DISEASES IN CONSTRUCTION WORKERS: A CRITICAL REVIEW AND RESEARCH OPPORTUNITIES

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Abstract

There is a need for change in the construction industry to respond to increasing competitive pressure for more productive systems. Thus, given the concern for improving productivity levels in the industry, it is necessary to face the problem from all perspectives. One of these perspectives of analysis is the worker, who plays a key role in the productivity and final results of a project. This is especially relevant in those parts of the world where construction work remains labor-intensive, so occupational and chronic diseases become of interest. Healthier workers are physically and mentally more energetic, robust, productive, and less likely to be absent from work due to illness. Although many employers are now concerned about the health of their workers, their efforts have focused more on medical costs (insurance) than on interventions to understand the impact of health on workforce productivity. Through a systematic literature review, this article describes the status of some occupational and chronic non-communicable diseases in developing countries and how they affect productivity in the construction industry. This will make it possible to have clarity on the diseases that affect construction workers and that have been most studied, such as cardiovascular diseases, chronic respiratory diseases or diabetes, and also to identify diseases whose impact has been little studied and that require further analysis in order to propose concrete actions to deal with them. Thus, cardiovascular diseases, chronic respiratory diseases and diabetes are the most analyzed diseases in the construction sector. However, mental health, musculoskeletal disorders and audiological diseases are also becoming relevant.

Keywords: cardiovascular diseases, construction workers, diabetes, musculoskeletal diseases, productivity.

1. Introduction

Construction productivity is a significant determinant of success in the projects carried out in the industry [1] since it promotes cost savings and the effective use of resources [2]. There is a need for change in the construction industry to respond to growing competitive pressure for more productive systems, given that the sector presents important problems concerning productivity. Thus, given the concern for improving productivity levels in the industry, it is necessary to address the problem from all perspectives.

One of the most analyzed perspectives is the economic one. In this context, economic losses from occupational accidents in some industrialized countries have been estimated at 3 to 5% of gross domestic product (GDP), with the World Health Organization [3] stating that economic losses (resulting from incapacity for work and early mortality related to exposure to occupational risk factors) can reach 10 to 15% of GDP.

Another approach focuses on the worker, who has a fundamental role in the productivity and results of a project. Occupational diseases are of interest in those parts of the world where construction work remains labour-intensive. According to estimates by the International Labor Organization [4], 5,000 workers die per day from work-related diseases in what are considered occupational accidents, occupational diseases, "work-related diseases", and diseases made worse by work and during 2016, almost 1.9 million people died from work-related diseases and injuries [5].

Healthier workers are physically and mentally more energetic, robust, productive, and less likely to be absent from work due to illness. Although many employers today are concerned about the health of their workers, their efforts have focused more on medical costs (insurance) than on interventions to understand the impact of health on workforce productivity.
Materials, tools, rework, work acceleration, poor coordination, project changes and their management are the main factors that affect productivity [6] and therefore are the most researched topics. The health problem and its impact on productivity differ from the research focus in the construction sector [7].

While it is true that most of the research conducted focuses on cardiovascular diseases [8, 9, 10, 11], studies are also beginning to extend to somatic and mental illnesses [12, 13, 14], including acute and chronic pain [15]. The importance of non-immediate consequences to prolonged exposure to noxious agents has also been studied in osteoarticular; musculoskeletal; dermal; respiratory; neuropsychological; otological; or fatigue diseases [16].

Thus, this article analyzes research on some occupational and non-communicable diseases in non-developed countries, aiming to deepen the understanding of how these affect productivity in the construction industry. Through a systematic review using the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) methodology [17], we describe the status of these occupational diseases, compare the data and analyze the effect of these on productivity in the construction industry in undeveloped or developing countries.

2. Method

This review was carried out following the methodology PRISMA checklist 2009 [17]. Publications from 2000 to 2023 indexed in the Google Scholar, Scopus, Scielo and Latindex databases were retrieved using the keywords "diseases", "construction worker", and "list of LATAM country".

The results obtained from these databases were 43. Each of these articles was reviewed by the authors, taking into consideration that each study had to meet the following criteria: (1) analysis in the construction sector, (2) studies on diseases, (3) articles where the study was conducted in Latin America, (4) published between 2000 and 2023, (5) articles written in English, Spanish or Portuguese and (6) articles published in peer-reviewed journals.

In the screening stage, 19 articles were eliminated because they were not related to the construction sector, and in the eligibility stage, seven articles were eliminated because they did not have peer review. Figure 1 shows the PRISMA flow chart, showing that after the entire process, 17 articles were included in the qualitative analysis.

![PRISMA Flow diagram of literature search and review](source)

**2.1 Selection of articles based on the selected criteria**

Finally, based on the criteria selected for the analysis, the aim is to understand which occupational and non-communicable diseases are analyzed in LATAM and how they affect productivity in the construction industry. The 17 articles included in the analysis, results and discussion are shown in Table 1.
Table 1. Articles retained for analysis

<table>
<thead>
<tr>
<th>Authors</th>
<th>Year</th>
<th>Country</th>
<th>Sector</th>
<th>Disease</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zarate et al. [18]</td>
<td>2009</td>
<td>Chile</td>
<td>Miners; N= 4673</td>
<td>obesity, diabetes, cardiovascular disease</td>
</tr>
<tr>
<td>Salinas et al. [19]</td>
<td>2014</td>
<td>Chile</td>
<td>Construction worker; N=194</td>
<td>obesity</td>
</tr>
<tr>
<td>Salinas et al. [20]</td>
<td>2016</td>
<td>Chile</td>
<td>Construction worker; N=142</td>
<td>obesity</td>
</tr>
<tr>
<td>Caichac et al. [21]</td>
<td>2013</td>
<td>Chile</td>
<td>Miners; N=94</td>
<td>obesity</td>
</tr>
<tr>
<td>Rodríguez [22]</td>
<td>2015</td>
<td>Colombia</td>
<td>Construction worker; N=291</td>
<td>obesity</td>
</tr>
<tr>
<td>Rodríguez Nieves et al. [23]</td>
<td>2019</td>
<td>Ecuador</td>
<td>Construction worker</td>
<td>metabolic syndrome N=54</td>
</tr>
<tr>
<td>Viana and Carvalho de Oliveira [24]</td>
<td>2017</td>
<td>Brazil</td>
<td>Civil construction; N=50</td>
<td>cardiovascular disease</td>
</tr>
<tr>
<td>Martinez and Dias de Oliveira [25]</td>
<td>2006</td>
<td>Brazil</td>
<td>metal and steel company’s workers; N= 3777</td>
<td>diabetes</td>
</tr>
<tr>
<td>Machado Susseret, Briceno-Ayala and Radon [26]</td>
<td>2019</td>
<td>Argentina</td>
<td>Migrant construction workers N= (134+141)</td>
<td>musculoskeletal</td>
</tr>
<tr>
<td>Olivares, Villalobos-Rodríguez and Cerda [27]</td>
<td>2019</td>
<td>Chile</td>
<td>Construction workers; N=186</td>
<td>musculoskeletal</td>
</tr>
<tr>
<td>Cabrera Pazmiño and Quinde Alvear [28]</td>
<td>2021</td>
<td>Ecuador</td>
<td>Civil worker; n=4</td>
<td>hearing disease</td>
</tr>
<tr>
<td>Loera González et al. [29]</td>
<td>2006</td>
<td>Mexico</td>
<td>Construction worker statistics of occupational diseases and occupational accidents</td>
<td>hearing disease</td>
</tr>
<tr>
<td>Barrios et al. [31]</td>
<td>2023</td>
<td>Chile</td>
<td>Construction worker; N=180</td>
<td>mental health</td>
</tr>
<tr>
<td>Da Costa Leao et al. [32]</td>
<td>2018</td>
<td>Brazil</td>
<td>Migrant construction workers N=709</td>
<td>mental health</td>
</tr>
<tr>
<td>Fajardo-Zapata et al. [33]</td>
<td>2009</td>
<td>Colombia</td>
<td>Construction worker; N=1175</td>
<td>various</td>
</tr>
<tr>
<td>Silva [34]</td>
<td>2002</td>
<td>Argentina, Brazil, Paraguay &amp; Uruguay</td>
<td>Database</td>
<td>various</td>
</tr>
</tbody>
</table>

3. Analysis

One of the most studied topics has been obesity to understand its prevalence and direct impact on work and cost. Zarate et al. [18], when investigating the cost of health and work absenteeism associated with obesity, found that in the study group, the prevalence of obesity was 28.2%. Therefore, the increase of severe and morbid obesity increases the health cost by 17% and 58%, respectively, regarding absenteeism, subjects with arterial hypertension, diabetes mellitus and dyslipidemia, present on average 17.7, 21.2 and 13.5 days of absenteeism respectively. Salinas et al. [19] shows the prevalence in a group of Chilean workers of overweight (41.8%) and obesity (40.2%). Rodríguez Nieves et al. [23] did something similar with 54 Ecuadorian workers, where 57.4% were overweight and 14.8% obese. In the case of Colombia, Rodriguez [22] showed that of the 291 subjects studied, 46% of workers were overweight and 15% obese. Another study in Brazil of 50 subjects showed that 52% were overweight and 18% obese [24].

Associated with the previous topic, Salinas et al. [20] demonstrated the importance of performing interventions in construction workers. Interventions decreased the metabolic syndrome from 44.4% to 38.3%, associated with a high rate of accidents. Caichac et al. [21], like Salinas [20], evaluated the importance of intervention. Although he did not obtain a significant decrease in the results (a decrease of only 0.4 points), he did show a decrease in systolic blood pressure, glycemia and triglycerides.
Martinez and Dias de Oliveira [25] showed that the prevalence of blood pressure was 24.7%, intense work stress, sedentary lifestyle, alcohol consumption, body mass index over 25, altered cholesterol and triglycerides were associated with high blood pressure. On the diabetes mellitus side, the value was 11.5%.

Regarding musculoskeletal diseases, Machado Briceno-Ayala and Radon [26] describe the precarious situation of immigrant workers in Argentina, where 80% of workers reported suffering from low back pain, compared to 42% of local workers. The results show that immigrant workers are more afraid to report poor working conditions or health problems because they fear legal punishment or deportation. Olivas [27], on the other hand, analyzes compliance with the maximum weights allowed by Chilean regulations on construction sites, where it was observed that hand labourers exceed the Recommended Weight Limit by 15.69 kg, bricklayers by 15.17 kg and ironworkers by 10.7 kg, even though the weight handled is under the limit of 25 kg established by Chilean Law 20.949. This article highlights that a technical, administrative, and engineering reflection is required to avoid musculoskeletal problems for workers.

Concerning to hearing diseases, Loera González [29] analyzes hypoacusis as acoustic trauma in occupational diseases in Mexico. In 2000, this disease accounted for 41% of workers’ illnesses, where cases resolved by lawsuits increased by 105% in 4 years, and the estimated monthly cost per worker was 277 Mexican pesos. Cabrera Pazmiño and Quinde Alvear [28], on the other hand, upon conducting a field analysis, determined that there is an overexposure and acoustic overdose of workers who handle compaction equipment for long hours and generate a high level of noise, where the health recommendations presented by the WHO are not being complied with since the values exceeded 85dB.

Ostos [30] studied the general knowledge that construction workers have about respiratory diseases. Thirty percent of the respondents do not know the origin of occupational asthma, 60% are not familiar with silicosis, and 65% are not aware of actions to prevent respiratory diseases.

Regarding mental health studies, Barrios et al. [31] analyzed sleep quality and fatigue. The results show that workers are at high risk for other health problems. For example, BMI measures show that many suffer from overweight and obesity. The cognitive-behavioural intervention showed that workers reduced their levels of sleepiness and fatigue.

Da Costa et al. [32], on immigrant workers in Brazil, analyzed the ailments of this group, where the results indicated physical and psychosocial suffering, along with pains in the spine, head, stomach, or throughout the body, in addition to intense effort, fatigue, insecurity in the execution of activities, among others. They also mentioned intimidation, humiliation, lack of respect and homesickness.

In various topics category, the Fajardo – Zapata, Méndez-Casallas and Molina [33] study showed that 34% of the Colombian workers in the construction industry who were studied presented hypoacusis. In contrast, 30% presented some visual refraction defect, 13% had pterigion, 13% had varicose veins, 4% had abdominal wall hernias, 16% were overweight, 4% obesity and 6% had alterations of the spinal column. Meanwhile, 9% of the group evaluated had had occupational accidents.

Finally, Silva [34], comparing the situation of workers in Argentina, Brazil, Paraguay and Uruguay, pointed out that there is sufficient data and a lack of periodic medical examinations in Argentina. Even so, the most frequently identified diseases were respiratory, eye and musculoskeletal diseases. In Brazil, health concerns have been improving, and the list is not only limited to obesity issues but also to hearing loss, dermatosis, repetitive strain injury, ophthalmologic problems, or pneumoconiosis. In Paraguay, it is challenging to evaluate workers because 95% still need a contract. Finally, in Uruguay, the databases are outdated and until 1999, skin diseases, allergies, acoustic trauma and musculoskeletal problems predominated. In general, there needed to be a higher level of control in the countries analyzed in this study.

4. Conclusion

Few studies have been conducted in LATAM on the health of construction workers. The country with the most significant number of studies was Chile, with seven studies focused on obesity or cardiovascular problems. Of
the 17 studies analyzed, only one focused on health costs and absenteeism as factors related to productivity. The rest are only descriptive.

Regarding obesity, some LATAM countries share the same rates of obesity and overweight, but some studies highlight the excellent results of early interventions.

There has also been an increase in research on construction work among migrants where precariousness and mental health problems stand out.

In hearing or musculoskeletal diseases, the problem is repeated in the construction sector, where tasks must be performed manually, affecting hearing (compacting machines or cargo) or transporting loads musculoskeletal issues.

The results show that there still needs to be more knowledge about how illnesses impact workers’ performance and quality of work and personal life. It is necessary to conduct more studies that address these issues to develop actions that help to reduce the prevalence of these diseases and help to form a healthier, motivated and committed workforce.

References


