

Obesity and stress among workers from different sectors of production: an integrative review

Obesidade e estresse entre trabalhadores de diversos setores de produção: uma revisão integrativa

Obesidad y estrés entre trabajadores de diversos sectores de producción: una revisión integrativa

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ABSTRACT

Objective: To identify the relationship between obesity and stress among workers in various sectors of production. **Methods:** This is a study conducted using the method of integrative literature review. To search for articles, we used the following databases: Medical Literature Analysis and Retrieval System Online (Medline), the Latin American and Caribbean Health Sciences (LILACS); Scientific Electronic Library Online (SciELO), Scopus; Web of Science (ISI). Descriptors used for this search were: obesity, occupational stress and workers. **Results:** Seven articles were included. Regarding the purpose of the study, the selected articles showed no significant relationship between obesity and stress. **Conclusion:** We reiterate the need for studies with more precise designs to show the relationship between obesity and stress of the worker.

Keywords: Obesity; Stress ocupacional; Workers; Occupational health

RESUMO

Objetivo: Identificar a relação entre obesidade e estresse em trabalhadores de diversos setores de produção. **Métodos:** Trata-se de um estudo realizado por meio do método de revisão integrativa da literatura. Para a busca dos artigos, foram utilizadas as seguintes bases de dados: Medical Literature Analysis and Retrieval System Online (Medline); Literatura Latino-Americana e do Caribe em Ciências da Saúde (Lilacs); Scientific Eletronic Library Online (SciElo); Scopus; Web of Science (ISI). Os descritores obesidade, estresse ocupacional e trabalhadores foram usados para esta busca. **Resultados:** Sete artigos foram incluídos. Em relação ao objetivo da pesquisa, os artigos selecionados não apresentaram relação significativa entre obesidade e estresse. **Conclusão:** Reiteramos a necessidade de estudos com delineamentos mais precisos para evidenciar a relação entre obesidade e estresse do trabalhador.

Descritores: Obesidade; Estresse ocupacional; Trabalhadores; Saúde do trabalhador

RESUMEN

Objetivo: Identificar la relación entre obesidad y estrés en trabajadores de diversos sectores de producción. **Métodos:** Se trata de un estudio realizado por medio del método de revisión integrativa de la literatura. Para la búsqueda de los artículos, se utilizaron las siguientes bases de datos: Medical Literature Analysis and Retrieval System Online (Medline); Literatura Latino-Americana e do Caribe em Ciências da Saúde (Lilacs); Scientific Eletronic Library Online (SciElo); Scopus; Web of Science (ISI). Los descriptores obesidad, estrés ocupacional y trabajadores fueron usados para esta búsqueda. **Resultados:** Fueron incluídos siete artículos. En relación al objetivo de la investigación, los artículos seleccionados no presentaron relación significativa entre obesidad y estrés. **Conclusión:** Reiteramos en la necesidad de realizar estudios con delineamientos más precisos a fin de evidenciar la relación entre obesidad y estrés del trabajador.

Descriptor: Obesidad; Estrés laboral; Trabajadores; Salud laboral

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INTRODUCTION

Work complaints are increasingly frequent among workers from different production sectors. According to data of the scientific literature⁽¹⁾ these complaints are connected both to the work process and conditions and to aspects related to the environment, to the interpersonal relations, and to workers themselves.

Considering that work plays an essential role in characterizing conditions of life /health of workers, the way it is organized in the environments can lead to weariness both to the physical and mental health of workers⁽²⁾.

As for mental health, stress is known as a problem that can lead to hazards to workers' health. The body of a stressed worker reacts for protection, preparing it to face or escape from a threatening situation that has to be controlled⁽³⁾.

To that end, if workers are stressed, the heart and respiratory rates are increased and there are also changes in the blood glucose and fat levels which will only return to normal parameters when the stress is controlled.

These reactions are called allostatic and aim to maintain body balance, ranging within a normality range that is higher than homeostasis. In a short term allostatic reactions are beneficial, however, when they are prolonged, they are a hazard to health, leading to stress and physical and/or mental illnesses⁽⁴⁾.

Diseases of the circulatory, respiratory and endocrine systems can also affect workers' health. Their professional activity and life style can alleviate or increase the severity of these problems⁽⁵⁾.

In Brazil, the diseases of the endocrine system have been the focus of many scientific studies and currently obesity has become a public health problem as important as malnutrition and should receive a special attention by health teams*.

A study on obesity with workers from several countries demonstrated a 17% prevalence of overweight workers, 7.6% with obesity level I and 3.4% with obesity level II. Regarding the risk for developing cardiovascular diseases, assessed through the waist-hip ratio, there was a 29% prevalence of moderate risk and the same value for workers with high risk⁽⁶⁻⁷⁾.

In England, after researchers assessed the health history of 10 thousand civil servants, a relationship between stress and Metabolic Syndrome was found. The results show that workers with chronic work stress have more than twice the chance to present this syndrome that those who do not have stress, taking into account other risk factors⁽⁸⁾.

The Metabolic Syndrome is formed by a set of cardiovascular risk factors related to central fat deposition and insulin resistance⁽⁹⁾. Obesity can be previous to the Metabolic Syndrome.

The companies where these people worked are an important scenario for the development of a healthy lifestyle and, thus, they have a great responsibility in promoting the health of workers, since obesity and stress

can interfere in their performance and quality of life.

Considering that the majority of the adult population is formed by workers, and many of them spend at least 40 hours per week at work, institutional programs are extremely important to alleviate diverse situations that contribute to the development of obesity and stress.

From this context, we wanted to identify in the national and international literature the studies that were carried out approaching the presence of obesity among workers and its relationship with occupational stress.

The research question was: What is the relationship between occupational stress and obesity in workers of the different production sectors?

OBJECTIVE

To identify the relationship between obesity and stress in workers from the different production sectors.

METHODS

The study was carried out through the method of integrative review of the literature, this method enables to summarize the studies already carried out and draw conclusions supported by an interest⁽⁸⁾. The integrative review is a strategy to identify and assess the existing evidences of health practices when the body of scientific knowledge is not grounded enough⁽⁸⁻⁹⁾.

The study was developed in six stages, according to the methodological recommendations for this type of survey⁽¹⁰⁾. On the first stage, the question to be reviewed was described; on the second stage the studies of the sample were selected; on the third stage the characteristics of the reviewed research were chosen; on the fourth stage, the analysis of the findings was carried out according to the established inclusion criteria; on the fifth stage the outcomes were interpreted and on the sixth stage this article was written to communicate the outcomes obtained.

To search for the articles, the following data base were used: Medical Literature Analysis and Retrieval System Online (Medline); Latin American and Caribbean Health Science Literature Database (LILACS); Scientific Electronic Library Online (SciElo) and Scopus; Web of Science (ISI).

The inclusion criteria were established in the beginning of the study when the theme to be studied was defined: we decided to include quantitative and qualitative study with a descriptive design, quasi-experimental and experimental, in the period from 2000 to 2009, in Portuguese, English and Spanish and that were fully available for later reading and analysis.

To search for articles, the descriptors used were obesity, occupational stress and workers, and the search criteria established in each data base were respected.

In these databases, the descriptors used were: *obesidade, estresse ocupacional, sobrepeso, peso e trabalhador* (for data base in Portuguese) and obesity, occupational stress, weight, overweight, worker (for data bases in English). These descriptors have been used because they were part of the list of DECS and MESH.

For data collection an instrument built for that purpose

* Rumiato AC. Report of the multidisciplinary training in the area of nutrition. Universidade Estadual de Londrina (UEL). Londrina; 2006.

was used, it was assessed by judges from another study with the same methodology, following the methodological recommendations for this type of research⁽¹¹⁾. The instrument used has the following items: identification of the original article, methodological characteristics of the study, assessment of the methodological rigor and assessment of the results found⁽¹¹⁾. In the present study we have not used the item assessment of the measured interventions as proposed by a previously used instrument because it was not the objective of our study.

To rank the evidences found in the studies a classification proposed by the Agency for Healthcare Research and Quality of the United States was adopted, in which the following seven levels of evidences are described: (1) Evidence obtained from meta-analysis of randomized controlled trials or systematic reviews from controlled randomized clinical trials; (2) Evidence obtained from at least one well designed randomized controlled trial; (3) Evidence obtained from at least one well-designed controlled study without randomization; (4) Evidence obtained from well-designed cohort or case-control analytic studies, (5) Systematic reviews of descriptive and qualitative studies; (6) Evidences from a single descriptive or qualitative study (7) Opinions from specific authorities in the area studied⁽¹²⁾.

The results are presented in a descriptive manner, using tables to capture the evidences of the relationship between

obesity and workers' stress in many production sectors.

RESULTS

We have included in the present study seven articles that presented evidences on the relationship between obesity and stress at work.

In the data from Table 1, the inclusion and exclusion of the articles according to database researched are presented, considering the following characteristics: total amount of articles found, total amount of articles found and the total number of articles included in the study.

Table 1 – Distribution of the number of articles identified and selected according to the data base investigated - 2000/2009

Data Base	Identified Articles	Selected Articles*
SCOPUS	38	3
ISI	257	1
LILACS	135	1
SciELO	39	-
MEDLINE	145	2
Total	614	7

* The articles excluded did not present evidences of the correlation between obesity and workers' stress

Table 2 – Distribution of the studies according to the data base, year it was published, source country, title, authors, method and main results of the surveys (2000-2009)

Data bases	Year	Source	Title	Authors	Method	Results
LILACS	2001	Paraguay	Prevalencia de la obesidade, patologias crônicas no transmisibles asociadas y su relación com el estrés, hábitos alimentarios y actividad física em los trabajadores del Hospital de la Anexión.	Villareal Ramírez ⁽¹³⁾	Correlational	The presence of chronic diseases and the increase in obesity seen in health care service workers can affect productivity. The high stress level and obesity contribute to the problems with social interaction among employees.
SCOPUS	2005	Tailandia	Factors associated with obesity among workers in a metropolitan waterworks authority.	Kantachuvessiri et al. ⁽¹⁴⁾	Cross-sectional	Significant association between age and obesity. More food was consumed when they were stressed. They have good knowledge and attitudes towards obesity, but they still don't practice healthy lifestyles.
	2005	United States	Relationship between work stress and body mass index among 45,810 female and male employees.	Kouvonen et al. ⁽¹⁵⁾	Cross-sectional	In men, lower job demands were associated with a higher BMI. Weak correlation between BMI and stressful work.
	2009	United States	Eating behavior related to obesity and job stress in male Japanese workers.	Nishitani et al. ⁽¹⁶⁾	Correlational	Obesity was associated with eating behaviors such as eating fast, and substitution, and eating from irritability. These eating behaviors were related to high job demands, psychological stress, tension, anxiety and depression.
MEDLINE	2006	Pakistan	Obesity: An Independent risk factor for systemic oxidative stress.	Khan et al. ⁽¹⁷⁾	Correlational	Obesity can decrease the activities of body's protective antioxidants, and can enhance the systemic oxidative stress.
	2006	Japan	Relationship of obesity to job stress and eating behavior in male Japanese workers.	Nishitani, Sakakibara ⁽¹⁸⁾	Correlational	Male obese workers tend to be stress which may be related to high job demands.
ISI	2009	Japan	Effect of the interaction between mental stress and eating pattern on body mass index gain in healthy Japanese male workers.	Toyoshima et al. ⁽¹⁹⁾	Cohort (5 years)	Stress and eating habits were not significantly correlated. In people with a high stress level, the increase in BMI was significantly higher in people that ate too much.

In the data from Table 2, the articles selected according to data base, year of publication, source, title, authors, method and results.

Among the seven articles included in the present study, two were published in a specific obesity journal (International Journal of Obesity).

The other five articles were published in journals that were not obesity-specific; however, they were all health-related; they were about: epidemiology, social security, public health and nutrition.

DISCUSSION

The concern with obesity is probably due to the increase in this condition as an important social factor to the health of the population. Many areas of knowledge connected to Health Sciences study the theme.

The level of evidence used in integrative and systematic reviews is a way to assess studies carried out in certain areas of knowledge, according to the methodology used by the authors to show improvement in care in issues that are not strong yet⁽²⁰⁾.

According to the type of methodology applied in the articles studied, we observed that four articles are correlational studies, two are cross-sectional, and one has a cohort methodology with duration of five years.

Applying the classification to determine the level of evidence of the articles, six of them presented evidence 5, one presented evidence 4. This showed that the methodologies used by the studies assessed have strong clinical evidence for the subject studied.

As for the objective of the present study, which tried to find evidences of the correlation between workers' obesity and the presence of stress in several production sectors where these workers are inserted in, the articles included did not present significant correlation between obesity and stress, with a total of 4 (17.4%) of the 23 conclusions found in the studies.

High job demands are found to cause stress in workers (4.3%)^(13,15,19) and increase the need and desire to eat (17.4%)⁽¹⁵⁾, however, in non-obese people, this need has not been observed.

A study on the influence of obesity and stress at work concluded that in obese people there is a strong tendency for the increase in stress-induced physiological activation, manifested in the presence of environmental challenges, such as chronic occupational stress⁽²¹⁾.

A study also showed that obese people usually eat faster when annoyed at work (4.3%), and they also eat more when they are stressed (4.3%)⁽¹⁶⁾. The same study showed that obese people are aware of the problems obesity can cause but, even so, they present unhealthy behaviors such as sedentary lifestyle and an irregular diet with irregular times to eat⁽¹⁶⁾.

Another result presented by one of the studies was that old age is significantly associated to obesity⁽¹⁴⁾. With ageing, there is decrease in muscle mass, decrease in the metabolism with a consequent increase in fat, as well as decrease in height, relaxation of the abdominal muscles, kyphosis, and change in the skin elasticity⁽²²⁾ and, also,

highlights that the proportion of obesity is about four times higher after the 40s⁽²³⁾.

With this integrative review it was seen that provision of services of any nature can be affected when workers present chronic diseases and are obese, and when they are stressed they present many social problems in their lives with other workers⁽¹³⁾.

These data corroborate a study⁽²⁴⁾ that puts occupational stress as a possible explanation for social inequality and the risk for developing diseases. Obese people also have difficulty to get work where they have to expose their bodies, are less agile than slim people, and may be unemployed in the future⁽²⁵⁾.

As for stress and obesity leading to a fall in productivity, a study that assessed American nurses found a great associated between occupational stress and intense decrease in physical capacity which was comparable to smoking and sedentary lifestyle⁽²⁶⁾.

A study also showed that a great amount of effort at work and low job demand can increase the Body Mass Index (BMI)(8.7%)⁽¹⁴⁾.

Thus, stress due to high job demands can make workers present problems to perform the tasks asked, take longer to do so, present a lower pace at work, and have problems to understand orders and disagreements⁽²⁾.

CONCLUSION

After analysis of the studies published from 2000-2009, and in an attempt to rank the evidences resulting from the publications in the main scientific journals, we may conclude that studies do not show a significant correlation between obesity and workers' stress in any of the production sectors.

The present study shows that there is a question that should be answered: is there significant evidence between workers' stress and the development of obesity? This question presented in this review cannot be answered by this type of integrative review in which we review the published articles that deal with the subject in the indexed journals.

The limitations of the present study are related to the search performed in the database because the descriptors used by researchers many times are not the same in all data base used and, because of that, many international and national articles may not have been found.

Study designs should be more rigorous to investigate the problems found and should bring scientific evidences to the clinical practice that can effectively contribute to the necessary changes to guarantee the health of workers.

We reinforce the need for studies with methodologies that promote the collection of laboratory tests, weight and height to identify BMI of workers, using validated questionnaires that can answer this question to show the evidence of the relationship between obesity and workers' stress.

We also reinforce the need for nurses working in this

area to observe the issue of obesity and workers' stress in the places they work, fostering strategies to manage occupational stress and treating overweight and obesity with regular physical activities combined with a healthy diet.

REFERENCES

- Bohle P, Quinlan M, Kennedy D, Williamson A. Working hours, work-life conflict and health in precarious and "permanent" employment. *Rev Saúde Pública*. 2004;38(Supl):19-25.
- Benatti MCC. Acidentes do trabalho em um hospital universitário: um estudo sobre a ocorrência e os fatores de risco entre trabalhadores de enfermagem [tese]. São Paulo: Faculdade de Enfermagem da Universidade de São Paulo; 1997.
- Macedo LE, Chor D, Andreozzi V, Faerstein E, Werneck GL, Lopes CS. Estresse no trabalho e interrupção de atividades habituais, por problemas de saúde, no Estudo Pró-Saúde. *Cad Saúde Pública*. 2007;23(10):2327-36.
- Mc Ewen BS, Lasley E. Carga alostática: quando a proteção dá lugar ao dano. In: McEwen BS, Lasley E, organizadores. *O fim do estresse como nós o conhecemos*. Rio de Janeiro: Nova Fronteira; 2002. p.79-93.
- Saad MJA, Zanella MT, Ferreira SR. Síndrome metabólica: ainda indefinida, mas útil na identificação do alto risco cardiovascular. *Arq Bras Endocrinol Metab*. 2006;50(2):161-2.
- Chandola T, Brunner E, Marmot M. Chronic stress at work and the metabolic syndrome: prospective study. *BMJ*. 2006;332(7540):521-5.
- Sociedade Brasileira de Hipertensão, Sociedade Brasileira de Cardiologia, Sociedade Brasileira de Diabetes, Associação Brasileira para Estudos da Obesidade. I Diretriz Brasileira de Diagnóstico e Tratamento da Síndrome Metabólica. *Arq Bras Cardiol*. 2005;84(Supl 1):S3-28.
- Galvão CM, Sawada NO, Rossi LA. A prática baseada em evidências: considerações teóricas para sua implementação na enfermagem perioperatória. *Rev Latinoam Enferm*. 2002;10(5):690-5.
- Hamer S. Evidence-based practice. In: Hamer S, Collinson G, editors. *Achieving evidence-based practice: a handbook for practitioners*. London: Baillière Tindall; 1999. p.3-12.
- Ganong LH. Integrative reviews of nursing research. *Res Nurs Health*. 1987;10(1):1-11.
- Ursi ES, Galvão CM. Prevenção de lesões de pele no perioperatório: revisão integrativa da literatura. *Rev Latinoam Enferm*. 2006;14(1):124-31.
- Villareal Ramírez SM. Prevalência de la obesidad, patologías crónicas no transmisibles asociadas y su relación con el estrés, hábitos alimentarios y actividad física en los trabajadores del Hospital de la Anexión. *Rev Cienc Adm Financ Segur Soc*. 2003;11(1):83-93.
- Kantachuvessiri A, Sirivichayakul C, KaewKungwal J, Tungtrongchitr J, Lotrakul M. Factors associated with obesity among workers in a metropolitan waterworks authority. *Southeast Asian J Trop Med Public Health*. 2005;36(4):1057-65.
- Kouvonen A, Kivimäki M, Cox SJ, Cox T, Vahtera J. Relationship between work stress and body mass index among 45,810 female and male employees. *Psychosom Med*. 2005;67(4):577-83.
- Nishitani N, Sakakibara H, Akiyama I. Eating behavior related to obesity and job stress in male Japanese workers. *Nutrition*. 2009;25(1):45-50.
- Khan NI, Naz L, Yasmeen G. Obesity: an independent risk factor for systemic oxidative stress. *Pak J Pharm Sci*. 2006;19(1):62-5.
- Nishitani N, Sakakibara H. Relationship of obesity to job stress and eating behavior in male Japanese workers. *Int J Obes (Lond)*. 2006;30(3):528-33.
- Toyoshima H, Masuoka N, Hashimoto S, Otsuka R, Sasaki S, Tamakoshi K, Yatsuya H. Effect of the interaction between mental stress and eating pattern on body mass index gain in healthy Japanese male workers. *J Epidemiol*. 2009;19(2):88-93. Erratum in *J Epidemiol*. 2009;19(5):273.
- Galvão CM. Níveis de evidência. *Acta Paul Enferm*. 2006;19(2):5.
- Steptoe A, Cropley M, Griffith J, Joeekes K. The influence of abdominal obesity and chronic work stress on ambulatory blood pressure in men and women. *Int J Obes Relat Metab Disord*. 1999;23(11):1184-91.
- Cabrera MAS, Jacob Filho W. Obesidade em idosos: prevalência, distribuição e associação com hábitos e co-morbidades. *Arq Bras Endocrinol Metab*. 2001;45(5):494-501.
- Gigante DP, Barros FC, Post CLA, Olinto MTA. Prevalência de obesidade em adultos e seus fatores de risco. *Rev Saúde Pública*. 1997;31(3):236-46.
- Stansfield S, Head J, Marmot M. Work related factors and ill health. The Whitehall II Study. Contract Research Report 266/2000. Health & Safety Executive 2000. [Internet] 2000 [cited 2010 Jun 12]. Available from: http://www.hse.gov.uk/research/crr_pdf/2000/crr00266.pdf
- Magalhães J, editor. A obesidade e o mercado de trabalho. *J Traquimfar*. [Internet] 2007 [citado 2010 Ago.] Disponível em: <http://www.traquimfar.org.br/jornal/set-2007/jornal.htm>
- Cheng Y, Kawachi I, Coakley EH, Schwartz J, Colditz G. Association between psychosocial work characteristics and health functioning in American women: prospective study. *BMJ*. 2000;320(7247):1432-6.

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