



Job stress factors and health effects: effort-reward imbalance model and demand-control model

Factores de estrés laboral y efectos en la salud: modelo desbalance esfuerzo recompensa y modelo demanda control

Centro Sur.
Social Science Journal
April - June Vol 5 No 2
<http://centrosureditorial.com/index.php/revista>
eISSN: 2600-5743
revistacentrosur@gmail.com
Receipt: May 24, 2020
Approval November 13, 2020

88 - 108

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Abstract

In a more competitive world, work stress in recent years has increased its influence on the development of our work activities, causing alterations in health in the workforce. This article aims to analyze work stress factors from the Effort-Reward Imbalance, and Demand-Control models, as well as the effects of stress on health. The current work carried out an exploratory systematic review in scientific journals of 45 articles in the last 10 years related to psychosocial risk factors, work stress and the Demand-Control, Effort-Reward Imbalance models, selecting 40 articles. The variables chosen were Demand-Control models, Effort-Reward Imbalance, effects of work stress on health. The studies found that there are occupations that present psychosocial risk factors intrinsically associated with the activities of the work they perform, that women present a higher incidence of stress due to role conflict, on the other

hand, health professionals consume psychotropic drugs in cases stress, and adaptive responses to stress affect the body. There are various studies that have been carried out based on these models, but even more studies are needed to be carried out in

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the Latin American context.

Keywords: Psychosocial risk factors; Work stress factors; Effort-Reward Imbalance Model; Demand-Control Model.

En un mundo más competitivo el estrés laboral en los últimos años un ascenso de su influencia en el desarrollo de nuestras actividades laborales, ocasionando en la población laboral alteraciones en la salud. El presente artículo tiene como objetivo el analizar los factores de estrés laboral desde los modelos Desbalance Esfuerzo-Recompensa, y Demanda-Control, así como los efectos del estrés en la salud. El actual trabajo realizó una revisión sistemática exploratoria en revistas científicas de 45 artículos en los últimos 10 años relacionados con factores de riesgos psicosociales, estrés laboral y los modelos Demanda-Control, Desbalance Esfuerzo-Recompensa, seleccionándose 40 artículos. Las

variables escogidas fueron modelos Demanda-Control, Desbalance Esfuerzo-Recompensa, efectos del estrés laboral en la salud. Los estudios localizaron que existen ocupaciones que presentan factores de riesgos psicosociales intrínsecamente asociados a las actividades propias del trabajo que realizan, que las mujeres presentan mayor incidencia de estrés debido al conflicto de rol, por otro lado, los profesionales de la salud consumen psicotrópicos en casos de estrés, y las respuestas adaptativas al estrés afecta al organismo. Existen diversos estudios que se han realizado a partir de estos modelos, pero se necesitan aún más estudios que sean realizados en el contexto latinoamericano.

Palabras clave: Factores de riesgos psicosociales; Factores de estrés laboral; Modelo Desbalance Esfuerzo-Recompensa; Modelo Demanda-Control.

Introduction

For (Gómez-Rojas, Hernández-Gerrero, & Méndez-Campos, 2011) work is recognized as an essential part of life that influences its health and quality of life, both positively and negatively, gives meaning to life, provides us with objectives, gives structure and content, offers recognition, social support and economic reward.

For the European Agency for Safety and Health at Work "Psychosocial risks emanate from inadequacies in the design, structure, and management of the work, as well as from a derisory social content of the work". (p.5)

Ortiz, Toro, & Rodríguez (2014, p.198) stated that "By performing a job in appropriate conditions, in addition to increasing income and the possibilities of receiving social support, there are also increased opportunities to experience success and the possibility of satisfying basic affective needs, such as belonging, self-efficacy and independence".

(Sabando & Lucas, 2018) Stress is a term first introduced by Hans Selye in 1936 to define stress is a physiological response of the organism where a series of defense mechanisms come into play to cope with situations perceived as threatening or an increased demand. (Sabando & Lucas, 2018) His research led to define stressors as the circumstances that trigger a psychological and physiological response of the organism.

How can work stress be explained from the effort-reward, demand-control imbalance models and how does it affect workers' health?

In Spain, the National Institute of Census reported in 2018 an average Job Stress of 4.18 in both sexes.

The Mexican Institute of Health Care and Social Protection in 2018 stipulated that 75% of Mexicans suffer from stress fatigue.

For the Pan American Health Organization (2016) studies on work-related stress in the Americas and other regions determined that it is a revealing problem, while surveys on conditions and health conducted in 2012 in Central America found that 10% of respondents reached levels of stress, tension, sadness, depression, or loss of sleep caused by concerns due to their work. In Argentina in 2009 26.7% of workers reported stress, in Brazil 14% of health services reported absenteeism due to mental illness, while in Chile in 2011 27.9% of workers and 13.8% of employers reported stress and depression in their companies.

According to (Osorio, 2017) Stress has stimulated interest in health scholars because of its consideration as a disease of the 20th century. Work stress is defined as the result of the appearance of psychosocial risk factors that by itself has a high probability of significantly affecting the health of workers. (Balladares Ponguillo & in Hablick Sánchez, 2017) today's society, especially in the workplace it is common to talk about work stress, burnout, as well as work addiction.

For the Instituto de Higiene Seguridad y Salud en el Trabajo de España (INSHT) (2015) to value work stress it must be assumed as possible stressors the work organization; (Álvarez Silva & Espinoza Samaniego, 2019) established by physical and psychosocial content, and unquestionable particular typologies that forge undeniable scenarios be perceived as violence to security, threats to work improvement and/or physical or psychic prosperity. The results of stress in this argument will become low creation,

increased staff turnover, absenteeism and catastrophic events, and originating amounts of health decline. (Alvarez Silva & Espinoza Samaniego, 2019) stress ended up becoming a social phenomenon, with significant implications that affect the well-being of collaborators in organizations.

Lazarus and Cohen (1977) classify psychosocial stressors into: major changes or single stressors, minor changes or multiple stressors, and everyday stressors or microstressors.

There are a variety of instruments for the evaluation of work stress, the model proposed by the German psychologist Johannes Siegrist (1996) brings together the component of the worker's suggestibility in the man-worker correlation. His author proposes that the person makes a cost-benefit judgment about his work, and in integrity of it appreciates or not work stress, depending on whether the correlation is or not.

favorable. The one with the highest contingency of generating work stress and designates it as "Effort-Reward Imbalance".

The Effort-Reward Imbalance model is a person-environment model, the interaction with the organizational context, which evaluates the balance between effort and reward, and how an imbalance between these can lead to the appearance of occupational stress.

The Demand-Control model values demand-control and social support, where job demand and individual control play a role in establishing work patterns.

(Fernandez-Castro et al., 2017) Reward perception-effort, demand-control depend mainly on momentary tasks, reward perception is negatively influenced by personal factors such as emotional exhaustion.

(Psic. Clin. Liliana Loor Ortiz, 2015)Stress produces modifications in our organism as an adaptive response, (Psic. Clin. Liliana Loor Ortiz, 2015)a series of long-term modifications appear, when this response is not sufficient to reach homeostasis, allostatic overload appears, these modifications that the organism makes cause alterations in blood pressure, glycemia levels, predisposition to allergies, aggravation of autoimmune diseases).

For (Charria Ortiz, Sarsosa Prowesk, & Arenas Ortiz, 2011) "The recognition that psychosocial risk factors require systematic evaluation, (Balladares Ponguillo & arises Hablick Sánchez, 2017)in a context of social, political, legislative transformations that accentuate the interest in promoting the health of workers".

The INSHT in its technical standard 604 proposes guidelines for action in each of the three dimensions of the Demand-Control model, which demonstrates the growing need to create healthy spaces in the workplace.

Specifically, the objective of the present review was to analyze work stress factors from the models Effort-Reward Imbalance, Demand-Control, as well as the effects of work stress on health.

Materials and methods

This article is based on the methodology of an exploratory systematic review (Manchado Garabito et al., 2009) of the publications that have been published worldwide regarding psychosocial risk factors, work stress factors analyzed from the effort-reward imbalance model, work stress factors analyzed from the demand-control model and the effects of work stress on health.

A search was carried out using Google Scholar, and PUBMED, Elsevier, Lilacs; Redalyc, Web of Science, for which the key words used to search for research on the subject were: psychosocial risk factors, work stress factors, effort-reward imbalance model, and demand-control model.

This research was not limited to geographical situations, nor to work areas, nor gender; from this exploratory inquiry 5240 articles were found on the topic chosen to perform the article, making a pre-selection of 45 articles based on a quick reading of title and abstract, which met the inclusion criteria: articles of primary studies, articles that contain in their abstract keywords in relation to the search, as exclusion criteria (Carrizo & Moller, 2018): articles that were based on the Demand-Control and Effort-Reward Imbalance models to perform a new model for the study of work stress, studies of work stress that was performed in salaried population, letters to the editor, postgraduate research, at the end were left 40 articles from an exploration of the last 18 years: 9 in English, 4 in Portuguese and 27 in Spanish.

For the search of the information, a data collection protocol was included, with information of the author and year of publication, sample size, results found (Guirao-goris, Vida, & Mindfulness, 2014). The variables chosen were: Demand-Control Models, Effort-Reward Imbalance, effects of work stress on health. (Weil, 1995). Ethical requirements in documentary research were taken into account, authors' rights were protected, the paper was appropriately cited according to APA standards.

Results

In this systematic literature review, it was found that the countries that conducted the most research on this topic were Spain, Colombia and Brazil, as can be seen in Table 1, as well as the types of studies conducted, which were the most reviewed.

Table 1
Geographical location of the articles analyzed and types of studies found

<i>Countries</i>	<i>No. of items</i>	<i>Type of studies</i>	<i>No. of items</i>
Chile		Review	
Brazil		Correlational	5
Venezuela	1	Experimental	
Spain		Analytical	5
Argentina	1	Non-experimental	1
Cuba	1	Descriptive	
China		Observational	1
Mexico	1	Transversal	
Finland	1	Exploratory	1
Germany	1	Prospective	1
Colombia		Multicentrico	1

Total

(Navinés, Martín-Santos, Olivé, & Valdés, 2016) found in their study that higher tension leads to higher stress, and this is related to cardiovascular diseases, acute myocardial infarction, atherosclerosis, cerebrovascular diseases, arterial hypertension, and also (Gómez-Ortiz & Moreno, 2010) from a sample of 251 teachers, where 23.1% were male, 76.9% were female; 54.2% of the workers presented job stress, 35.5% of the workers presented high stress jobs, concluding that excessive hours, lack of promotion, and job insecurity are determining stressors, on the other hand, it considers a 40% increase in mental health problems in the last 12 years, on the other hand, it confirmed a moderate evidence between stress and cardiovascular risk higher in men. It also concluded that there are different coping styles. In addition, (Ortiz, Toro, & Rodríguez, 2014) in their study of 302 teachers, found that the greater the stress and the fewer the resources to balance the demands of family and work roles, the higher the rates of discomfort presented by the study subjects. On the other hand Aguiar, Fonseca, & Valente (2010) in their study that they conducted on 52 workers found low values of psychological demands, Ansoleaga & Castillo Carniglia (2011) found higher psychological demands in women, in addition it was found that there was consumption

of 18% of anxiolytics, 19% of hypnotics, 6% of antidepressants, contrary to what evidenced (Ansoleaga, Diaz, & Mauro, 2016) which studied 3010 subjects presented 18% of stress, 23.8% of women versus 14.8% of men, one fifth presented psychic stress, and one in 10 who demonstrated psychic stress presented low social support. (Marrero Santos & Aguilera Velasco, 2018) who conducted a study in 521 workers between 19 and 45 years old, found that 31.1% of pregnant women had as conditioning factors a lot of effort at work and little reward which was associated with low birth weight of their newborns. (Fernández-López, Fernández-Fidalgo, & Siegrist, 2005) who studied a group of dentists revealed that 47% of the teachers reported having a job other than the University, 42.3% of the dentists reported having two or more jobs, minor psychiatric disorders were 24.6% in dental surgeons, and 19.1% among teachers. High demands were shown to concentrate greater health risks. Gluschkoff et al. (2016) determined that the Effort-Reward Imbalance model is a good predictor of burnout. For Dong, Zhang, Sun, Sang, & Xu (2017) job stress plays an important role in the development of sleep disorders.

Cordeiro et al. (2018) in the conditions that were presented in the articles studied among this group were cardiovascular, mental, osteomuscular disturbances, depressive symptoms, fatigue, in addition the research of occupational stress and health: contributions of the demand-control model determined that occupational stress leads to psychological disturbances, cardiovascular diseases, depression, miscarriages.

Gabriela et al. (2016) in their analysis of Burnout Syndrome, Musculoskeletal Discomfort and Work Content in Middle and Senior Management of the Maquiladora Industry in the City of Juarez coincides with the articles that were conducted in health workers, and also concludes that when occupational stress occurs there is lower production in companies, increased costs, absenteeism, less dedication to work, and higher staff turnover. This leads to losses for the company.

Charria et al. (2011); Ortiz et al. (2014) which are the articles that studied the population group of teachers observed that this group presented pictures of psychomatic symptoms, depression, sleep disorders, and this group determined as risk factors: discipline in the classroom, lack of resources, conflicts and role ambiguity, work overload and low recognition, hourly load and that they have to continue with studies, interrelation with other teachers, low recognition. Useche, Cendales, Montoro, & Esteban (2018), Carrillo et al. (2018) have shown that either separately or together high demands and low decision latitude are significant risk factors that can lead to negative physical and mental health outcome, in addition to linking stress to heart disease.

Blanco (2011) who in his study conducted to 339 professionals in the rehabilitation area in which the average reward was 40.41% as opposed to the average for effort and involvement was 14.84% and 12.94% respectively, determining that these workers identify as stress factors the contact with suffering and the volume of patients, uncertainty in the evolution of the treatment, not having the necessary resources, and on the other hand this group concludes that the greater the reward the greater the satisfaction perceived with the work, which coincides with what is proposed by the effort-reward model, e Cordeiro et al. (2018) with a sample of 377 health workers determined that there was no statistical correlation between physical and emotional demand, nor between common mental disorders and the effort-reward imbalance,(e Cordeiro et al., 2018)Viviola (2010) that

The study of 1922 participants, classified in 6 groups, determined that the highest effort was in teachers and health personnel, Colombian teachers reported higher effort and high rewards. On the other hand, Lopez Gonzalez et al (2004) studied 752 workers; 390 men and 362 women, where it was found that stress levels are higher in health personnel. Viviola (2010) also determined that the decision authority is higher in nurses and the mixed group, nurses had a higher rate of demands, they also have greater job insecurity, the supervisor's support was lower in drivers. For Fogaça, de Carvalho, Cítero, & Nogueira (2010) pediatric and neonatal ICU Physicians present excessive commitment. For Ansoleaga M, Elisa & Castillo (2011); Araújo, Graça, & Araújo (2003); Blanco, (2011); Canepa, Briones, Pérez, Vera, & Juárez (2008); Carrillo C, Ríos M, Escudero L, & Martínez M., (2018); Escribà, Más Pons, & Flores (2001); Fogaça et al.(2010); Griep, Rotenberg, Landsbergis, & Vasconcellos, (2011); Schmidt (2013); Ansoleaga & Ansoleaga (2015); Gonzalo, (2006) demonstrated that stress occurs more frequently in female personnel, without

However, the article Effort-Reward Imbalance and State of Mental Distress in Health Care Workers in Chile did not locate this difference between genders.

Chiang , Riquelme , & Rivas (2018) who conducted a study on 184 workers significantly negative between the way of performing the job with satisfaction and autonomy.

Ju, Mart, Feldman, & Bol (2014) which studied 989 employees from 6 countries, which determined that in Venezuela there were low demands, high control, and high social support unlike Peru and Chile where lower support and lower control were observed, Colombia had high psychological demands. Ju et al. (2014) article on demand/control and mental health in health professionals in 6 Latin American countries proved that there is a universal relationship between the variables of the demand/control/social support model and mental health in the study group, which means that these variables should be subject to permanent control and monitoring in workplaces, The article that

carried out a critical analysis that studied 3 psychological perspectives of work stress resolved that the economic factor, contrary to what is usually considered, is not perceived as the only method of reward, participative leadership and recognition are perceived as buffers in the appearance of stress, and social support is observed in many cases as an important buffer.

Araújo et al. (2003); Cuevas & García (2012); de Aguiar et al.(2010); Fernández, Johnston et al. (2016),Gómez , (2011); Schmidt (2013) González , Carrasquilla , Latorre , Torres , & Villamil (2015) in which their articles that used the Effort-Reward Imbalance model for the evaluation of stress finiquituated that the higher the satisfaction the lower the psychological demands, and those who used the Demand-Control model resolved that those who present high demands and little control, are determinants to present work stress, but social support is an amortigating factor.

Blanco (2011), Aguado, Bátiz , & Quintana (2013) in their articles found that in health care workers the stressors were a high degree of competitiveness, work demands, and the number of patients, also dealing with death is another relevant factor in the causation of stress.

Chiang Vega et al., (2018) Articles conducted on nurses concluded that they perceived more support among peers than from their superiors. One of the articles referring to nurses working as flyers presented role conflict.

Petri & et al (2017); Serrano, Moya, & Salvador (2009) in these articles that used cortisol as a test for stress evaluation did not agree on the contribution of this test, one of the articles concluded that morning cortisol is related to chronic stress, on the other hand, what the article that was conducted in military police reveals is that these are subjected by their activity to stressors, but they do not perceive it as such since these are intrinsically related to their work.

Ansoleaga et al. (2016) in this article that reviews the topic of stress from the gender perspective coincides with the articles that were made to nurses in that women presented higher incidence, in women this can be reasoned because women in addition to their work must reconcile family life, on the other hand women are selected for lower positions, despite having a higher education in many cases, another aspect is the perception of gender inequality, lower income and that women have a shorter or interrupted working life. Other studies that looked at the gender perspective reveal that women have higher stress rates than men, due to this combination of factors.

Serrano Rosa et al. (2009) Occupational stress is an anomaly that affects a high percentage of the working population in the world, especially in the industrialized world, and results in a high percentage of

personal, economic, and psychosocial costs, as well as Götz, Hoven, Müller, Dragano, & Wahrendorf (2018) the presence of stress at work is linked to higher absenteeism. Johnston et al. (2016) demonstrated that when there is an imbalance between buffering tools and task-specific factors it gives openness to the occurrence of job stress.

In the present review of the last 18 years on the subject of work stress, many of these studies coincide in the health affections of workers. The models used for the evaluation of occupational stress are based on demand-control and social support, and on the effort and effortlessness of the workers.

- Although Kasarek's model did not have stress assessment as a principle, it is an instrument whose value has been validated in some countries around the world.

Many articles state that defining job stress is a complicated task and that it must be differentiated from job strain.

According to the demand-control model leads us to observe that control influences the appearance of stress, how much control the worker has in each task versus work demands when there is an imbalance between these is where stress can appear, in addition to social support proves to be a significant factor, to the extent that the work situation becomes more rigorous, with the degree of control that the person has determines the impact and tension experienced, an imbalance between the perceptions of effort expended and rewards absorbed establishes the category of stress.

The effort-reward model determines that when there is a balance between effort and reward, which does not necessarily refer to an economic reward, work stress does not manifest itself.

It is important to recognize that when conducting stress assessment studies the individual characteristics of each person to be assessed must be considered, the individual coping of each case is a factor that also influences the view of stress as outlined in the effort-reward model that

The study suggests that there are people who, faced with the demands at work, may see these as threats or as opportunities and, according to this perception, they may experience work stress or not experience it at all.

The gender perspective is also significant in terms of psychosocial risk factors and stress; women consider that reconciling family and work is a difficult task, and other aspects that have an influence are that women are usually assigned to lower-ranking positions, and lower salaries regardless of their level of education.

In recent years there has been an increase in psychological illnesses, given that a large part of our time is dedicated to our work tasks, the need arose to investigate how

work influences the appearance of stress, which led to studies dedicated to work stress and the development of evaluation models.

In the opinion of the author of this paper, there is still much to be analyzed and in an increasingly competitive and technological world, psychosocial risk factors and the health effects derived from them will continue to increase, which is why it is important to emphasize the promotion of research in these fields.

Conclusions

There are several studies that have been carried out based on these models, but there is still a need for more studies to be conducted in the Latin American context.

The application of these models or other models of work stress assessment should be aimed at proposing control measures to improve the situation of workers, and to take preventive measures that can warn of disorders in the health of employees.

The adaptive responses that the organism undergoes when subjected to stressful situations lead to a deterioration in the health of the individual.

These effects result from the body's adaptive responses to reach a level of homeostasis. Occupational physicians must consider psychosocial risks when conducting a causal investigation of a disease, as many conditions can result from these factors.

The studies that were analyzed resolved that both the Effort-Reward Imbalance and Demand-Control models are valid models for the evaluation of work stress, in addition to being explanatory for the study of work stress, which benefits us in understanding this phenomenon, and on the other hand provides us with tools for intervention in the prevention and control of work stress.

As each individual faces the challenges presented at work, and the organizational tools and constitution of each job determines the occurrence of work-related stress or not, the understanding of this problem is much more complex than it seems at first glance.

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