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Chapter 10

Work-Related Musculoskeletal Disorders and the Relationship to Ethnicity

Rosana M. Quintana

Additional information is available at the end of the chapter

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Abstract

Work-related musculoskeletal disorders (MSDs) are a constellation of painful disorders, which could cause chronic disability. Multiple risk factors, both occupational and non occupational, may be involved. MSDs have been extensively studied in several countries; however, few studies have been carried out based on the relationship between MSDs and ethnicity.

Objective: To describe the relationship between MSDs and ethnicity in different parts of the world.

Methods: A nonsystematic literature review of studies, with both quantitative and qualitative methodology, was conducted.

Results: The evidence in research, qualitative and quantitative, emphasizes the importance of this problem in vulnerable populations in different parts of the world, prioritizing migration to developed countries and precarity condition of work.

Conclusion: Recommendations for a multidisciplinary approach of MSDs in vulnerable groups were raised.

Keywords: work-related musculoskeletal disorders, ethnicity, vulnerable and indigenous populations

1. Introduction

Work-related musculoskeletal disorders (MSDs) are a constellation of painful disorders of muscles, tendons, joints and nerves, which can affect all body parts, although neck, upper limbs and back are the most common areas. Upper extremity musculoskeletal disorders are

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also highly prevalent in manual-intensive occupations, and back and lower limb disorders occur disproportionately among truck drivers, warehouse workers, construction trades, among others. In most cases, it could cause chronic disability [1, 2].

The appropriate term is "work-related" disorders, as distinguished from specifically "occupational" disorders where a single factor is both, necessary and sufficient, in order to cause the disease [3].

MSDs have multiple risk factors, both occupational and nonoccupational. In addition to work demands, other aspects of daily life can influence their appearance. Musculoskeletal tissues can also be affected by systemic diseases [1, 2].

Risk varies by age, gender, socioeconomic status and ethnicity. Other suspected risk factors may include obesity, smoking, muscle strength and other aspects of work capacity [1].

MSDs cause a huge socioeconomic burden to patients and their household, society and their country indeed. Yet, their relevance is often minimized, particularly in developing countries with fragmented healthcare system and poor nations.

MSDs have been extensively studied in several countries; however, few studies have been carried out so as to investigate the relationship between MSDs and ethnicity [4–9].

The main objective of this chapter is to describe the relationship between MSDs and ethnicity in different parts of the world.

2. Material and methods

A nonsystematic literature review of studies, with both quantitative and qualitative methodology, was conducted. Methodological phases proposed by Greenhalgh et al. [10] were in the following (**Figure 1**):

1. Planning phase: It defines the research question for the development of the review.
2. Search phase: The search was conducted in the databases: MEDLINE, EMBASE, LILACS, SOCIAL SCIENCE INDEX and PSYCOINFO. The key words were as follows: work-related musculoskeletal disorders, ethnicity, vulnerable and indigenous populations. A hand search was carried out as well. Studies, in English and Spanish, were included in the current search.
3. Mapping phase: The key words of the selected studies were identified.
4. Synthesis phase: Data relevant to the objectives of this study were synthesized using interpretive analysis.
5. Recommendation phase: The paper summarized all the aspects related to its objective, and since then, recommendations were developed.

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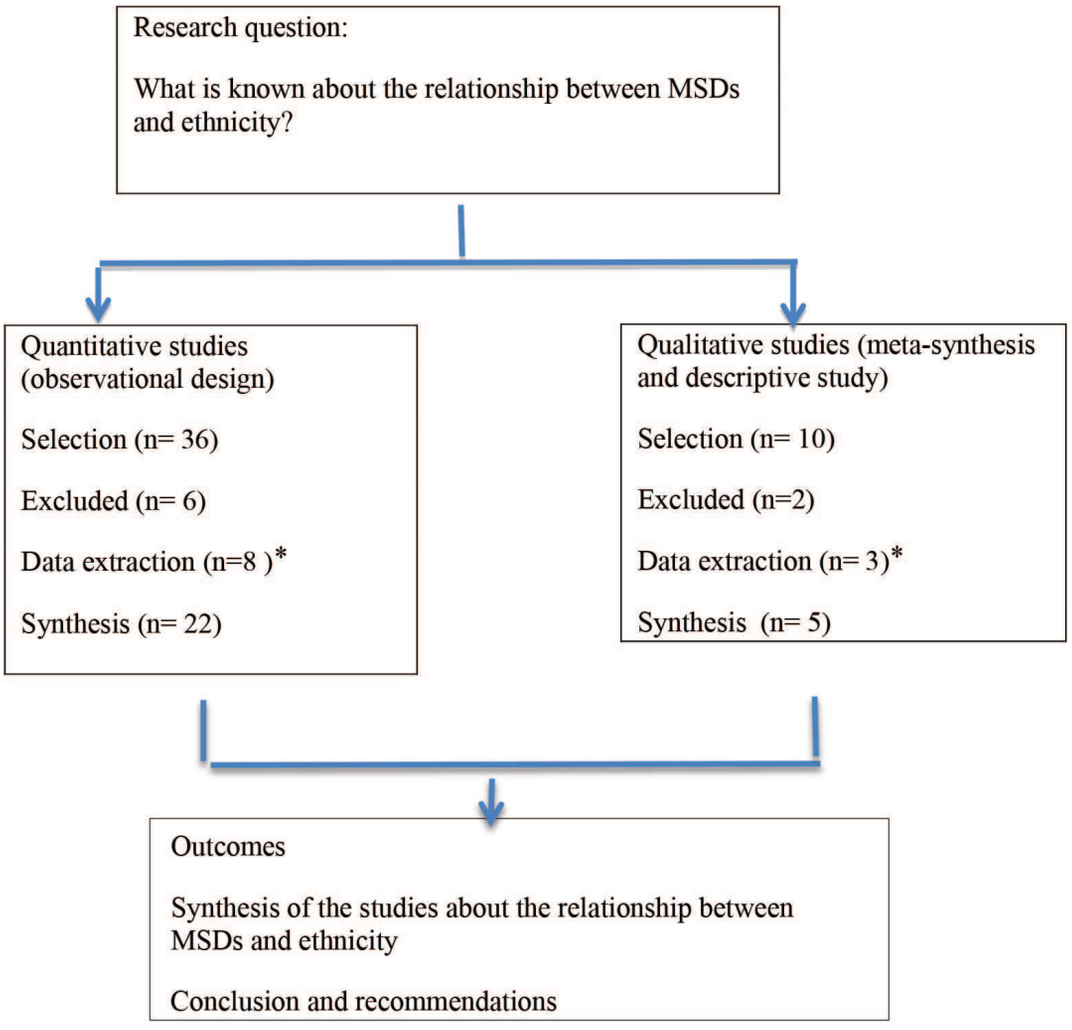


Figure 1. Methods of review. Greenhalgh et al. [10].

3. Results

Our findings fall into two categories: 1. Summary and analysis of quantitative studies and 2. Synthesis and interpretation of qualitative studies

1. Summary and analysis of quantitative studies (**Table 1**): The literature is mostly of European and American origin. They emphasize that certain population groups, especially immigrants and those belonging to lower socioeconomic status, have more MSDs.

In 1998, Urwin et al. [11] describes that people who live in socially deprived areas in United Kingdom (UK) have more musculoskeletal symptoms. Mergler [12] in Canada prioritizes the combination of qualitative and quantitative methods for this complex problem.

Author, year [ref]	Objectives and method	Country	Group studied	Conclusions
Urwin et al, 1998 [11]	Estimate the frequency of musculoskeletal pain in the adult population. Population survey	UK	Adults	Musculoskeletal pain is common in the community. People who live in socially deprived areas have more musculoskeletal symptoms
Mergler, 1999 [12]	Identify work conditions that affect human health and well-being with a view to reducing or preventing MSDs Combining qualitative and quantitative methods	Canada	Adults	Combining the results allowed us to identify the behaviors and policies that resulted from workplace changes and improved health
Cole et al., 2001 [13]	Describe the prevalence of MSDs in the Canadian working population The Canadian 1994 national population health survey (NPHS)	Canada	Adults household residents	Associations between work stressors and MSDs provide evidence for physical and psychosocial factors both affecting disability in a working population
Vindigni et al., 2004 [14]	Describe the prevalence of MSK disorders in rural indigenous Australians areas A cross-sectional research	Australia	Indigenous members of the community (Kempsey District, New South Wales)	The 57% people have learnt to live with chronic levels of pain affecting multiple anatomical sites
Turner et al., 2004 [15]	Develop statistical models that accurately predict chronic work disability This is a population-based, prospective study	US	Worker interview	The combination of sociodemographic, biomedical, work-related, administrative/legal and psychosocial risk factors for predicting chronic disability in workers
Ahonen et al., 2007 [16]	Summarizes the information on immigrant occupational health available from recent studies, incorporating varied study designs Review	US, Europe, Canada, Asia	Immigrant adults	The immigrations were associated with occupational risk factors, health consequences and the social, economic and cultural influences on worker health
Côté et al., 2008 [17]	Describe the prevalence and incidence of neck pain and disability in workers Review	Canada	Adult workers	Neck pain is endemic in workers throughout the industrialized world

Author, year [ref]	Objectives and method	Country	Group studied	Conclusions
Joshi and Chopra, 2009 [18]	Estimate urban prevalence of MSK disorders and compare to an earlier rural regional study COPCORD methodology	India	Pune adult residents	Similarly, the prevalence of MSK disorders was significantly lower in the urban (current Pune) vs. rural (Bhigwan)
Davatchi et al., 2009 [19]	Compare the prevalence of MSK disorders in Caucasians and Turks in an identical environment COPCORD methodology	Iran	Tehran adult residents	Musculoskeletal complaints were more frequent in Turks than in Caucasians, and the prevalence of rheumatic disorders was rather similar except for knee osteoarthritis
Jørgensen et al., 2011 [7]	Investigate differences self-reported health measures between immigrant and Danish cleaners Cross-sectional study	Denmark	Adults immigrant and Danish	The immigrant cleaners generally had a poorer self-reported health and work ability than the Danish cleaners
Schulz et al., 2013 [5]	Describe the prevalence of upper body musculoskeletal symptoms reported by Latino poultry processing workers and a comparison population of Latino manual workers in Western North Carolina Cross-sectional study	US	Latino poultry workers and other Latino manual workers living in communities	Back symptoms and wrist/hand symptoms were reported by over 35% of workers. Workplace conditions facing poultry processing and indigenous language speaking workers deserve further exploration
Rosenbaum et al., 2013 [6]	Improve understanding of immigrant Latino manual workers' occupational health, focusing on upper body musculoskeletal injury Cross-sectional study	US	Latino poultry workers and other Latino manual workers living in communities	Upper body musculoskeletal and low back pain are common in immigrant Latino workers and may negatively impact long-term health and contribute to occupational health disparities
Xiao et al., 2013 [8]	Characterize the association between agricultural work and chronic musculoskeletal pain. Cross-sectional study	US	Adult workers in California Latino farm	Chronic musculoskeletal pain is prevalent among farm workers and is associated with common work positions

Author, year [ref]	Objectives and method	Country	Group studied	Conclusions
Cartwright et al., 2013 [9]	Determine the incidence of CTS over 1 year in Latino poultry processing workers Community-based sampling.	US	Adult Latinos in poultry and non-poultry manual labor occupations	Latino poultry processing workers have an incidence of CTS that is possibly higher than Latinos in other manual labor positions
Peláez-Ballestas et al., 2015 [20]	Estimate the prevalence of MSK disorders and rheumatic diseases in indigenous Maya-Yucateco COPCORD methodology	Mexico	Adult identified as indigenous resident in Chankom (state of Yucatan)	MSK pain and rheumatic diseases were highly prevalent, with high impact on daily activities
Rodriguez-Amado et al., 2016 [21]	Identify individual and contextual factors associated with the variation of prevalence of OA in the Mexican population Multilevel analysis SGIx was associated with OA	Mexico	Adult identified as indigenous resident in Chankom who had symptomatic OA	These factors were independently associated with the prevalence of OA: female, pain intensity, physical limitation and the use of pain treatments with OA. The association between OA prevalence and regional variations with SGIx reflects inequities in health
Quintana et al., 2016 [22]	Estimate the prevalence of MSK disorders and rheumatic diseases among the indigenous Qom (Toba) in Argentina COPCORD methodology	Argentina	Adult identified as indigenous resident in Rosario (Argentina)	MSK pain and rheumatic diseases were highly prevalent, with high impact on daily activities
Loyola-Sanchez et al., 2016 [23]	Evaluate the impact of arthritis on the physical function of people living in a Maya Yucateco rural community COPCORD methodology	Mexico	Adult identified as indigenous resident in Chankom with arthritis	Arthritis is highly associated with disability. The prevalence of arthritis is associated with social factors, in addition to individual factors
Julián-Santiago et al., 2016 [24]	Estimate the prevalence of MSK disorders and rheumatic diseases in the Chontal and Mixtec indigenous communities in Mexico COPCORD methodology	Mexico	Adult identified as Mixtec and Chontal indigenous resident in rural areas of Oaxaca	The prevalence of MSK disorders was 45.5 %. The most common rheumatic diseases were back pain and osteoarthritis A high percentage of participants had not received medical care

Author, year [ref]	Objectives and method	Country	Group studied	Conclusions
Del Río Nájera et al., 2016 [25]	Determine the prevalence of MSK pain and rheumatic diseases in the Raramuri indigenous (Chihuahua) in Mexico COPCORD methodology	Mexico	Adult identified as Raramuri indigenous resident in Chihuahua city, Mexico	MSK pain and rheumatic diseases were highly prevalent, with high impact on daily activities
Granados et al., 2016 [26]	Estimate the prevalence of MSK disorders and rheumatic diseases in the Warao, Kari'ña and Chaima indigenous populations (Monagas State) Venezuela COPCORD methodology	Venezuela	Adult identified as Warao, Kari'ña and Chaima indigenous in Monagas State, Venezuela	The prevalence of MSK disorders and rheumatic diseases was high in the three indigenous groups. The Chaima indigenous group reported a higher prevalence of rheumatic diseases
Alvarez-Nemegyei et al., 2016 [27]	Estimate the prevalence of RRPS in four Latin-American indigenous groups COPCORD methodology	Mexico, and Argentina	Adult identified as in four indigenous groups: Chontal (Oaxaca, Mexico), Mixteco (Oaxaca, Mexico), Maya-Yucateco (Yucatán, Mexico) and Qom (Argentina)	There was a consistently higher prevalence of RRPS in indigenous populations RRPS vary according to the population and may be influenced by inherent factors specific for each population

US, United States; UK, United Kingdom; MSK, rheumatic musculoskeletal disorders; MSDs, work-related musculoskeletal disorders; COPCORD, Community-Oriented Program for Control of Rheumatic Diseases; CTS, carpal tunnel syndrome; OA, osteoarthritis; SGIx, Social Gap Index; RRPS, rheumatic regional pain syndromes.

Table 1. Summary and analysis of quantitative studies.

In 2004, Vindigni et al. [14] describes the prevalence of musculoskeletal (MSK) disorders in rural Indigenous Australians areas, where the 57% of people have learnt to live with chronic levels of pain affecting multiple anatomical sites.

Ahonen et al. [16] summarize the information on immigrant occupational health available from studies, incorporating varied study designs. The immigration was associated with occupational risk factors, health consequences, and the social, economic and cultural influences on worker health. Similarly, Jørgensen et al. [7] investigate differences in self-reported health measures between immigrant and Danish cleaners, where the immigrant cleaners generally had a poorer self-reported health and work ability than the Danish cleaners.

Joshi and Chopra [18] and Davatchi et al. [19] investigate the prevalence of MSK diseases in India and Iran, respectively, through the implementation of the Community Orientated

Program for the Control of Rheumatic Diseases (COPCORD). In the first case, people living in urban area had less prevalence of MSK diseases, in comparison to the people in rural area. In the second case, the musculoskeletal complaints were more frequent in Turks than in Caucasians, both living in identical environment.

In United States (US), several papers have been published on this topic, especially on immigrant population. In this sense, Schulz et al. [5] describes that the back symptoms and wrist/hand symptoms were reported by over 35% of Latino workers. In the same way, Rosenbaum et al. [6] identifies that upper body musculoskeletal and low back pain are common in immigrant Latino workers and may negatively impact long-term health and contribute to occupational health disparities. Xiao et al. [8] and Cartwright et al. [9] describe the Latino population as a vulnerable group for MSDs.

In Latin American (LA), previous studies have shown that people belonging to an indigenous group are associated with the prevalence of rheumatic disease as the rheumatoid arthritis (RA) [28]. Due to the presence in LA of indigenous groups, all countries and their condition of vulnerability, not only socioeconomic but also ethnic, were created the Latin American Group for the Study of Rheumatic Diseases in Original Populations (Grupo Latino Americano De estudio de Enfermedades Reumáticas en Pueblos Originarios; GLADERPO). The main objective was to carry out epidemiological, anthropological and genetic studies, thus fulfilling with intervention processes in the affected populations. Studies are currently being carried out in several indigenous populations of Argentina, Mexico and Venezuela [29]. In 2016, "The Clinical Rheumatology Journal" published a supplement with information about the Maya-Yucateco, Mixtec, Chontal and Rarámuri populations from Mexico; Warao, Kari'ña and Chaima from Venezuela; and Qom from Argentina [29]. The design of the studies, including samplings, case definition and methodology, was the same. The methodology was that proposed by COPCORD. Overall, low back pain, osteoarthritis (OA) and rheumatic regional pain syndromes (RPPS) were the most prevalent rheumatic diseases across all populations. Among the inflammatory rheumatic diseases, RA was the most prevalent, especially in the Qom community (2.4%) [22]. There were variations in the prevalence of certain diseases among different populations. The low back pain was more prevalent in the Qom community (19.8%) [22] and the OA in the Chontal community (32.1%) [24]. Variations were not related to the design of the study but to the characteristics of the populations and environmental factors, that is to say, heavy loads in Chontales versus Rarámuris or Maya-Yucateco in people not exposed to the same environment [20–23, 26, 27]. These results give information on working and socioeconomic conditions in these populations.

2. Synthesis and interpretation of qualitative studies: Few researches have been conducted based on social impacts associated with MSDs so far. Most outcome studies in occupational health have been focused on workers' compensation (WC), insurance payments, provision of medical services, return-to-work time and other direct insurance and employment-related measures [30]. Unfortunately, there has been little research studying the impact on the social and family environment of the workers affected, as well as the indirect economic consequences. These complex interactions create significant difficulties for researchers attempting to study the social consequences of MSDs.

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The sociodemographic characteristics of affected individuals and groups such as age, gender, ethnicity, nationality, education and socioeconomic status can influence the social consequences of the injury. They could also influence the responses of employers, insurers and medical providers [30].

Studies suggest that work-related injuries have significant long-term physical, economic and psychological consequences, which were worse in those who had been out of work for longer periods of time [31].

Patients with more serious MSDs have higher rates of psychological problems, drug abuse, and marital difficulties and the quality of the affected worker's family relationships.

Contemporary studies suggest that significant disparities in the incidence of MSDs and deaths still exist among various racial and ethnic groups. For example, in California, workplace injuries were found to occur 32% more frequently among black workers than among whites, and the rate for Hispanics is 18% higher [32]. There is scattered evidence indicating that the social consequences of MSDs also fall most heavily on women, minorities, immigrants and other vulnerable populations [33, 34].

4. Discussion

It is extremely important to study in-depth the closely related social and cultural aspects. Only traditional social variables have been studied that are only the tip of the iceberg. Multilevel analysis (e.g., individuals, social environment, health system, employers, type of work, insurance) should be incorporated for study between MSDs and vulnerable groups [35].

The constant migration of vulnerable groups to developed countries and precarious work must be taken into account in the analysis of MSDs.

The approach to this problem should be through the qualitative methods. These can serve to contextualize quantitative data providing means of cross-validation and what is termed by social scientists as triangulation, that is, the use of different approaches, by the conceptual, methodological or data collecting, to study the same problem in order to optimize the understanding of underlying mechanisms, work activity and environment, relationships, and solutions.

The incorporation of the COPCORD methodology should be of great help because it would assist the health system in the appropriate selection and application of resources, as well as the decision making in the system, demonstrating that the major worldwide problems of rheumatic complaints and disability are not just relevant to the elderly populations of developed countries, but also to the vulnerable populations living in poorer conditions [36].

5. Conclusion and recommendations

The burden of MSK disorders is likely to vary in different parts of the world. While modernization has bulldozed the Western world toward similar lifestyles, it has not yet transformed the cultural and traditional picture of Asia, Africa and several regions of South America. The disease

health process is cultural and is influenced by socioeconomic factors. Many indigenous groups traditionally squat and/or sit cross-legged on the ground to enhance their daily activities [37, 38]. Several MSDs can interfere causing immense suffering and frustration. Despite severe pain and disability, people do not easily give up this traditional and cultural lifestyle. It also coping to pain and disability, giving priority to work. This can also be seen in different vulnerable groups, where the quality and precariousness of work make individuals normalize pain and coping to it.

The recommendations are based on the literature discussed in this chapter. The assistance to this problem should be multidisciplinary, using both qualitative and quantitative methodology.

A priority is the promotion and prevention of such conditions in the most vulnerable population groups, living in precarious conditions and social inequality.

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Conflict of interest

None.

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