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Article of scientific and technological research

Workload and its effect on the health of workers: A biliometrics

Carga de trabajo y su efecto en la salud de los trabajadores: una bibliometría

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ABSTRACT

Introduction: a descriptive bibliometric study was carried out. **Objective:** to analyze the scientific production on the effects of the workload on the health of workers and to identify research trends. **Method:** analysis of publications was carried out in the Scopus database and was complemented with network analysis using the Vosviwer tool. **Results:** two areas are observed in which research on workload predominates. The first is related to occupational risks and the second to the mental and physical health of workers, linked to jobs with shift rotation. **Conclusion:** These results indicate that the intensification of work has a strong association with the concepts of psychosocial and occupational risks.

Keywords: Workload; Workers' health; Occupational risks; Bibliometrics.

RESUMEN

Introducción: se realizó un estudio descriptivo de tipo bibliométrico. **Objetivo:** analizar la producción científica sobre los efectos de la carga de trabajo en la salud de los trabajadores e identificar tendencias investigativas. **Método:** se realizó análisis de publicaciones en la base de datos Scopus y se complementó con análisis de redes utilizando la herramienta Vosviwer. **Resultados:** se observan dos áreas en las que predomina la investigación sobre la carga de trabajo. La primera está relacionada con los riesgos ocupacionales y la segunda con la salud mental y física de los trabajadores, vinculados a trabajos con rotación de turnos. **Conclusión:** Estos resultados indican que la intensificación del trabajo tiene una fuerte asociación con los conceptos sobre riesgos psicosociales y ocupacionales.

Palabras clave: Carga de trabajo; salud de los trabajadores; riesgos laborales; bibliometría.

INTRODUCTION

In recent decades, the conditions and demands of work have increased to achieve the sustainability and competitiveness of companies. In a time like the current one, with a predominance of an economy based on knowledge subject to rapid changes, workers are immersed in multiple requirements that make their tasks and professional practice more complex and intensity[1].

Regarding the amount of work, the concept of intensification appears, which refers to the time a worker dedicates to carry out his tasks[2]. Some authors affirm that the workload refers to the amount or intensification of work carried out in a specific time, which implies an expenditure of physical, mental, and psychological energy[3,4]. Under this framework, the workload construct refers to a worker's physical, mental, and emotional effort to perform their tasks[4-7].

The intensification or workload was noticed from the earliest stages of industrial development[4]. This concept was addressed in its beginnings by sociology and has been studied by other occupations, such as epidemiology, which has focused on health from a more social perspective[3,5], and it is also argued that intensification must be studied from interdisciplinarity[3]. Thus, the intensification of work has been addressed in research from occupational medicine, epidemiology, and ergonomics that addresses the physical and mental load to which intellectual, psychological, and emotional fatigue are linked. The intensification of work has also been studied under the gaze of psychosociology, leading to the analysis of models related to psychosocial risks, taking into account the quantitative, intellectual, and emotional demands[7].

In relation to health, over time, it has been stated that intensification not only deteriorates the quality of work but also affects the health of workers[2,5]. Consistently, it is pointed out that high levels of work can require excessive psychological demands with repercussions on the worker's health and their professional, social, and family life[8-10]. In the findings of a study carried out in Spain[4,5]; it is revealed that the impact of the intensification of work on the health of knowledge workers in that country is becoming more evident every day, as a consequence of the demands of work[8], which has led to an increase in work stress and psychosocial risk factors in general.

In line with the above, Pérez *et al*.[3] point out that work intensity becomes one of the most critical factors for the psychosomatic health of workers, surpassing traditional physical risk factors such as discomfort due to postures or temperature. In addition, the authors indicate that other risk factors were found, such as the requirement of high concentration levels, scarcity of information, and constant exposure to computers, which have been considered factors associated with knowledge work. In addition, this type of work demands autonomy and self-management from workers, leading them to transgress the limits of time and place. In other words, the knowledge worker is overloaded with a high level of responsibility, which instead harms their emotional, physical, and social state[1].

The workload affects workers' health, generating sequelae at the level of their physical, mental, social, and family health[10,11]. Therefore, it was considered relevant to know the studies carried out in this regard, especially the trends in these publications, so this review becomes a source for future research. This led to the following question: what are the updated publications and research trends on the effects of workload on workers' health?

The main research trends and publications concerning the workload and its effect on workers' health were identified during 2018-2021.

METHOD

Kind of investigation

This study had a descriptive approach of bibliometric analysis of scientific literature referring to the workload and its effect on the health of workers and is aimed at identifying the main thematic groups from the recently published selected articles.

Procedure

For the search, we used a combination of words (*"work intensification" or "elevation job" or "intensification" or "intensity"*) and ("workers") and (*" effects" or "health" or "mental health" or "stress" or "psychosocial risk"*).

The publications released through the Scopus database are initially exposed (Table 1). Subsequently, the authors, journals, articles, and the countries with the most significant publications are presented. Next, the selected articles, the word network, and the main thematic axes obtained by the *Vosviewer tool*[12] are presented.

For this study, the co-occurrence of keywords was performed through network analysis[13]. This is a widely used technique to know in greater depth the literature developed in a specific field[14], which helps to understand the relationship between the intensity and centrality of the obtained keywords that are obtained[15].

The impact factor of the journals (quartile and H index) was obtained from the search in the *Journal Citation Reports (JCR)*, while the number of citations received in each publication was obtained from the *Scopus* database.

Instruments and tools

In this study, a bibliometric analysis was carried out between the years 2018-2021; the Scopus database was used, taking into account that it is an extensive database in which it is possible to locate a large amount of literature and high-impact productions. In addition, it has tools that facilitate the monitoring and visualization of the publications. Vosviwer software was used as a resource for analyzing and visualizing the relationship network of word groups (clusters).

Statistic analysis

A descriptive statistical analysis was carried out specifying selection criteria and quantities according to year and type of publication, language, and access. Authors, types of study, and citations are also analyzed; journals and the number of publications, H index, and location quartile. With the selected publications, the Vosviwer analysis tool was used, and bibliographic data mapping was performed, taking into account the number of co-occurrence of keywords, citations, and co-citations between authors[12]. The co-occurrence of keywords was performed through network analysis[13]. For the citations of the articles, Scopus was used; for the citations of the journals, the Journal Citation Reports (JCR) was considered.

RESULTS

This section presents the results of the bibliometric study. With the combination of words initially referred to, 364 articles were obtained, and those published between 2018-2021 were taken as selection criteria, obtaining 132 articles. Subsequently, the publications from empirical research and theoretical reviews were selected, leaving 121 articles. The selection was limited only to articles published in English, leaving a sample of 106 articles. When obtaining this result, those open-access articles (60 articles) were selected, and an exhaustive review of the *Abstracts was carried out* to confirm that the publications studied the effects of work intensification and related it to workers' health. When making this selection, seven articles were obtained (see Table 1).

The impact factor of the journals (quartile and H index) was obtained from the *Journal Citation Reports (JCR)* search, while the number of citations received in each publication was obtained from the *Scopus* database.

Table 1. Searches and publications returned.

Stage	Criterion
Total number of publications	364
Publication year	132
Publication-type scientific articles	121
English language	106
Open Access Articles	60
Review of the Abstract that would allow the identification of the physical and mental health subject.	10
Items selected with Vosviwer	7

Table 2 below lists the selected articles, the number of citations, the type of study, the authors, and the year of publication. Of the seven articles obtained, 100% have a quantitative approach, and 93.8% are products of empirical studies. The number of publications between 2019 and 2021 is proportional; 2 articles were published per year.

The articles with the highest number of citations are *Work Intensity, low-grade inflammation, and oxidative status: A Comparison between Office and slaughterhouse workers, with ten citations, followed by Lean Production, work Intensity, and employee well-being: Can line-manager support make a Difference?*, with five citations. The authors are affiliated with some institutions: the Universidad de La Sabana, Universitätsmedizin Berlin, School of Health Sciences, Kristiania University College, and University of Southern Denmark.

In relation to these first findings, it can be said that despite the fact that the intensification of work is a topic that has been gaining relevance in different disciplines, a low number of citations is observed in the articles mentioned, which may mean that it is a topic little explored.

Table 2. Articles by the number of citations.

Authors	Study type	Quotes	Year
Sandoval *et al*[16]	Quantitative	0	2021
Borle *et al*[17]	Quantitative	3	2021
Mamen *et al*[18]	Quantitative	3	2020
Menon *et al*[19]	Quantitative	3	2020
Kohont y Zajc[9]	Quantitative	2	2019
Huo *et al*[20]	Quantitative	5	2019
Zelzer *et al*[21]	Quantitative	10	2018

About the areas of knowledge, medicine stands out first with three publications, followed by business management, administration, and accounting with two publications, *and Environmental Science* and Psychology with one publication. It is observed that the intensification of work and its effect on health has been awakening interest in different interdisciplinary areas.

Regarding the journals in which the publications were found, it is observed that it is a journal with a high impact, located mainly in Quartile Q1 and Q2. The journal that stands out for its H index (113) is *the International Journal of Environmental Research and Public Health*, located in a Q2 Quartile, followed by the International *Journal of Environmental Research and Public Health*, with an H index of 92 located in a Q2 Quartile. , in third place is the journal *International Archives of Occupational and Environmental Health*, with an H index of 88, with a Quartile Q2 (Table 3).

Table 3. Journals.

Journals	No. publications	H Index	Quartile
International Journal of Environmental Research and Public Health	1	113	Q2
International Archives of Occupational and Environmental Health	1	88	Q2
International Journal of Environmental Research and Public Health	1	92	Q2
British Journal of Industrial Relations	1	70	Q1
Economic and Industrial Democracy	1	40	Q1
Teorija in Praksa	1	8	Q3
Oxidative Medicine and Cellular Longevity	1	79	Q1

Figure 4 shows the co-occurrence of keywords used most frequently in the reviewed articles. Network analysis (*Vosviwer*) returned two clusters. The keywords in this word network are "human" and "occupational health," which in turn are related to other words in the network. A color identifies each cluster, and each of the words that make it up indicates the degree of relationship between them. The first cluster is identified with the green color, in which the keywords with the most remarkable association are physical activities, occupational exposure, personal health care, personal health, questionnaires, and other words related to gender and age.

The group of words in red strongly correlates with risk factors and work schedule rotation. These keywords (red cluster) are, in turn, related to worker rotation, occupational risks, nurses, time worked, risk to the patient, and risk assessments, among others.

These groups of words constitute two thematic areas that need to be taken into account when addressing the effects of work intensification on workers' health. The thematic areas addressed are related to occupational exposures in health workers and the risk factors associated with shift work.

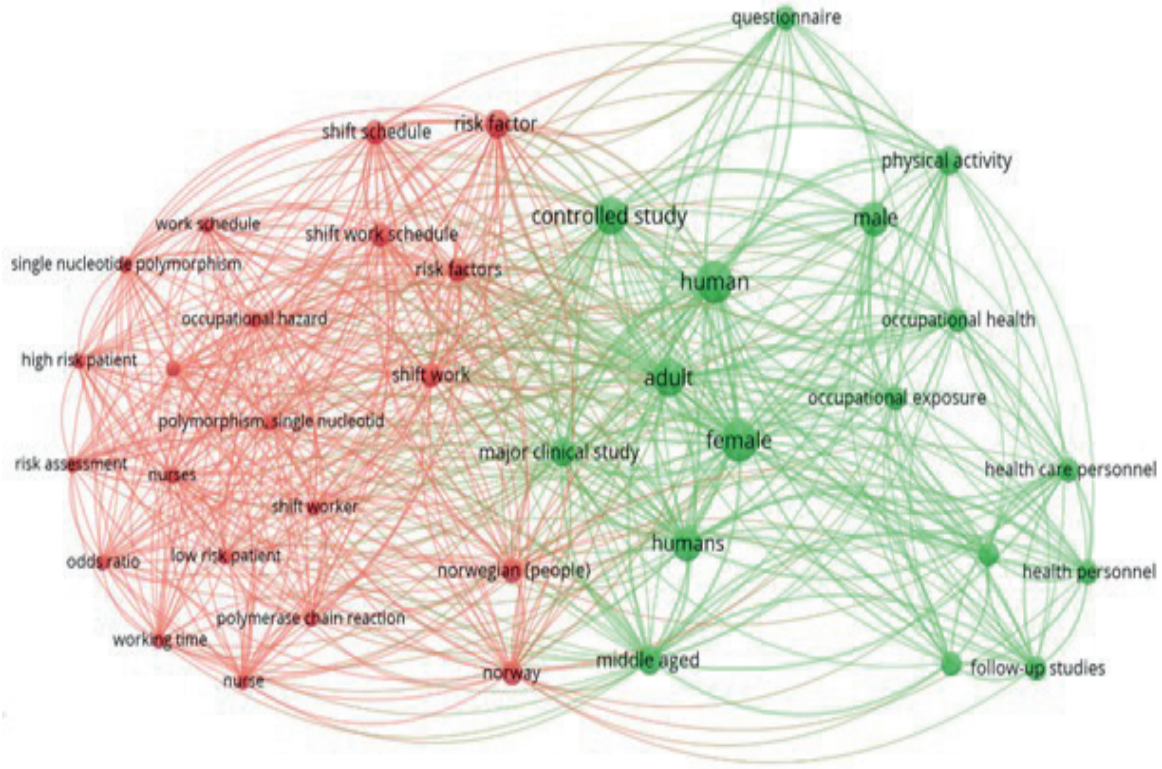

Figure 4. Co-occurrence of words.

DISCUSSION

With this investigation, it was possible to observe that the articles under study identify that the excess workload affects the appearance of occupational and psychosocial risks of workers in the health sector. The scientific productions on workload and its effect on workers' health have been published in high-impact journals. The subject has been of interdisciplinary interest; there is a greater tendency towards studies with a quantitative approach.

Some studies have focused on investigating work intensity and shift rotation[18,19]. It seems that the risks in health personnel increase due to the workload due to the different factors to which the workers are exposed[22] and the shift that seems to have a substantial impact specifically on the health of doctors and nurses[23,24]. The findings reveal that the workload is closely related to the time of work, so working long days or continuous weeks, night shifts, and weekends; schedule changes imposed by employers are associated with more intense work[21,26]. Some evidence indicates that occupational factors such as shift work and especially night work imply the interruption of the circadian rhythm[21]. Other studies have indicated different cardiovascular diseases and cerebrovascular accidents in workers who perform shifts[24,26-28]. In the same sense, it is stated that excessive workload can cause musculoskeletal diseases[27] and a greater risk of suffering from breast cancer can even lead to death[28].

Additionally, there are other effects of the workload, such as insecurity[29], sleep disorders[30,31], work stress[31-35], burnout syndrome, and motivation, which in turn have repercussions at the physical level[34]. Several authors affirm that the workload affects the balance between work and personal life and the well-being of employees[17,20].

The workload predicts the interference between work and personal life, increases stress and reduces personal and family well-being. In the same way, it has been analyzed how work overload affects worker performance[9], arguing that a decrease

in communication, training, and loss of institutional knowledge about safety[20,35] usually accompanies work intensity. Likewise, it has been considered that organizations that overload their employees with hard work take their needs into account[9]. The preceding is in line with what points out who affirms that the intensity of work is not only damaging for the health of workers[37] but also for the performance of the organization, the family, and the social life of people.

In short, different studies indicate that the intensity of work deteriorates the health of workers[9,18,20]. In addition, the effects of intensity increase when the worker's participation is not considered when making decisions about their work. This study coincides with the findings of Kohont and Zajc[9], who point out that greater intensity of work negatively affects people's health. In addition, they argue about the need to distribute workloads and generate a good work environment that favors workers' physical and mental health.

On the other hand, Pérez *et al*.[3] studied the effects of the workload as a consequence of the excess of empowerment attributed to workers, especially it has to do with knowledge workers since they are professionals who tend to be increasingly self-directed and have self-imposed goals. Knowledge workers are self-demanding as they need to respond to organizational needs and become highly competitive workers; however, this self-demand can cause deterioration in their health. This has been called the "paradox of autonomy"[3]. Thus, according to the author, while autonomy continues to be considered a key factor for motivating and promoting healthy working conditions, current trends make this scenario more confusing[3].

Another aspect to consider in which studies on work intensity are leaning has to do with the frequent use of technologies or computers and their effect on health and the quality of work[17,19]. It has been pointed out that the digital workload tends to have a more significant adverse effect on mental health than physical health[17].

The workload generates different effects on the well-being of 31 workers physically, mentally, emotionally, and socially. The studies found in this bibliometric review coincide with the results of other investigations[38-44] that have found that workload, mental demand, and jobs with high levels of turnover have physical and mental repercussions, such as stress, burnout syndrome, in sleep, decreased physical and cognitive capacity of the worker and tend to be prone to accidents at work[45-47]. Along the same lines, the findings of the studies from this bibliometric review coincide with other investigations[48-51], which found that night work mainly generates gastric and cardiovascular problems and difficulties at the level of family bonds and social interaction.

Similarly, a coincidence is observed with a bibliographical review study which concludes that teachers experience a high mental workload related to work intensity, strenuous work times, noise, job instability, and lack of resources[49]. The intensity of work affects not only those work activities that involve rotating shifts but also those that, daily, require greater autonomy, as well as the use of technology.

In general, the articles analyzed in this study highlight that more attention and care are needed in organizations to guarantee a healthy and stimulating work environment based on the participation of employees in feedback, in the possibility of visualizing practices work flexible[51] as well as using prevention and intervention strategies that promote social support and improve the climate and relationships between peers[41].

There is a need to rethink the health-work relationship and the implementation of new strategies that facilitate this relationship[19,27]. Along the same lines, the need to increase the studies and the design of scales[52] is considered in order to analyze the effects of the new forms of work in the face of health, promote the prevention and promotion of occupational health in the face of the new economy[47]; link workers as active agents for the detection of problems related to occupational health and in turn can provide different alternative solutions[52].

Strengths and limitations

The Scopus database is recognized for the quality of publications, which guarantees the quality of publications and research considered. The study takes into account updated publications and manages to introduce the study of a little-explored research topic. As a limitation, it is considered that

this study restricted its analysis to publications from the Scopus database from 2018 to 2021. It is recommended for future studies to consider other databases and expand the time range. It is also suggested to expand the language of publications and includes a greater range of keywords related to the object of study, which would expand the sample of publications.

CONCLUSION

In research on the workload and its effect on the health of workers, an increase in scientific production is observed between the years 2018-2021 in a significant number of high-impact journals with a predominance of research with a quantitative approach and participation—growing number of different disciplines and areas of knowledge. Work intensity exposes workers to occupational and psychosocial risks related to work stress, physical illnesses, and other psychosocial risk factors. In the case of doctors and nurses, shift rotation exposes them to substantial impacts on their health; Added to this are long working hours, night work, weekends, and schedule changes, which are closely linked to the perception of the workload. For future research, it is proposed to consider populations at risk, such as young people and women, and the differences in risks and impacts due to the workload associated with gender differences.

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DECLARATION ON CONFLICTS OF INTEREST

The authors declare to have no conflict of interest.

AUTHORS' CONTRIBUTION

Dubys Regalado Calanche: information search and writing

Oscar Rosero Sarasty: writing and proofreading.

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