

Psychosocial Factors And Their Relation Between Work Accidents Among Outsourced Construction Workers

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ABSTRACT : Introduction: Accidents suffered by outsourced construction workers may be due to some factors that change the psychosocial environment. Objective: To analyze and compare the control demand between healthy and injured workers. Method: Exploratory and cross-sectional study with a quantitative approach between two groups of 29 workers each (healthy and injured) of a petrochemical company in the region of Cubatão, São Paulo. The reduced version of the instrument "Job Strain Model" was used. Results: In the 58 interviewed workers, the low demand and tact control prevailed among the injured and healthy workers. Only 12% of the healthy individuals showed active work; among the injured ones, this percentage was 34.48%; the vast majority of healthy people have passive work (87.93%) as well as slightly more than half (65.71%) of the injured ones. The results obtained by categorization showed that the coexistence of low control and low demand was present among the injured and healthy workers of the construction industry and it is known that the interaction of the two factors, namely passive work and intermediate risk to health, is seen as inducer of decline in the individual's general activities. Conclusion: The presence of psychosocial factors in the work environment may favor the occurrence of occupational accidents.

KEYWORDS - Psychosocial Aspects; Civil Construction, Occupational Health.

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I. INTRODUCTION

Important events that have occurred in the history of mankind have led to new forms of work organization and work management, such as the outsourcing, which has its roots in the industrial revolution. In the last 40 years, outsourcing has been incorporated into the processes of productive restructuring, having the Japanese Toyotism as its main inspiration. As this pattern of Westernized work organization, subcontracting, or outsourcing, has occupied a central place. Added to the globalization of capital, outsourcing has been seen as the favorite and most efficient way of capital with the aim of making labor more flexible as a symbol of business modernity and the new basis for global competitiveness [1-2].

In Brazil, the old phenomenon of outsourcing had its roots in agricultural work, but during the urban industrial development of Brazil, with the installation of factories, outsourcing occupied a secondary position. However, with the emergence of durable goods factories (such as the automotive industry), outsourcing has become part of the productive structure, and with the phenomenon of economic and financial globalization and neoliberal policies beginning in the early 1990s, outsourcing ceases to be peripheral and becomes present in all types of enterprises: in industry, public and private services, in commerce, in construction, that is, in all kinds of work [1].

Researches have point out that work organization can have paradoxical consequences for the physical and mental integrity of individuals. This is because, on the one hand, it can be seen as productive activity that gives identity to the worker, with a fundamental role that guarantees their health, and on the other, it may acquires the sense of something painful, which is exercised in precarious conditions without opportunities of professional development and that may contribute to the sickness of workers, whether due to workaholic compulsion or due to lack of work and unemployment [3].

The increased evidence of the association between job insecurity and occupational health has been described in the literature, showing that it can result in psychological distress, physical symptom and low self-esteem. Working conditions, organizational and social structures, and individual characteristics may also be related to and increase the risk of occupational accidents [4- 5].

Civil construction is one of the most important activities in Brazil, accounting for approximately 3.5 million jobs in Brazil, which corresponds to 6% of the total, with a large proportion of these workers being male and coming from the Northeast region [6-7].

In Brazil, during the year 2013, around 717,900 occupational accidents were recorded in the National Social Security Institute (INSS in Portuguese), distributed between those while commuting to work, from occupational illnesses and those typical occupational accidents. Of the total number of accidents registered in the Work Accident Report (CAT in Portuguese), typical accidents occurring during work, causing bodily injury, or functional disturbance that causes death, permanent or temporary loss or reduction of capacity for work accounted for 77.32% [8-9].

Work accidents can be influenced by immediate work-situation aspects, such as: machinery, the task, technical or material environment, and also by labor relations, organizational culture and worker's fatigue [10-11]. The work environment is, therefore, a reservoir of several physical and psychological stressors [12]. With the changes taking place in the world, there has been a need to understand the risk factors of work accidents at the present time⁽¹³⁻¹⁴⁾.

Work accidents in industries are more frequent when compared to other segments. In the United States, in 2010, civil construction had the highest number of fatal accidents; in Brazil, occupational accidents represent the main aggravation of workers' health, besides being complex and multicausal phenomena, which may reveal a dysfunction in managerial and work organizations [15].

A number of epidemiological studies have found that psychosocial factors at work are linked to the incidence of cardiovascular disease, decreased immune responses, elevated blood pressure, depression and well-being [15,14,16].

So our main question was "do psychosocial factors interfere with work-related accidents?" In order to answer this question, the main objective of this study was to compare the psychosocial variables among the groups of healthy and injured construction workers.

II. METHOD

This is an exploratory and cross-sectional study with a quantitative approach conducted with outsourced construction workers. The study was carried out in a petrochemical pole industry built in the 1950s, located in the municipality of Cubatão/São Paulo. The outsourced company had an average of 4,118 employees working in different shifts and functions in the year 2013. All those who had suffered some kind of accident exclusively at work, in a period of one year were identified. Participants were 29 workers with occurrence of work accident with and without leave (Law 8213/1991). Another 29 healthy workers were chosen by non-probabilistic sampling technique, and the questionnaire was distributed randomly in the Occupational Health Outpatient Clinic. Workers who had suffered road accidents, were on vacation, medical leave or gestational leave were excluded. Thus, 58 workers of day and night shifts constituted the sample.

The data collection period was from July 2013 to June 2014.

The workers who answered the questionnaires developed various civil construction activities, such as: scaffolders and sanders, except for an employee who worked as a cook in one of the three restaurants located inside the place of study.

This research was carried out in accordance with the guidelines and norms set forth in Resolution 466/12 from the National Health Council [17], and was approved by the Research Ethics Committee of the Institution under the number approval certificate number 167324136.0000.5505. All the participants signed the Informed Consent Form.

The statistical analyzes used for the correlations between the quantitative variables were performed using Spearman's correlation coefficient [18] and the comparisons with the quantitative variables were performed using Student's t-test, in addition to the non-parametric Mann test -Whitney [18]. A 5% significance level was considered for all the analyzes and the statistical software SAS version 9.2 was used to carry out them.

In order to evaluate and compare the quality of life of construction workers, an instrument was used, the questionnaire control demand. The DCSQ model, a short version of the Job Strain Model questionnaire, contains 17 multiple-choice questions, subdivided into three scales: I - control at work and decision making: six questions about work - questions concerning control at work and questions about decision making); II - labor demand: five questions about labor demand (about time and speed to perform work); and III - social support in the work environment: six questions about social support workers receive in their work environment [19 20].

For the calculation of the instrument the answers are formed by four optional items in Likert-type scales that vary from 1 to 4 points. The scores were obtained in two ways: in a quantitative way, where they were obtained by adding the items of each dimension and ranged from 5-20 (demand) and 6-24 (control and social support). The high demand, high control and high social support were categorized with values above the median of the 58 respondents (11, 11 and 22) and of the 29 injured and healthy respondents (12, 10, 11, 12, 24 and 21, respectively). The other way was according to the midpoint of the scales, that is, the scores were obtained by adding the items of each dimension and ranged from 5-20 (demand) and 6-24 (control and social support). The high demand, high control and high social support were categorized in individuals with scores higher than the midpoint of the scale 12.5, 15 and 12.5; low demand high control - low demand, low demand low control - passive work; high demand and high control- active work; high demand and low control - high demand, respectively, of construction workers [19 20].

III. RESULTS

Of the construction workers participating in the study, most were men with a mean age of 35.6 years. Among the injured workers, the mean age was 38.2 years and among the healthy ones it was 33.1 years.

For the variable demand, the results indicated an average of 12.97 for the group of injured workers and an average of 9.90 for the group of healthy workers. The median values were 12.00 for the injured group and of 10.00 for the healthy group. A significant difference was observed between the two groups, in relation to the mean values of this variable ($p < 0.05$).

For social support, mean values of 21.93 were found for the injured group and an average of 20.38 for the healthy group. A median of 24 was found in the injured group and a median of 21 in the healthy group. A significant difference was observed between the two groups in relation to the mean values of this variable ($p < 0.05$).

Table 1 presents comparisons between the injured and healthy groups according to the variables control and demand.

Variable	Healthy	n	Injured	n	p-value
Demand	9.90±2.88	29	12.97±3.82	29	00.0011
Control	11.58±2.32	29	11.9±4.18	29	00.7027**
Social support	20.38±3.38	29	21.93±3.41	29	00.0089

Note: * p-value obtained through unpaired Student t-test.

** p-value obtained through the Mann-Whitney test.

There was moderate correlation between the environment and the existing demand at work, which allows us to say that the existing demands in the work among the civil construction workers are inversely related to the environment. A similar situation had been observed among the metal workers from Malaysia. There was no significant correlation in the control when correlated with social support; however, control is related to social relations [21].

Table 2 shows that the correlations between the variables control, demand and social support show significant data

Variable	Total sample		
	n	p	r
Demand X Control	58	0.0881	0.23*
Demand X Social support	58	0.0014	0.41*
Control X Social support	58	0.7049	0.05*

The correlation between the variables control, demand and social support was positive ($r = 0.41$). Construction workers were categorized into high or low demand, control and social support (values above the midpoint described earlier in the methods). Similarity was observed between healthy and injured workers in relation to demand, where the majority presented low demand (82.75%; 51.72%, respectively). The same situation was observed in relation to the control between the healthy (93.10%) and injured workers (79.31%). Social support was high in both groups (89.65%) and had the same value.

Table 3. Distribution of workers according to classification in high/low demand, control and social support. Cubatão – SP, 2015.

Variable	Category	Healthy	%	Injured	%
Demand	Low	24	82.75%	15	51.72%
	High	5	17.25%	14	48.28%
Control	Low	27	93.10%	23	79.31%
	High	2	6.90%	6	20.69%
Social support	Low	3	10.35%	3	10.35%
	High	26	89.65%	26	89.65%

In addition to the distribution found in Table 3, the work of construction workers was categorized, according to the quadrants, in the control demand model. Only 12% among the healthy ones showed to have active work and already the injured workers this percentage was 34.48%. The great majority of healthy workers (87.93%) and slightly more than half of the injured ones (65.71%) have passive work.

Table 4. Distribution of workers according to categories of demand control model. Cubatão – SP, 2015.

Variable		Healthy	%	Injured	%
Low demand	LDLC	26	44.82%	21	36.20%
Passive work	LDLC	51	87.93%	38	65.71%
Active work	TDLC	7	12.00%	20	34.48%
High demand	TDLC	32	55.17%	37	63.79%

D – Psychological demands C= Control

IV. DISCUSSION

The current scenario of active life is characterized by an incessant rhythm, the intensification of production regimes and urgent changes. In addition to these structural changes, the current economic crisis causes increasing pressure on employers and workers to maintain adequate levels of competitiveness. Many of these changes provide opportunities for development, but at the same time they can increase psychosocial risks by affecting workers' health and safety.

For many people, work is a social activity, a crucial source of feedback and can be a central component of personal identity, thus generating or not health and quality of life. Thus, working conditions may represent a prominent influence on emotions, self-esteem and identity. Although employment is usually assumed to promote health, the net effect on mental health depends on the psychosocial quality of work [22,23,24].

The International Labor Organization, back in in 1998, highlighted that only 3.9 per cent of work-related accidents worldwide had been recorded, despite the occurrence of around 270 million accidents with 350,000 deaths [2-21]. It is estimated that occupational accidents can represent economic and social expenditures at 10% of gross domestic product (GDP) [25].

In this study, the male gender, characteristic of the profession of construction workers, prevailed, which corroborates that observed in several studies of this segment [25-26].

The mean age of construction workers who have worked during the day in the total sample was 35.6 years old; among the injured ones it was 38.2 and among the healthy ones it was 33.1. A study conducted with injured workers of a construction industry in Hong Kong showed that the mean age was 42.3 years, evidencing an older population compared to that of the present study, composed of a younger group [11].

Workers who did not have a smoking habit prevailed in this study. A similar result was found in other research in Ethiopia [6].

Regarding the psychosocial aspects among construction workers, the present study showed that social support was better

Among the construction workers studied in this study, the results obtained by categorization showed that the combination of low demand and low control were present among the injured and healthy workers in the construction industry. The interaction of the two factors, namely passive work, intermediate risk to health, is seen as inducer of decline in the general activities of the individual [13,27,28].

Thus, the worker feels apathetic, either by the absence of new challenges or by the absence of decision-making; low control can be translated as lack of autonomy in the process and can be a psychosocial risk factor and, consequently, for the appearance of depressive symptoms; the low demand present in the study by Tomei et al., 2015 was similar [13,27,28].

However, this study revealed high social support among workers, but the absence thereof may also lead to the appearance of depressive symptoms. In addition to low control, another risk factor for psychosocial diseases may be added, which is low participation in decision making and lack of support from managers, who can be evaluated as superior and this may increase anxiety, stress, mental fatigue and the probability of accidents. However, when workers are part of the decisions, they feel important and part of the process [13,27,28].

V. CONCLUSION

Regarding the psychosocial environment, the present study allowed to identify, among outsourced construction workers, that social support among them was greater. As a consequence, lower demand, even with the characteristic of the employment relationship that is the outsourcing, therefore, a positive situation, since workers can count on each other, supporting each other and providing a work environment more appropriate to health.

The predominant characteristic found in this research was that of low demand and low control, resulting in a harmful situation. It was also observed high demand and low control, which is more harmful to the physical and mental health of construction workers.

Therefore, the present study indicated the possibility of occurrence of work accidents due to the presence of psychosocial and physical factors in the work environment of this population.

REFERENCES

- [1]. Druck Graça. terceirização desenfreada no Brasil: mais riscos precarização e de saúde para os trabalhadores. Cad. Saúde Pública [Internet]. 2016 [cited 2016 01 de outubro]; 32 (6): e00146315. Available from:

- http://www.scielo.br/scielo.php?script=sci_arttext&pid=S0102-311X2016000600502&lng=en. Epub 01 de Junho de 2016. <http://dx.doi.org/10.1590/0102-311X00146315>.
- [2]. Mascarenhas CHM, Fernandes MH, Prado F, Boery EN; Sena ELS. Qualidade de vida em trabalhadores da área de saúde: uma revisão sistemática. Espaço Saúde [Internet]. 2013; [cited 2017 Mar 13] 14(1/2): 72-81. Available from: <http://pesquisa.bvsalud.org/portal/resource/pt/lil-705458>
 - [3]. Choi KS, Kang SK. Occupational psychiatric disorders in Korea. Korean Med Sci [Internet]. 2010 [cited 2015 March 18]; 12(25):S87-S93. Available from: <http://dx.doi.org/10.3346/jkms.2010.25.S.S87>.
 - [4]. Ghisi M, Novara C, Buodo G, Kimble MO, Scozzari S, Di Natale A, et al. Psychological distress and post-traumatic symptoms following occupational accidents. Behav. Sci [Internet]. 2013 [cited 2015 May 4]; 3(4):587-600. Available from: <http://www.mdpi.com/2076-328X/3/4/587/htm>.
 - [5]. Virtanen M, Nyberg ST, Batty GD, Jokela M, Heikkilä K, Fransson EI, et al. Perceived job insecurity as a risk factor for incident coronary heart disease: systematic review and meta-analysis. BMJ [Internet]. 2013 [cited 2015 August 9]; 347:f 4746. Available from: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3738256/>.
 - [6]. Serkalem S, Haimanot GM, Ansha, NA. Determinants of Occupational Injury in Kombolcha Textile Factory, North-East Ethiopia. J. Occup. Environ. Med [Internet]. 2014 [cited 2015 Jun 9]; 5(2): 327-84. Available from: <http://www.theijoem.com/ijoem/index.php/ijoem/article/view/327/467>.
 - [7]. Kalte HO, Hosseini AH, Arabzadeh S, Najafi H, Dehghan N, Akbarzadeh A, et al. Analysis of electrical accidents and the related causes involving citizens who are served by the Western of Tehran. Electronic physician [Internet]. 2014 [cited 2015 Jun 10]; 6(2):820-6. Available from: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4324276/pdf/820-826.pdf>.
 - [8]. Sotelo-Suárez NR, Quiroz-Arcentales JL, Quiroz-Arcentales CP, Montilla CPM, López-Sánchez PA. Condiciones de salud y trabajo de las mujeres en la economía informal Bogotá 2007. Rev Salud Pública [Internet]. 2012 [cited 2015 Jun 9]; 14(1):32-42. Available from: <http://www.scielo.org.co/pdf/rsap/v14s1/v14s1a04.pdf>.
 - [9]. Ministério do Trabalho e Emprego (BR). Rais – Relação Anual das Informações sociais [Internet]. 2013 [cited 2015 jun 25]; [about 1 screen]. Available from: <http://portal.mte.gov.br/portal-mte/rais/>.
 - [10]. Prestes MRD, Feitosa MAG, Sampaio ALL, Carvalho MFC, Meneses EA. Can auditory neuropathy spectrum disorder contribute to work accidents? a clinical investigation report. Rev. bras. saúde ocup. [Internet]. 2012 [cited 2015 Jun 10]; 37(125):181-8. Available from: http://www.scielo.br/scielo.php?pid=S0303-76572012000100021&script=sci_arttext.
 - [11]. Vilela RAG, Almeida IM, Mendes RW. Da vigilância para prevenção de acidentes de trabalho: contribuição da ergonomia da atividade. Rev Cien & Saúde Coletiva [Internet]. 2012 [cited 2015 jun 4]; 17(10). Available from: www.scielosp.org/pdf/csc/v17n10/29.pdf.
 - [12]. Paterson JL, Clarkson L, Rainbird S, et al. Occupational fatigue and other health and safety issues for young Australian workers: an exploratory mixed methods study. J. Stage [Internet]. 2015 [cited 2015 June 9]; 53(3):293-9. Available from: https://www.jstage.go.jp/article/indhealth/advpub/0/advpub_2014-0257/_article.
 - [13]. Tomei G., Capozzella A, Rosati MV, Tomei F, Rinaldi G, Chighini A, et al. Stress e infortuni sul lavoro. Clin Ter [Internet]. 2015 [cited 2015 Jun 9]; 166(1):e7-22. Available from: http://www.seuroma.it/riviste/clinica_terapeutica/open_access/articoli/e49f83f395b2bc43f42b12cc6e2614b6.pdf.
 - [14]. Basnet P, Gurung S, Pal R, Kar S, Bharati DR. Occupational stress among tunnel workers in Sikkim. Ind Psychol J [Internet]. 2010 [cited 2015 Sept 15]; 19(1): 13-9. Available from: <http://www.industrialpsychiatry.org/article.asp?issn=0972-6748;year=2010;volume=19;issue=1;spage=13;epage=19;aulast=Basnet>
 - [15]. Alexopoulos EC, Argyriou E, Bourma V, Bakoyannis G. Reliability and Validity of the Greek Version of the Job Content Questionnaire in Greek Health Care Workers. Safety and Health at Work. 2015;6(3):233-239. doi:10.1016/j.shaw.2015.02.003.
 - [16]. HEO Y-S, LEEM J-H, PARK S-G, JUNG D-Y, KIM H-C. Job stress as a risk factor for absences among manual workers: a 12-month follow-up study. Industrial Health. 2015;53(6):542-552. doi:10.2486/indhealth.2015-0021.
 - [17]. Conselho Nacional de Saúde (Brasil). Resolução n 466, de 12 de dezembro de 2012. Brasília, [Internet]. 2012 [cited 2015 Nov 15] Available from: <http://conselho.saude.gov.br/resolucoes/2012/Reso466.pdf>.
 - [18]. Pagano M, Gauvreau K. Princípios de Bioestatística. São Paulo: Thomson; 2004.
 - [19]. Alves MGM, Braga VM, Faerstein, E, et al. Modelo demanda-control de estresse no trabalho: considerações sobre diferentes formas de operacionalizar a variável de exposição. Cad. Saúde Pública [internet]. 2015, [cited 2015 June 9]; 31(1):208-212. Available from: http://www.scielosp.org/scielo.php?script=sci_arttext&pid=S0102-311X2015000100208&lng=en&nrm=iso.
 - [20]. Magnano TSBS, Lisboa, MTL, Griep, RH, et al. Condições de trabalho de profissionais da enfermagem: avaliação baseada no modelo demanda-control*. Rev. Acta Enfermagem [Internet]. 2010 June [cited 2015 June 23]; 811-17. <http://www.scielo.br/pdf/ape/v23n6/15.pdf>
 - [21]. Rusli BN, Edimansyah BA, Naing L. Working conditions, self-perceived stress, anxiety, depression and quality of life: a structural equation modelling approach. Rev BMC Public Health [Internet]. 2008 [cited 2015 August 16]; 6(8):48. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/18254966>
 - [22]. OMS. The World Health Organization Quality of Life Assessment (WHOQOL): position paper from the World Health Organization. Social science and medicine. v.41, n.10, 1995, p.403-409.
 - [23]. Tabeleão Viviane Porto, Tomasi Elaine, Neves Siduana Facin. Qualidade de vida e esgotamento profissional entre docentes da rede pública de Ensino Médio e Fundamental no Sul do Brasil. Cad. Saúde Pública [Internet]. 2011 [cited 2017 Mar 08]; Dec 27(12):2401-2408. Available from: http://www.scielo.br/scielo.php?script=sci_arttext&pid=S0102-311X2011001200011&lng=en.
 - [24]. Knardahl S, Johannessen HA, Sterud T, et al. The contribution from psychological, social, and organizational work factors to risk of disability retirement: a systematic review with meta-analyses. BMC Public Health. [Internet] 2014; [cited 2017 Mar 8] 17:176. Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5299735/>
 - [25]. Garg R, Cheung JP, Fung BK, Ip WY. Epidemiology of occupational hand injury in Hong Kong. Hong Kong Med J. [Internet]. 2012 [acesso em: 16 Aug 2015]; 18(2):131-6. Disponível em: <http://www.ncbi.nlm.nih.gov/pubmed/22477736>
 - [26]. Lykouras D, Karkoulas K, Patouchas D, Lokuomentas J, Sampsonas F, Tranou MM, et al. Experience and limited lighting may affect sleepiness of tunnel workers. BMC research notes [Internet]. 2014 [acesso em 14 Mar 2015]; 7(1):417. Disponível em: <http://www.biomedcentral.com/1756-0500/7/417>.
 - [27]. Magnusson HLL, Chungkham HS, Åkerstedt T, et al. The role of sleep disturbances in the longitudinal relationship between psychosocial working conditions, measured by work demands and support, and depression. Rev. Sleep [Internet]. 2014 Dec [cited 2015 August 16] 1;37(12):1977-85. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/25325503>
 - [28]. Prakash S, Khapre P, Laha SK, et al. Study to assess the level of stress and identification of significant stressors among the railway engine pilots. Indian J Occup Environ Med. [Internet]. 2011 [cited 2015 August 17] 15(3):113-9. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/22412289> his heading is not assigned a number.

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