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Perceptions of working and living conditions among industrial male and female workers in Perú

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Abstract

Objective: To further investigate Peruvian blue collar workers' perceptions of their conditions of work and find out relationships between these conditions and overall worker well being.

Methods: A survey study conducted on-the-job via a self-administered questionnaire translated into Spanish. Main study variables included work satisfaction, self-reported health status, musculoskeletal pain, and mental distress symptoms. Working conditions and extra-organizational factors were included in this multilevel assessment using multiple regression analyses.

Participants: Blue collar workers from the formal manufacturing sector in Lima, Perú.

Results: A total of 305 women and 761 men completed the questionnaires. Female and male perceptions of their work environment differed significantly in magnitude and occasionally in direction. Among women, the extra-organizational factors played a key role in perceived mental distress. For men, task and organizational aspects together with the extra-organizational factors were important correlates of life and work satisfaction.

Conclusions: The combination of higher strain due to work plus extra-organizational factors for women is an important finding in this study and is critical for developing ideas about interventions in IDCs. Inclusion of extra-organizational factors contributed to a better understanding of workers' job satisfaction and health.

Keywords

Working conditions; gender differences; industrial workers; job satisfaction; industrially developing countries

1. Introduction

Work is a basic need that gives meaning and content to life [14]. However, every year, work-related injuries and illnesses are estimated to take some 2 million lives worldwide [20]. In Developing Countries (IDCs), which are home to 75% of the world's workforce, the reality is discouraging: long working hours, heavy physical workload, poor occupational safety and health conditions, threats and discrimination, low wages and poor benefits are common.

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In the developed world there is extensive evidence regarding the effects of poor working conditions on worker's mental and physical health [3,5,9,12,14,17,19,21,31,33,35]. Unfortunately, there have been few parallel studies on the effects of working conditions in IDCs. Most of the available studies have investigated only single aspects of the work system (a 'micro' approach), and rarely has the relationship between working conditions and workers' health or satisfaction been assessed.

The situation of working women in IDCs deserves special attention: "Most women have few choices as to where they can work. They end up doing work that can be heavy, dirty, monotonous, low paid and which involves long hours of work with no access to health services. Women are caught in a vicious circle whereby the majority lack opportunities for education or have few qualifications, especially those from the lower economic levels" [13].

1.1. Overview of working and living conditions in Perú

According to the National Institute of Statistics and Informatics [16], men and women respectively account for 55% and 45% of the economically active workforce in Perú. The Peruvian working class has been described as continuously struggling to make a decent living and meet the basic needs of themselves and their immediate families [26]. Data from the National Institute of Statistics and Information¹ reveal that 54% of the Peruvian population (14 million people) lives below the poverty line, defined as a daily expenditure of less than \$2. Almost 4 million live under extreme poverty, with a daily expenditure of less than \$1. The target population for this study was from the urban setting, where at least 40% of households were living below the poverty line in the previous decade (Fig. 1).

Workers in Perú have one of the lowest daily minimum wage levels in South America, \$183 per month [25²]. These wages do not correspond with the length of the work day observed in almost all Peruvian industrial workplaces. Overtime, daily work shifts of 10–12 hours, and a 48 working hours/week regulation that is barely enforced, turn the situation into a difficult one to sustain. It is important to note that unemployment is higher among women than men, and approximately 50% (6.2 million) of the working population are underemployed.

Parodi [26] studied workers' everyday lives in Perú by interviewing metalworkers in the metropolitan area of Lima. He described the poor working conditions, barriers to labor organization, and desperate living conditions which in turn exacerbated their daily experiences at the workplace. Beyond the work environment, workers dealt with lack of access to water and sanitation services, inadequate transportation systems, high unemployment and underemployment levels, discrimination, poor education system, an unstable national economy, and lack of regulation and enforcement of the minimum basic labor laws from the government and its agencies. Parodi also claimed that, contrary to the view of employers that workers represent nothing more than "*a brutish labor source with little imagination or initiative*," Peruvian workers were "*bright and energetic human beings with lots of ingenious ideas*" to counteract the negative effects of their environment. The

¹Cited as *Instituto Nacional de Estadística e Informática – INEI*.

²Cited as *Ministerio de Trabajo y Promoción Social – MTPS*.

work of Parodi provides a socio-ecological view of the quality of working life for Peruvian workers by describing the various challenges at and outside the work environment, and most importantly, by highlighting how these workers continue or sustain their daily lives with inner strengths and their respect to their own cultural values.

2. Research model

The conceptual framework for the present study was based on a research model [1] that incorporated: 1) working conditions and workers' health and satisfaction, and 2) the complex system of working conditions and the physical environment. Cooper and Marshall's model of stress at work [6] considers five categories: stressors intrinsic to the job, role in the organization, career development, relationships at work, and organizational structure and climate. They also included an extra-organizational category of stressors such as family problems, life crises, and economic aspects. This model of stress at work proposes a mechanism by which the 5 work system variables are related to each other and maintain a direct relationship to worker health outcomes. The inclusion of extraorganizational aspects was one of the main reasons why we used this model to elaborate our own conceptual framework in our assessment of the quality of working life of workers in a developing country.

The second model that helped us shaped our conceptual framework was taken from a pioneering work from the International Labor Organization (ILO) [5]. In this book, the authors propose a model of working conditions and environment where the living environment, economic constraints, and the political, economical and social context continuously interact and impact the quality of life of the worker together with the work system elements. This ILO framework and the one suggested by Cooper and Marshall contain important ecological variables such as the political, economical, and social context that do matter especially within an industrially developing country. Investigation of workers' lives should consider not only on-the-job factors but also factors external to the work environment. The conceptual framework used in our study (Fig. 2) also included the examination of the impact of gender.

The goal of this research initiative was to examine how work and community environments contributed to workers' perceived satisfaction and health in Perú, and whether there were differences in the perceptions of female and male blue-collar workers. By examining the gender differences we were trying to increase our understanding of what aspects matter most for women and men as relates to their perceived overall health and satisfaction. Finding out those relationships seemed important because there is very little research evidence of these differences in a developing country and also because there was a strong motivation to collect data on these differences other than the subjective data coming from one of the author's years of experience in industrial environments in Perú and her knowledge of sociocultural attributes of the Peruvian work environment.

3. Methods

3.1. Participants

The target population selected for the study was the blue-collar, manufacturing workforce of Lima, the capital of Perú. Two databases were used to select potential participant industrial companies, one from the National Society of Industries [29] and the other from an electronic web-based database from a major Peruvian newspaper [8]. The companies included were industrial manufacturing firms and belonged to the formal sector of the economy. The initial list was narrowed down to 96 companies that listed an electronic mail address in their contact information. Invitation letters describing the project and the data collection process were sent to all 96 companies. Several companies requested and received a copy of the questionnaire, the project timeline, and the promise of a report on the study findings.

A total of 12 companies agreed to participate. They represented the textile, beverages and food, plastics, chemical, newspaper printing, construction and automotive industrial sectors. Of the 12 companies, three were multinational corporations (U.S., Sweden, and Chile) and the rest were locally owned. Two were located outside the metropolitan area of Lima and two companies devoted 100% of their production to exports. One of the authors (MJB) undertook the data collection in Lima in March of 2002, assisting workers to self-administer questionnaires individually or in small groups on company time. During the entire data collection process confidentiality was guaranteed to the workers from these companies who volunteered to participate. The survey administration process followed the regulations for the protection of human subjects from the University of Wisconsin-Madison and was approved by that Institutional Review Board.

3.2. Constructing the questionnaire

A self-response questionnaire was designed and developed on the basis of eight extant instruments. They were the European Survey on Working Conditions [10, 11], the Corporate Social Responsibility and Working Conditions Questionnaire [34], Ergonomics Checkpoints [17], the Office Worker Survey [4], the Survey of Working and Living Conditions [22], the Mexican Working Conditions Survey [7], and the Survey of Working Conditions in Low-income and Immigrant Communities [23]. Relevant questions were compiled from those which were suitable for the context of IDC work systems and the research model. Most of the questions were redeveloped and reworded from their original sources. Response scales were reduced (to 4-point scale) considering education and literacy levels of the target population, as well as their limited exposure to survey research in general.

The final structure of the 57-item working conditions questionnaire³ had four major sections: 1) job information, 2) general aspects of tasks and work organization, 3) working conditions, and 4) individual factors. Section 3 included working time and wages, physical environment and ergonomics, occupational safety and health, discrimination issues, union-related issues, and satisfaction with working conditions. Section 4 included health information, socio-economic factors, and demographics. The questionnaire items were

³The questionnaire is available on request from the authors.

translated from English into Spanish by one of the authors (MJB) whose native language is Spanish. The use of plain translation avoided the use of jargon and slang and sought to increase readability and comprehension for Peruvian workers.

3.3. Dependent variables

The outcome variables were self-rated health status, musculoskeletal pain, mental distress, and job satisfaction. Self-rated health status was a single item with a 4-point scale ranging from 1 (poor) to 4 (very good). The other variables were scales constructed from several questionnaire items. Musculoskeletal pain was measured by a 4-item factor relating to neck pain, back pain, shoulder soreness, and muscular pain in arms and legs. These four items had 3-point scales ranging from 1 (never) to 3 (always), so a higher score indicated a higher level of musculoskeletal pain.

Three items were used to measure self-assessment of mental distress: frequency of severe fatigue or exhaustion, irritability, and periods of depression. Three-point scales ranging from 1 (never) to 3 (always) were used. All questions related to musculoskeletal pain and mental distress asked about the symptoms experienced within the twelve-month period prior to the data collection date.

The measure of job satisfaction was assessed by combining the three scores of satisfaction with job, satisfaction with the conditions of work, and satisfaction with the company. For each of the three items used, the corresponding question had 3-point scales ranging from 1 (not at all satisfied) to 3 (very satisfied).

3.4. Independent variables

Internal factors about the work environment included in the study were those related to working hours and wages, safety and health, including physical environment and ergonomics, task and organizational aspects (Fig. 4). Extra-organizational factors included housing, transportation, access to sanitation services and household income. Initially the questionnaire included items such as union membership and workers' perceptions of its competency; however, these variables were later eliminated because most of the union-related questions were left blank and the small percentage of workers who answered reported non-union membership.

3.5. Data analysis

Factor analyses using Principal Axis Factoring with an oblique rotation (Oblimin) and the Kaiser's stopping rule were conducted in order to confirm the structure of the musculoskeletal pain, mental distress, and worker satisfaction dependent variables. Following the same methodology the independent variables were also examined with factor analysis, resulting in 11 multi-item (factors) and 17 single-item variables [1].

Pearson correlation coefficients were calculated for all pairs of independent and dependent variables. Multiple linear regression modeling was used to determine how much variance in each of the four dependent variables was explained by the individual variables and multi-item factors representing the internal and external elements of the work system. Four

multiple regression models were developed for each gender group, corresponding to the four dependent variables. The effect of age, educational status, working group (based on grouping of reported job titles), and company were controlled for in all models. Regression analyses were conducted using SPSS (1998).

4. Results

There were a total of 1360 completed questionnaires, an estimated 78.5% return rate. For the purposes of this analysis, white-collar workers were excluded, leaving a sample of 1066 workers, 305 women and 761 men.

4.1. Descriptive results

Most of the men worked in the plastics, chemical, food, and beverage industrial firms while the women were from the textile and beverage industries. Several types of 'blue-collar' jobs were identified among the survey respondents: production worker (and assistants), machine operators (and assistants), maintenance workers (not mechanic), maintenance apprentices, technicians and quality control workers, forklift drivers, housekeeping workers, warehouse workers, distribution drivers, and security workers. Although they all had fixed positions, they often reported exchanging tasks and responsibilities depending upon the production needs and demands. For example, several security workers reported being engaged in production tasks throughout the day. Fifty percent of the male respondents reported being production workers, followed by machine operator (19%) and production worker assistant/helper (13%). Seventy-four percent of the women were production workers, followed by machine operators (17%).

Participants were predominantly male (or 71%, see Table 1). Female workers were on average 2.4 years younger than male workers, consistent with men's longer job tenure (4.6 years compared to 2.6 years), since both groups reported a starting working age of 17.7 years. Men were more likely than women to have a high school diploma (60% versus 50%) and had a higher gross monthly salary (\$177.3 compared to \$123.2). However, on average, women reported working almost 4 hours longer per week.

Overall, the socioeconomic conditions and the community environment were perceived similarly by female and male workers. Approximately 31% declared that household income was not adequate for their needs, with 70% of female and 78% of male workers being the major contributors to household income. At least 75% had regular access to sanitation services; 64% and 71% of women and men, respectively, had regular access to potable water. Less than one third reported being home owners with 36% of women and 38% of men living in a parent's home.

4.2. Results from factor analyses

The Principal Axis Factoring technique with an oblique rotation (Oblimin) and the Kaiser's stopping rule allowed grouping of the dependent variables musculoskeletal pain, mental distress, and worker satisfaction (Table 2). For the independent variables, three factors (psychological job demands, adequate work-related welfare facilities, and supervisor-related aspects) contained three items each while the other eight contained two items. Cronbach's

alpha values were above 0.50 for all risk factors except poor physical ergonomics at work (Table 3).

4.3. Bivariable and multivariable associations

Pearson correlation coefficients were in the expected direction for all pairs of dependent variables: less mental distress and fewer musculoskeletal symptoms tracked higher self-rated health and satisfaction (Table 4). Each category of independent variables had some items with coefficients above 0.2 for at least one outcome but none was as high as 0.4.

Table 5 shows the results (coefficients and estimated R^2) obtained for each of the 8 multiple regression models with a total of 23 independent variables. The R^2 value represents the percentage of the variance explained by the set of predictors, above the effect of the control variables.

Only four independent variables had significant relationships with the same outcome for both women and men: a) working under crowded workstations and uncomfortable working postures; b) psychological job demands and workload; c) adequacy of social/family working hours; and d) overtime. Overtime was negatively associated with satisfaction for women and positively so for men. Of the remaining independent variables (19) that had statistically significant relationships with at least one outcome, many of the associations in the other gender were lower in magnitude but in the same direction. Box 1 summarizes the variables that produced significant relationships for each outcome variable.

5. Discussion

The main findings of this study include a) the identification of relationships between poor conditions of work (long working hours, poor physical and psychosocial work environment) and higher levels of mental distress and lower levels of perceived job satisfaction among female and male Peruvian industrial workers, and b) the important role of extra-organizational factors (i.e. socio-economic and socio-cultural variables) on the workers' perceived levels of stress and satisfaction. There are few studies focusing on the assessment of working conditions in IDCs, and perhaps no study of the relationships between specific working conditions and workers' health and satisfaction in Perú. The study presented here is founded on a strong theoretical basis with a solid methodology for gathering general characteristics of a work population at a specific point in time: specifically industrial workers in the large metropolitan area of Lima, the political and industrial capital of Perú. The workplace variables and health measures examined have all been shown to be important in industrialized countries, and now they are also seen to be relevant in a developing country. We were able to identify how work and community variables contribute to workers' perceived satisfaction and health in Perú, and did find significant differences in the perceptions of female and male blue-collar workers. The following themes correspond to the main findings of the study and suggest key issues to consider in future research and design, as well as in the implementation of occupational and public health interventions that recognize the gender difference and most importantly address the need to re-design work environments that are respectful and inclusive for both, female and male workers.

5.1. Role of extra-organizational factors in workers' stress and well-being

It has been noted that inclusion of extra-organizational (socio-economic) factors might facilitate the process of evaluating the work system and how workers fare within such a system, especially within IDCs where living standards may be much lower for those at the low end of the national socioeconomic range [5,28]. Our results highlight the important link between work and the home/living conditions in stress (especially for female workers) and job satisfaction (especially for male workers). These issues need to be recognized by employers and organizations that aim to maintain and secure a healthy and productive workforce. By providing assistance to industrial workers with their home and community environments, employers could expect to sustain a more productive workforce with higher levels of work performance and overall industrial productivity. Employers could build programs that contribute to the sustainable development of their surrounding communities. Investment in transportation, education, and health areas could have an immediate impact in the worker well being and productivity. One of the mechanisms to accomplish this could be the establishment of partnerships via the implementation of Community-Based Participatory Research (CBPR) Programs by which industry works together with academia and community groups to identify, propose solutions and implement sustainable programs geared to the improvement of workers' quality of life.

5.2. Work, home conditions and women's health

Forastieri [13] stated that stress for female workers can be "aggravated by the fear of losing a job, relationship problems, sexual harassment, discrimination, or other non-occupational factors, such as family problems, multiple roles, health anxieties, commuting and financial worries". In IDCs most women have very limited choices as to where they can work. Women are caught in a vicious circle whereby the majority lack opportunities for education or have few qualifications, especially those from the lower economic levels". The concentration of women in jobs with poor working conditions, jobs which are dirty, monotonous, low paid and which involve long hours of work with no access to health services, as well as their major responsibility for family care and household work, might determine the higher prevalence of stress-related disorders in women. We believe that the contribution of extra-organizational factors (adequacy of household income, having an adequate social/family working hours scheme, having access to adequate sanitary and living conditions and potable water, and number of children under 18) to mental distress in working women is a central finding in this study and is critical for developing ideas about interventions in IDCs. Two other correlates of perceived stress, the number of working hours per day and working under crowded workstations and uncomfortable working postures, are not unique to IDCs [14,17].

5.3. Complexity of work/living conditions in IDCs as compared to developed countries

This study demonstrates the ties between work and home conditions differently than studies in developed countries which have focused primarily on the dual roles of women at work and home (and the overload, and stress it causes). Basic living conditions such as sanitation and access to clean water are fundamental needs for human health and need to be considered as a foundation for a healthy workforce in any country. The results indicate that although

these provisions may not be taken for granted in IDCs, their absence may be just as stressful on health and employee satisfaction.

The study findings also suggest the negative impact of discrimination among this Peruvian industrial working population, just as it has been shown to occur in developed countries. Discrimination in its various facets affected the physical, mental and social well-being of the female workers in this study, who also struggle with serious workload issues considering their dual reproductive and economic role as unpaid workers at home and as paid workers outside the home. The perceived discrimination due to being exposed to intimidation and threats was the only discrimination-related variable that showed a significant relationship with worker satisfaction for the male blue collar workers. Surprisingly the relationships were not founded statistically significant for the female group. It could be speculated that underreporting and fears of retaliation are the some of the reasons of why workers did not report being exposed to this hazard. In addition, data from the discrimination variables related to physical violence and sexual harassment suggest a serious underreporting issue that could be solved via qualitative studies. Data available from local and national polls suggest that there are significant numbers of women that are exposed to these unacceptable hazards, being the sexual harassment in both the work and home environment and the physical violence mostly in the domestic arena.

5.4. Limitations of the study and methodological considerations

The study population was not a random sample of Peruvian industrial workers, as the two-stage recruitment process involved finding companies that would co-operate and then seeking volunteers from within these companies. Thus the findings cannot be generalized to all industrial workers in Perú. However, as a first attempt to use a standardized instrument to document the relative importance of working and living conditions for worker's satisfaction and health in Perú, and to identify differences based on gender, we believe that the resulting data are highly informative. The survey instrument was found to be suitable for Peruvian workers and its validation and improvement might be part of future research for application in other IDCs.

The study was cross-sectional, making it impossible to determine causality. However, the major goal was not to find out the causes of workers' ill health, but rather to document the prevalences of work and life stressors and workers' perceptions of their importance. Weaknesses involved the use of self-reported measures are well documented and the likelihood of some measurement error is also acknowledged as a limitation here.

At the same time, there is no objective indicator of satisfaction, and self-perception is commonly considered the most obvious approach to assessment [30]. However, with regard to job satisfaction in particular, it is likely that, especially where unemployment rates are very high, people may give more priority to the problem of how to get work rather than considering the working conditions [24]. Thus, in IDCs, the importance of simply having a job in order to support oneself and one's family may contribute to higher self-reported satisfaction with the job itself than would otherwise be the case [33].

Another methodological issue that should be mentioned is the use of single item variables versus multi-item scales. In general, the latter are considered to be more reliable and valid [2]. However, in some domains there is evidence that a single item provides a sufficiently accurate measure, such as for general health status [4,32] and for overall satisfaction at work [10,11,17,27,30,32-34]. In this instance the large number of variables to be assessed forced us to opt for fewer items per domain, especially in light of advance concerns about recruitment and a suitable implementation process.

5.5. Future study? Where do we go from here?

Working in a multidisciplinary team with several Engineering and Public Health colleagues, the primary author plans to adapt and validate several data collection tools to assess the quality of working life (questionnaires, focus groups, risk mapping techniques) of blue collar workers and to further explore the role of community based participatory research approaches in promoting decent and safe work environments in both the formal and informal sectors of the economy. This work will be conducted in Lima, Perú during a 2011–2012 sabbatical project. Being respectful of the gender differences will be a common denominator throughout the research activities.

6. Conclusions

The data of primary interest in this paper describe working conditions and their potential effect on female and male workers' satisfaction and health in Perú, an industrially developing country. This study found that there were certain aspects of the work system that showed a significant impact on perceived satisfaction and health for the industrial workers investigated. Among women, the extra-organizational factors played a key role in perceived mental distress. For men, task and organizational aspects together with the extra-organizational factors were important correlates of life and work satisfaction. The study highlights the potential impact of occupational factors such as a good balance between working hours and family/social commitments, psychological job demands, having an interesting job, and adequacy of income for household needs.

Inclusion of extra-organizational factors contributed to a better understanding of workers' job satisfaction and health. A substantial percentage of respondents faced problems away from work such as inadequate sanitary living conditions, access to safe water, and inadequate transportation systems. When these issues were experienced in combination with poor conditions of work – long working hours, poor physical environment, and unsafe workplaces – they were related to greater levels of musculoskeletal distress and mental stress, and lower levels of perceived health and job satisfaction. The combination of higher strain due to work plus extra-organizational factors for women is a central finding in this study and is critical for developing ideas about interventions in IDCs. At the same time, most of the work-related aspects found to be important to worker health, stress and satisfaction in studies from the developed world were shown to have some influences within the context of a Perú, an IDC [3,10,11,14]. Thus the large body of knowledge already accrued from research in the developed world is of great potential importance to occupational health practice in industrially developing countries.

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Box 1.**Independent variables with significant relationships to outcome variables.****Variables with significant relationships to self-rated general health status**

For female industrial workers:

- a. being exposed to physical dangers and unhealthy conditions at work
- b. having an interesting job
- c. having a positive relationship and perception of the supervisor

For male industrial workers:

- a. being exposed to chemicals and toxic vapors
- b. company informing about progress and achievements to workers
- c. having an adequate social/family working hours scheme
- d. having access to adequate sanitary and living conditions and potable water

Variables with significant relationships to musculoskeletal pain

For female industrial workers:

- a. working under crowded workstations and uncomfortable working postures
- b. psychological job demands and workload
- c. adequacy of household income
- d. having an adequate social/family working hours scheme

For male industrial workers:

- a. working under high temperatures
- b. working under crowded workstations and uncomfortable working postures
- c. psychological job demands and workload
- d. having an interesting job
- e. discrimination in the form of intimidation and threats
- f. having an adequate social/family working hours scheme.

Variables with significant relationships to mental distress

For female industrial workers:

- a. working hours per day
- b. working under crowded workstations and uncomfortable working postures
- c. adequacy of household income
- d. having an adequate social/family working hours scheme

- e. having access to adequate sanitary and living conditions and potable water
- f. number of children under 18 (for women: lower levels of perceived mental distress)

For male industrial workers:

- a. being exposed to physical dangers and unhealthy conditions at work
- b. working in environments with poor air and/or ventilation
- c. working under crowded workstations and uncomfortable working postures
- d. having an interesting job
- e. having an adequate social/family working hours scheme

Variables with significant relationships to overall worker satisfaction

For female industrial workers:

- a. overtime
- b. being exposed to physical dangers and unhealthy conditions at work
- c. having access to adequate protective clothing and equipment
- d. having a positive relationship and perception of the supervisor

For male industrial workers:

- a. overtime
- b. salary
- c. being exposed to vibration and dangerous equipment
- d. having a safe work environment
- e. having access to adequate work-related welfare facilities -restrooms, cafeteria or rest areas
- f. psychological job demands and workload
- g. company informing about progress and achievements to workers
- h. having access to onsite training courses
- i. having access to resources and equipment
- j. discrimination in the form of intimidation and threats
- k. adequacy of household income
- l. having an adequate social/family working hours scheme
- m. having access to adequate sanitary and living conditions and potable water

Fig. 1. Households living below poverty line in peru. **Source:** Instituto Nacional de Estadística e Informática – INEI, 2001.

Fig. 2.
Research model.

Fig. 3.
Data collection in Perú (March 2002).

Fig. 4.
Independent variables.

Table 1
Demographic Characteristics, working and living conditions of Peruvian blue-collar workers ($n = 1066$)

	Female workers ($n = 305$)	Male workers ($n = 761$)
Age (in years)		
Mean	27.85	30.23
S.D.	7.49	8.19
Education Level		
Incomplete high school or less	12.9%	12.2%
Complete high school	59.7%	49.9%
Technical school	27.4%	37.9%
No. of Years with Present Company		
Mean	2.58	4.60
S.D.	2.99	6.10
Age When Started Working		
Mean	17.73	17.65
S.D.	3.43	2.79
Gross Monthly Salary (converted to US \$)		
Mean	123.2	177.3
S.D.	28.2	97.1
Working Hours (per week)		
Mean	59.46	55.67
S.D.	12.49	10.53
Being Major Contributor to Household Income		
Yes	69.5%	77.8%
No	30.5%	22.2%
Household Income Adequate for Needs		
Yes	31.5%	31.4%
No	68.5%	68.6%
Housing Type		
House	70.8%	66.7%
Apartment	3.7%	6.3%

	Female workers (<i>n</i> = 305)	Male workers (<i>n</i> = 761)
Room	17.6%	18.0%
Other	8.0%	9.1%
Housing Ownership		
Owner	28.3%	27.3%
Tenant/renter	33.3%	37.0%
Other (living in parents' house)	38.4%	35.7%
Access to Potable Water		
Never	7.3%	3.8%
Sometimes	28.7%	25.5%
Always	64.0%	70.7%
Access to Sanitary Conditions		
Never	12.9%	6.0%
Sometimes	12.2%	11.6%
Always	74.9%	82.4%
Mean of Transportation to work		
Public transportation	88.2%	79.6%
Other (private car, motorcycle, bike, walk)	11.8%	20.4%
Transportation Time (one way) to work		
Less than 30 min	25.3%	38.1%
Between 30 and 60 min	44.7%	43.0%
More than 60 min	29.9%	18.9%

Table 2

Factor loadings and reliability coefficients for dependent variables

Factor	Items	Factor Loading	Cronbach's Alpha
Musculoskeletal symptoms	Neck pain	0.597	0.720
	Back pain	0.688	
	Shoulder soreness	0.507	
	Muscular pain in arms/legs	0.514	
Mental distress	Periods of depression	0.686	0.667
	Times of severe fatigue	0.664	
	Irritability	0.552	
	Satisfaction w/current job	0.832	
Worker Satisfaction	Satisfaction w/company	0.773	0.812
	Satisfaction w/working conditions	0.709	

Table 3

Factor loadings and reliability coefficients for independent variables

Factor	Items	Factor loading	Cronbach's Alpha
OSH training/norms	Health and safety training	0.788	0.626
	Rules to avoid accidents	0.468	
Exposure to chemicals and toxic vapors/substances	Exposure to chemicals	0.808	0.771
	Exposure to toxic vapors	0.771	
Psychological job demands	Job requires work hard	0.755	0.564
	Work pace	0.507	
	Workload exceeds work capacity	0.417	
Access to safe water and sanitary living conditions	Access to adequate sanitary living conditions	0.725	0.664
	Access to potable water	0.717	
Supervisor-related aspects	Supervisor treats all the same	0.690	0.697
	Supervisor is competent	0.674	
	Good relationship with boss	0.605	
Adequate work-related welfare facilities	Adequate sanitary conditions - restrooms	0.754	0.667
	Adequate changing and washing facilities	0.728	
	Adequate eating or lounging areas	0.430	
Discrimination due to age and disability	Discrimination due to disability	0.643	0.548
	Discrimination due to age	0.636	
Physical violence	Physical violence from others outside the workplace	0.829	0.555
	Physical violence from people within the workplace	0.454	
Vibration and dangerous equipment	Vibration	0.816	0.674
	Dangerous equipment	0.559	
Housekeeping	Regular cleaning/maintenance of machine & equipment	0.660	0.637
	Regular cleaning/maintenance of working areas	0.613	
Ergonomics-related aspects	Crowded workstations	0.587	0.483
	Uncomfortable and tiring working postures	0.424	

Table 4

Pearson correlation coefficients for dependent and independent variables: Questionnaire survey of blue-collar workers in Lima, Perú (2002)

Pearson Correlation values	Health status		Musculoskeletal pain		Mental distress		Worker satisfaction	
	male	female	male	female	male	female	male	female
Dependent Variables								
Musculoskeletal pain	-0.274	-0.366	1.000	1.000	0.437	0.524	-0.236	-0.246
Worker satisfaction	0.297	0.294	-0.236	-0.246	-0.252	-0.184	1.000	1.000
Mental stress	-0.216	-0.262	0.437	0.524	1.000	1.000	-0.252	-0.184
Health status	1.000	1.000	-0.274	-0.366	-0.216	-0.262	0.297	0.294
Working hours and salary variables								
Working hours per day	-0.074	-0.242	0.097	0.244	0.068*	0.249	-0.083	-0.111*
Overtime	0.021*	-0.179	0.071*	0.201	0.022*	0.160	0.045*	-0.216
Salary	0.079	0.126	-0.021*	-0.054*	0.019*	-0.072*	0.158	0.150
Ergonomics, Safety & Health								
Exposure to chemicals and toxic vapors	-0.133	-0.096*	0.126	0.152*	0.187	0.121	-0.102	-0.188
Exposure to vibration and dangerous equipment	-0.059*	-0.126	0.153	0.197	0.163	0.119	-0.154	-0.044*
High temperatures	-0.127	-0.242	0.182	0.249	0.188	0.199	-0.156	-0.214
Physical dangers exposure	-0.137	-0.297	0.193	0.332	0.251	0.235	-0.179	-0.347
Poor air (ventilation)	-0.174	-0.226	0.179	0.228	0.251	0.143	-0.190	-0.228
Crowded workstations & uncomfortable working postures	-0.172	-0.288	0.215	0.354	0.254	0.261	-0.225	-0.249
Having a safe work environment	0.123	0.119	-0.181	-0.141	-0.134	-0.082*	0.307	0.202
Adequate protective clothing & equipment	0.162	0.007*	-0.054*	0.046*	-0.078	0.036*	0.190	0.174
Adequate work-related welfare facilities	0.158	0.086*	-0.148	-0.127	-0.177	-0.106*	0.296	0.261
Task/Organizational Aspects								
Psychological job demands/workload	-0.115	-0.264	0.206	0.337	0.157	0.232	-0.203	-0.205
Work is interesting	0.125	0.224	-0.131	-0.168	-0.119	-0.116	0.193	0.161
Company informs about its achievements	0.198	0.126	-0.096	0.002*	-0.107	-0.067*	0.276	0.226
Onsite training courses	0.105	0.055*	-0.074	-0.008*	-0.094	-0.027*	0.241	0.037*

Pearson Correlation values	Health status		Musculoskeletal pain		Mental distress		Worker satisfaction	
	male	female	male	female	male	female	male	female
Resources/help and equipment availability	0.178	0.095*	-0.121	-0.133	-0.150	-0.109*	0.336	0.205
Supervisor-related	0.165	0.245	-0.117	-0.128	-0.156	-0.115	0.306	0.377
Discrimination - intimidation or threats	-0.079	-0.074*	0.183	0.172	0.185	0.113	-0.273	-0.117
Extra organizational factors								
Household income adequacy	0.107	0.004*	-0.125	-0.091*	-0.158	-0.207	0.285	0.126
Social & family working hours fit	0.210	0.209	-0.255	-0.303	-0.220	-0.263	0.347	0.253
Adequate sanitary living conditions	0.121	0.094*	-0.075	-0.119	0.060*	-0.174	0.101	-0.016*
Children under 18	-0.043*	0.058*	0.015*	-0.078*	-0.065*	-0.140	0.051*	0.023*

* correlation is **not** significant at the 0.05 level

Table 5Regression results for blue-collar Peruvian workers (female $n = 305$; male $n = 761$)

	INDEPENDENT VARIABLE	Health Status		Musculoskeletal pain		Mental distress		Worker satisfaction	
		Female	Male	Female	Male	Female	Male	Female	Male
1	Working hours & Salary								
2	Working hours per day	-0.131	-0.044	0.028	0.047	0.136	0.023	0.079	-0.045
3	Overtime	-0.064	0.068	0.030	0.051	0.055	0.025	-0.154	0.106
4	Salary	0.047	0.023	-0.016	0.013	-0.007	0.004	0.024	0.086
5	Safety and Health								
6	Exposure to chemicals and toxic vapors/substances	0.037	-0.086	0.043	0.034	0.034	0.066	-0.108	-0.001
7	Exposure to vibration and dangerous equipment	-0.025	0.008	0.069	0.043	0.036	0.004	0.112	-0.067
8	High temperatures	-0.037	-0.008	0.023	0.076	0.062	0.059	-0.042	-0.045
9	Physical dangers/unhealthy conditions at work	-0.135	-0.030	0.101	0.041	0.010	0.102	-0.142	0.033
10	Poor air/ventilation	-0.098	-0.065	0.069	0.045	-0.018	0.123	-0.089	0.000
11	Crowded workstations & uncomfortable working postures	-0.108	-0.036	0.167	0.073	0.161	0.118	-0.090	-0.006
12	Having a safe work environment	-0.004	-0.023	0.016	-0.057	0.025	-0.008	0.061	0.091
13	Adequate protective clothing and equipment	-0.050	0.049	0.066	0.056	0.035	0.013	0.130	-0.003
14	Adequate work-related welfare facilities	-0.066	0.045	-0.001	-0.009	0.032	-0.039	0.073	0.103
15	Task/Organizational aspects								
16	Psychological job demands/workload	-0.106	-0.045	0.168	0.121	0.041	0.044	-0.007	-0.100
17	Work is interesting	0.129	0.062	-0.088	-0.086	-0.040	-0.074	0.016	0.035
18	Company informs about its achievements	0.028	0.092	0.089	-0.003	0.021	0.036	0.038	0.107
19	On-site training courses	0.016	-0.024	-0.003	0.018	0.015	-0.012	-0.097	0.076
20	Resources/help and equipment availability	0.056	0.057	-0.096	-0.012	-0.033	-0.028	0.083	0.137
21	Supervisor-related	0.136	0.027	0.015	0.023	-0.010	-0.008	0.187	0.027
22	Discrimination - intimidation or threats	0.062	0.004	0.045	0.077	0.017	0.062	0.019	-0.108
23	Extra organizational factors								
24	Household income adequacy	0.005	0.063	-0.109	-0.063	-0.202	-0.058	0.073	0.149
25	Social & family working hours fit	0.024	0.127	-0.115	-0.123	-0.163	-0.096	0.097	0.165
26	Adequate sanitary living conditions/potable water	0.090	0.073	-0.092	-0.055	-0.200	0.060	-0.018	0.061
27	Children under 18	0.053	-0.033	-0.072	0.033	-0.180	-0.047	0.025	0.020

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	INDEPENDENT VARIABLE		R ²		Health Status		Musculoskeletal pain		Mental distress		Worker satisfaction	
					Female	Male	Female	Male	Female	Male	Female	Male
					17.2%	10.4%	20.0%	12.9%	16.7%	15.2%	26.0%	30.3%