive analysis was performed using frequency distribution (%) of outcomes and independent variables. The analysis of the association between heath behaviors outcomes and job-strain groups were assessed by Pearson's Chi-square tests. Differences were considered statistically significant at $P \leq 0.05$. Associations between variables were expressed as crude and adjusted prevalence ratios and their respective 95% confidence intervals, using Poisson regression models with robust variance. Analyses of data were performed using STATA (V.10.0).

RESULTS

In this study, the internal consistency estimates (Cronbach's alpha) for the demand and control at work dimensions (0.76 and 0.62, respectively), were similar to those presented by Alves et al. [2004] (0.72 and 0.63, respectively).

Table I shows the subjects' characteristics of study. Mean age ± SD of the participants was 40.2 ± 11.1 years. Participants were mostly women (69.1%), younger (18–44 years) (60.3%), and educational attainment >12 years (60.4%). Slightly more than half (50.7%) reported having a partner.

Regarding occupation, 59.1% of the participants had routine non-manual occupations yet 53.3% reported earning the Brazilian minimum wage. For the workload, few (15.5%) had more than 40hr/week and most never or rarely had overtime work (58.7%) or shiftwork (75.8%). The majority (77.9%) reported body positions that might cause muscle pain both at and outside work. The stress scale results showed 29.6% of public servants could be classified as low demand and high control (low strain), 21.4% were high demand and low control and (high strain), and 19.0% were in the high demand and high control (active) group.

Most employees (86.8%) were non-smokers and 53.9% consumed no alcohol. Although 56% reported regularly eating fruit and vegetables and 59.5% were physically active both ''outside'' and ''at work'' (36.4%), almost half (49.4%) were overweight.

Table II shows bivariate associations between job stress groups and the dependent variables. Occupational stress was associated with regular fruit and vegetable consumption, and physical activity ''in and outside'' of work ($P \leq 0.05$). Participants in passive jobs reported less consumption of fruits/vegetables (49.6%) and less physical activity (51.0%) than those in other categories of occupational stress. On the other hand, high strain groups were more active at work than others.

Using the low strain group as the reference, there were no differences between the other groups in regular fruit and vegetable consumption, and physical activity ''outside'' of work was negatively associated with the passive work group (although this group has more activity at work). After accounting for potential confounders-adjustment in a multiple logistic regression analyses, healthy behaviors outcomes selected for this study were not associated with job stress categories as defined by high strain, active, and passive work group, using low strain group as reference (Table III).

DISCUSSION

The major finding of this study was the lack of association between job strain and health related behaviors such as healthy eating, physical activity, and smoking.

Earlier studies have reported an association between job stress and healthy behaviors, since both variables have characteristics that may influence (direct or indirectly) the risk of chronic diseases [Siegrist and Rödel, 2006; Hellerstedt and Jeffery, 1997]. However, evidence for the impact of job characteristics on health behaviors has produced mixed results [Landsbergis et al., 1998; Van Loon et al., 2000].

Some authors have suggested that psychosocial factors including working conditions might shape health behaviors [Hellerstedt and Jeffery, 1997; Ng and Jeffery, 2003; Kouvonen et al., 2007]. Thus, employees under high psychosocial job strain (high demands and low control) would be more prone to have adverse effects to health and job strain can be used as independent indicators of work stress [Hellerstedt and Jeffery, 1997; Landsbergis et al., 1998; Van Loon et al., 2000; Kuper and Marmot, 2003]. Intuitively, high work stress might lead to an increase in

TABLE I. Characteristics of Participants, Move-se Hemominas Study, Minas Gerais/Brazil, 2009 (n = 893)

	n	%
Gender		
Men	276	30.9
Women	617	69.1
Age (years)		
18–34	304	34.0
35–44	235	26.3
45–54	274	30.7
≥55	80	9.0
Marital Status[a]		
Without partner	439	49.3
With partner	451	50.7
Education (years)		
0–8	65	7.2
9–11	289	32.4
≥12	539	60.4
Occupation[b]		
Professionals	206	23.1
Routine non-manual	528	59.1
Manual workers	159	17.8
Income from work (mw)[c,d]		
<3	468	53.3
3–5	218	24.8
≥5	192	21.9
Weekly working hours[e]		
≤40 h/wk	733	84.5
>40 h/wk	135	15.5
Overtime work[d]		
Frequently/sometimes	366	41.3
Rarely/never	520	58.7
Shift work[d]		
Frequently/sometimes	214	24.2
Rarely/never	671	75.8
No breaks at work[d]		
Frequently/sometimes	451	50.9
Rarely/never	435	49.1
Adopt positions that cause muscle pain "in or outside" at work[d]		
Frequently/sometimes	690	77.9
Rarely/never	196	22.1
Occupational stress[d]		
High strain	189	21.4
Low strain	261	29.6
Active work	168	19.0
Passive work	265	30.0
Smoking status[d]	117	13.2
Alcohol consumption[d]	409	46.1
Physical activity (PA)[d]	528	59.5
Activities at work[d,f]	321	36.4
Regular fruit and vegetable consumption (≥5 days/week)[d,g]	496	56.0
Overweight/obese[h]	426	49.4

[a]2 missings.
[b]determined through a question involving type of work and features of the occupation level (based on Brazilian classification of occupations).
[c]mw (minimum wage): R$ 465.00.
[d]5–15 missings.
[e]25 missings.
[f]At work, you walk a lot and also carry heavy loads.
[g]Combined consumption of fruits and vegetables on five or more days a week.
[h]31 missings.

the consumption of fatty and sweet (or comfort) foods, while intake of fruits, vegetables, fish, and meat may be reduced at least among susceptible individuals. Presumably high job strain might also inhibit physical activity and could become related to increased heavy drinking and smoking. Likewise, it might be intuitive that job stress be expressed in the form of overweight or obesity. However, evidence on work-related determinants of these behavioral risk factors is inconclusive, and comparative studies are especially lacking [Lallukka et al., 2008].

Ishizaki et al. [2004] showed no significant interactions of demand-control job with BMI. The same authors, later (2008), pointed out the bidirectional effect of work stress on BMI as one reason for the inconsistent correlation between work stress and BMI, because work stress could not only lead to hyperphagia but also to hypophagia.

The indicator for physical activity practice (outside at work) may also not have been well evaluated in this study simply because it was dichotomized (physical activity was measured by self reports). Furthermore, impression management might have affected responses, although this was not assessed in the current study. Work commitments can be a potential barrier to physical activity practice [Kouvonen et al., 2005] and employees really may be constrained by other time demands, such as family care giving activities [Burton and Turrell, 2000].

Work characteristics are modifiable and may therefore provide a potential target for influencing lifestyle in working populations [Gimeno et al., 2009]. The physical activity is an important component of healthy lifestyle [Wemme and Rosvall, 2005]. But, some surveys have shown that in the context of psychosocial work conditions, it has been hypothesized that jobs combining low psychosocial demands and low control over one's work situation (i.e., passive jobs), which lack challenge and are depleted of meaningful content, may be conducive to a passive lifestyle such as low levels of leisure time physical activity.

TABLE II. Health Behaviors and Job Strain Domains, Move-se Hemominas Study, Minas Gerais/Brazil, 2009

	Occupational stress										
	Total		High strain		Low strain		Active work		Passive work		
	n	%	n	%	n	%	n	%	n	%	*P*-value
Overweight (BMI $\geq$25 Kg/m^2)	422	49.5	81	45.2	131	51.4	80	50.3	130	50.1	0.628
Regular fruit and vegetable consumption[a]	491	56.0	110	58.8	145	55.9	105	62.9	131	49.6	0.043
Physical activity (PA)	525	59.7	111	58.7	169	65.2	105	62.9	140	51.0	0.030
Smoking status	117	13.3	27	14.3	28	10.8	23	13.7	39	14.7	0.554
Alcohol consumption	406	46.2	79	41.8	127	49.0	86	51.5	114	43.2	0.160
Active at work[b]	321	36.4	95	50.3	77	29.6	46	27.5	103	38.9	$<$0.001

[a]Combined consumption of fruits and vegetables on five or more days a week.
[b]At work, you walk a lot and also carry heavy loads.

[Gimeno et al., 2009] Empirical evidence of this relationship is mostly cross-sectional, but still inconclusive, with some studies reporting effects [Hellerstedt and Jeffery, 1997; Brisson et al., 2000; Kouvonen et al., 2005; Wemme and Rosvall, 2005; Gimeno et al., 2009] and some none [Landsbergis et al., 1998; Van Loon et al., 2000; Tsutsumi et al., 2003].

In this study, we observed a similar pattern only in the unadjusted analysis, i.e., workers in passive work were less likely to report the practice of physical activity as compared to those in low strain work. But, after adjusting for confounders, the effect of the association ceases to be observed.

Kouvonen et al. [2005] reported that workers with jobs that are demanding and which at the same time seriously limit control, take part less in organized and goal-oriented activities outside work. They have also suggested that high job strain could impede the implementation of exercise intentions.

While a large number of studies have demonstrated that regular LTPA accounts for a significant protection against CVD, conflicting findings on the beneficial effects

TABLE III. Unadjusted and Adjusted Models of Health Behaviors by Job Strain Domains, Move-se Hemominas Study, Minas Gerais/Brazil, 2009

	Unajusted			Ajusted[a]		
	High strain	Active work	Passive work	High strain	Active work	Passive work
	RP (CI95%)	RP (CI95%)	RP (CI95%)	RP (CI95%)	RP (CI95%)	RP (CI95%)
Overweight	0.88	0.98	0.98	0.96	1.01	1.04
	(0.72–1.08)	(0.80–1.19)	(0.82–1.16)	(0.78–1.19)	(0.82–1.25)	(0.87–1.24)
Regular fruit and vegetable consumption[b]	1.05	1.12	0.88	1.06	1.07	0.95
	(0.79–1.10)	(0.76–1.04)	(0.90–1.26)	(0.91–1.26)	(0.91–1.27)	(0.81–1.13)
Physical activity (PA)	0.90	0.96	0.81	0.99	0.89	0.90
	(0.77–1.04)	(0.83–1.12)	(0.70–0.94)	(0.85–1.17)	(0.76–1.04)	(0.77–1.05)
Smoking status	1.32	1.27	1.37	1.55	1.39	1.40
	(0.81–2.17)	(0.76–2.13)	(0.86–2.15)	(0.92–2.62)	(0.81–2.42)	(0.87–2.24)
Alcohol consumption	0.85	1.05	0.88	0.93	0.98	0.91
	(0.69–1.05)	(0.86–1.27)	(0.73–1.06)	(0.74–1.17)	(0.79–1.20)	(0.75–1.11)
Active at work[c]	1.70	0.93	1.31	1.19	0.89	0.95
	(1.34–2.15)	(0.68–1.27)	(1.03–1.67)	(0.92–1.52)	(0.65–1.21)	(0.74–1.21)

The low-strain category was used as a reference group in all the analyses.
[a]Adjusted for gender; age (years); marital status; education (years); income from work (minimum wage: R$ 465.00); occupation (determined through a question involving type of work and features of the occupation level (based on Brazilian Classification of Occupations)); weekly working hours; adopt positions that cause muscle pain "in or outside" at work; no breaks at work; shift work; overtime work.
[b]Combined consumption of fruits and vegetables on five or more days a week.
[c]At work you walk a lot and also carry heavy loads.

of occupational physical activity (OPA) have been reported [Sofi et al., 2007]. Our findings suggest no effect.

The literature notes that "less-skilled workers" report significantly more OPA than those "professionals" [Salmon et al., 2000], but otherwise are less active during leisure time. Some reasons for low leisure time activity have been proposed including that people from blue-collar occupations may be obliged to live in distant suburbs, and be more reliant on public transport, thereby adding extra time to the working day. The lack of time due to balancing multiple roles and responsibility in or outside workplace also were reported [Lisenko, 2006].

This finding highlights the importance of assessing different domains of physical activity [Salmon et al., 2000], in particular at workplaces and considering psychosocial work conditions, extending also the information for beyond workplaces.

Smoking status and alcohol intake were also not associated with occupational stress, as observed in other studies [Hellerstedt and Jeffery, 1997; Landsbergis et al., 1998; Ng and Jeffery, 2003; Tsutsumi et al., 2003]. It is known that the direct effects of cigarette smoking and alcohol consumption on health are often difficult to study, because both are related to other health behaviors that independently affect health and chronic disease risk [French et al., 1996].

The findings here indicate that work-related stress is not consistently associated with the healthy behaviors selected that contribute with CVD risks highly prevalent in advanced societies. We went one step further, namely, to inspect possible influences of neighborhood of residence. Thus, not only the characteristics of work or occupational stress could determine their life behaviors, but also aspects of their neighborhood (walkability, security, recreational spaces, cohesion social, and offer access to healthy food), socioeconomics, social capital, and other factors related to the act of living in cities, which can shape and determine the occurrence of chronic diseases as a whole [Proietti and Caiaffa, 2005; Nomura et al., 2010]. No important associations were identified. Given the stresses and strains of an urban environment where traffic, violence, air pollution might impede outdoor physical activity outside of work, this topic merits additional attention reinforces the fact that studying the occupational environment in the context of urban health in all its complexity becomes necessary. Perhaps the lack of association for job strain and health behaviors was related in part to the study being conducted in an urban environment. Future studies will likely be able to better disentangle this set of factors.

As is well known, the healthy behaviors were constructed concomitantly to stages industrialization, economic progress and growing proportion of industrial populations. In particular, the epidemiologic and nutritional transitions contributed with determination of patterns healthy behaviors, globally. From birth cohort studies, childhood and adolescence, for example, are important stages in the formation of health-risk behavior. Healthy behavior change encompasses a variety of social, emotional, and cognitive factors. Therefore, the contribution of work stress in adult life, toward maintaining, intensifying, or quitting these types of behavior deserves attention in a life course perspective [Siegrist and Rödel, 2006].

CONCLUSION

Our results do not support the hypothesis of occupational stress effects on urban employees' health behaviors. We intended to advance our understanding beyond the occupational environment in factors related to urban context, to neighborhood, interpersonal interactions, social support, and environmental influences that could modulate the health behaviors on different occupational stress levels.

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Appendix. Demand control support questionnaire [Adapted from Hökerberg et al., 2010]

Psychological demands

(1) Do you have to work very fast? (work fast)
(2) Do you have to work very intensively? (work intense)
(3) Does your work demand too much effort? (work effort)
(4) Do you have enough time to do everything? (enough time)
(5) Does your work often involve conflicting demands? (conflicting demands)

Decision latitude

Skill discretion

(6) Do you have the possibility of learning new things through your work? (learning new things)
(7) Does your work demand a high level of skill or expertise? (skill level)
(8) Does your job require you to take the initiative? (requires initiative)
(9) Do you have to do the same thing over and over again? (repetitive work)

Decision authority

(10) Do you have a choice in deciding HOW you do your work? (how to do the work)
(11) Do you have a choice in deciding WHAT you do at work? (what to do at work)