A Scoping Literature Review of Work-Related Musculoskeletal Disorders Among South Asian Immigrant Women in Canada

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Global migration has recently garnered intense interest from a public health standpoint. Topics concerning migration, such as push-pull theories, resettlement stress, the healthy immigrant effect, cultural assimilation, and occupational health issues, are increasingly being studied. The occupational health of migrant workers—particularly female workers—is an especially important area for research. Migrant women have an increased vulnerability to occupational musculoskeletal disorders (MSDs) in low-paid and gendered occupations such as those in the textile, hairdressing, cleaning and garment-work industries, accompanied by mental stress due to production demands.[1] One of the fastest growing communities in Canada is that of female migrants from South Asian (SA) countries, comprised of Pakistan, Bangladesh, Sri Lanka, India and Nepal.

The purpose of this paper is to examine the literature concerning work-related musculoskeletal disorders among South Asian immigrant women in Canada. We have focused on SAs because they make up the largest visible minority group since 2006, with a population of 3.2 to 4.1 million people within Canada. This group is expected to remain the largest set of visible minorities until 2031.[4] This study defines Canadian visible minorities as persons who are non-Aboriginal, non-Caucasian or non-white in color. This includes such ethnicities as South Asian, Chinese, Black, Arab, West Asian, Filipino, Southeast Asian, Latin American, Japanese and Korean.[5] As the SA population continues to expand, more SA individuals are expected to enter the workforce and may experience occupational health disparities. If these individuals are at a high risk for MSDs, introducing appropriate interventions could minimize health problems, and reduce the burden of health and disability in this largest visible minority group. A literature review could help assess whether or not a large scale study is necessary on this topic.

Guided by Arksey and O'Malley's framework,[6] a scoping review of peer-reviewed literature was carried out using the following databases: Medline (Ovid), CINAHL (Ebsco) and Scholars Portal. Search years ranged from 2000 to 2014. Articles were screened for relevance by topic. Following this strategy, manual search of gray literature was employed, such as searching reference lists from scholarly papers, and textbooks on women's occupational health. Results were limited to articles in the English language, excluded dissertations, conferences and studies involving undocumented migrants, the latter being excluded because they are not permanent economic migrants. Including them would be outside of the scope of this study.

Thirteen sources were retrieved and analyzed for this paper. After assessing the sources for relevancy to the topic, issues and gaps in knowledge, pertaining to non-reporting of MSDs, socioeconomic class effects, high-risk occupations and cultural factors as modulators and determinants of the occupational health of immigrant women—including SA immigrant women—were identified. Although most studies of immigrant workers incorporate SA populations, they are not comprehensive in their focus on this group. There is a lack of significant literature that explicitly examines the prevalence of MSDs among SA immigrant women in Canada was identified. This knowledge gap can be explored and filled in future studies.

Introduction

The healthy immigrant effect is the assumption that immigrants are typically healthy on arrival because of careful selection and medical screening that disqualifies those with serious illness. However, there is a caveat; the longer they reside in their new host countries, the more their health deteriorates and converges with that of the native-born population.[7,8,9] Behavioral, social, political and cultural factors, including poor dietary habits, smoking/drinking, lowered socioeconomic status, loss of social networks, poor working conditions, language barriers and inadequate access to healthcare provisions seem to be causes of this decline.[3] The occupational health of migrant workers, particularly migrant women, is an important area for research that could add to knowledge of the healthy immigrant effect, especially because women tend to hold precarious forms of work while participating in paid and unpaid duties simultaneously.

Musculoskeletal disorders (MSDs) are defined as disorders affecting the muscles and joints, including back pain, repetitive strain injuries, spinal disorders, sprains, dislocations and fractures. According to a 2003 World Health Organization (WHO) report,[10] they are among the many types of occupational health hazards—such as biological, chemical,

physical, ergonomic, or psychosocial—affecting migrant workers.[11] MSDs are one of the most prevalent and chronic conditions in Canada, with 43% having reported having an MSD.[11] MSDs also have a detrimental cost to the Canadian economy, estimated at $37 billion each year due to disease and injury.[12] These costs stem from hospital care, physician visits, rehabilitation and prescription drugs, but nearly 75% of the overall costs are indirect and due to absence from work, lost potential earnings and underperformance.[12,13] According to Canada's provincial worker compensation boards, MSDs were also the single largest category of lost-time injury claims—work-related absences due to injury or illness—in Canada.[14,15]

The risk of occupational injuries and MSDs seems to be compounded in many immigrants, especially immigrant women. A possible reason for their vulnerability to occupational injuries and MSDs is due to de-skilling: their previous skills and experiences are not recognized in the labour market, as a result they take up new jobs that that do not match their previous skills and experiences. Migration makes immigrants vulnerable to work-related accidents and illnesses because they are involved in increasingly precarious forms of work, such as part-time, seasonal or casual work (which refer to working less than 40 hours per week, working in particular seasons, or working on an on-call basis).[2,10,16,17] Among migrant women, these occupational problems are possibly exacerbated by the multiple burdens of paid work and unpaid domestic responsibilities coupled with deskilling and precariousness. While women in the native population may experience either paid or unpaid demands, they are not exposed to the same precarious working conditions as are migrant women.[16]

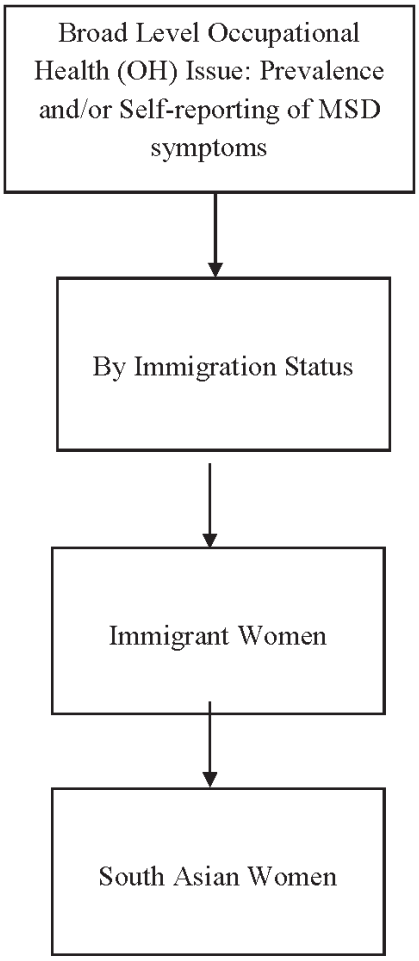


Figure 1: Diagram indicating focus of this review

Based on recent reports, the incidence and consequence of MSDs vary by gender. Evidence shows that work-related repetitive strain injuries such as tendonitis, Carpal tunnel syndrome and other upper-extremity MSDs are more frequent among women than men.[18,19,20,21] MSD prevalence has been reported to be higher among female employees than male employees in rubber manufacturing and assembly plants,[28] sewing machine operations[29] and newspaper offices.[14] Traditionally, the reason for women's vulnerability to MSDs has been predominately explained through a biological paradigm that assumes women are smaller in size and weaker than men. However, growing evidence suggests that women's vulnerability to MSDs is beyond simple biological differences between men and women.[30,31] Rather, these differences might actually be due to both the double burden of paid and unpaid domestic responsibilities that women experience and the feminization of certain forms work, such as services sector work, in which more women participate than men.[32] For example, 62.1% of workers employed in community, business and personal services are women.[33]

The rationale for studying the occupational health of migrant people—and migrant women—is that they experience multi-level disparities in the workplace. In general, racialized peoples or visible minorities and migrants have precarious work statuses; experience discrimination in jobs, pay and promotions.[34,35] Minority immigrants also earn lower incomes compared to non-racialized and non-immigrant groups. Many immigrants switch to new and unfamiliar occupations, or work in areas that are repetitive and manual, such as garment work, which may unintentionally increase their risk of injuries.[37] Some migrant women might be vulnerable to MSDs, and experience them differently than migrant men due to the multiple burdens of paid work and unpaid domestic responsibilities coupled with deskilling and work precariousness. Accordingly, a comprehensive understanding of MSD injuries among vulnerable groups, such as SA immigrant women, is needed. If these individuals are at a higher risk of MSDs, then targeting this population, promoting workplace health, and/or introducing appropriate interventions in this group would be beneficial.

Studying the prevalence and experiences of MSDs or related symptoms among South Asian (SA) immigrant women is important due to population demographics, economic impact, and the potential for SA women's vulnerability to MSDs. SAs form the fastest growing Asian group in Canada and the largest visible minority (i.e. racialized, non-white) group since 2006.[2,4,5] This group is expected to remain the largest set of visible minorities until 2031, estimated to be between 3.2 to 4.1 million people, with the rest of Canada's population at 31.2 million.[4] As the SA population continues to expand, more individuals are expected to enter the workforce, impacting and contributing to the state economy. Considering the growing population diversity in the global north, and especially in Canada due to the arrival of nearly a quarter million migrants each year, this is an important public health issue to examine.[2,38] The purpose of this paper is to examine the existing literature regarding work-related musculoskeletal disorders among South Asian (SA) immigrant women in Canada and identify knowledge gaps (Figure 1). For the purpose of this paper, SA immigrants are defined as those individuals whose place of birth was from Pakistan, India, Bangladesh, Sri Lanka or Nepal.

We focus on Canada because of high rates of migration and because of its health and worker compensation systems. Canada has one of the highest rates of permanent immigration in the world,[2,38] and has a history of having one of the oldest programs for employer-funded worker compensation.[39] There is also a publicly funded healthcare system in which workers communicate injuries to physicians, who then guide them to the appropriate compensation and rehabilitation venues.[40] Accordingly, we expect that the presence of structural mechanisms, such as worker compensation and publicly funded health care systems, would make it easier for reporting, treating and collecting information about occupational health conditions, for which reason more data concerning MSDs in women is crucial.

This paper also focuses on women because there is generally limited knowledge on migrant women's experiences of workplace health, and also because we are theoretically guided by a feminist political economy lens. This guiding framework is used for this paper because we recognize that sex, gender, culture, race, income and working conditions are social determinants of health (DOH/SDOH). The theoretical approach of feminist political economy explores women's social, political and economic conditions, connects these to health, acknowledges that health disparities are experienced by women and that women's health intersects race and migrant status primarily due to their social, political and economic contexts.[41,42,43,44,45] Feminist political economy is a branch of materialism, which has a worldview that power is produced or reproduced through organizations, interest groups, social structures, various classes and material conditions.[46,47] Feminist political economists argue that material and cultural discrimination against girls and women are the primary factors that influence their social conditions and health.[30,33] The health problems women face emerge from the discrimination and disadvantage that they experience as they carry out the gendered activities making up their daily lives.[30,48] Women, for example, might be confined to households because their work is not perceived as exchangeable for wages in the market, and the women who participate in the labour market often do so as a reserve supply on either daily, weekly, seasonally, and/or part-time basis to respond to demand.[33] Furthermore, working women may also face dual demands of paid/

economic work and unpaid domestic responsibilities, which has a direct effect on the way women participate in certain sectors of the labour market and how women experience wage disparities.[33] We believe these dual demands of paid and unpaid responsibilities also differentially affect women's health compared to men because of the DOH/SDOH and political economy approaches.

Methods

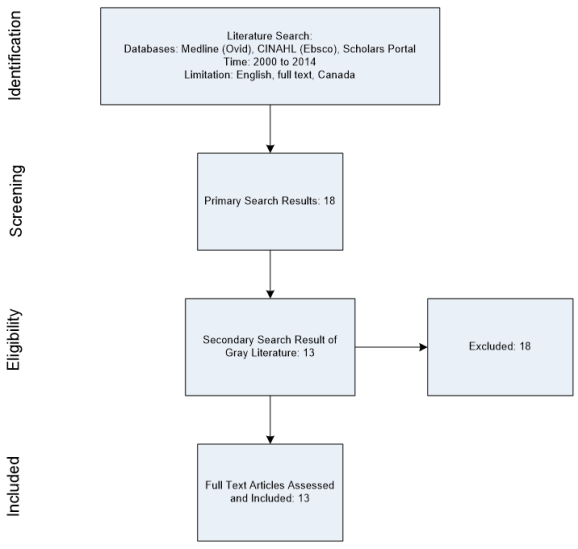
A scoping review of the literature was conducted based on Arksey and O'Malley's (2005) methodological framework.[6] Scoping literature reviews, unlike traditional systemic reviews, investigate broad research areas, issues and concepts. This process can be divided into five stages: 1) identification of a research question; 2) identification of relevant studies; 3) study selection; 4) charting data and 5) collating, summarizing and reporting results.[6]

Accordingly, the objectives of this paper were to 1) identify occupational health literature, which focused on work-related MSDs among vulnerable groups such as immigrant women, with a novel focus on immigrant women from South Asia, and 2) identify knowledge gaps in the field of occupational health.

The quality of the papers that were assessed was determined by examination of the following as inclusion criteria: 1) inclusion of "MSD," "MSI," "pain" or "strain" in the title, abstract, results or discussion; 2) clear presentation of a rationale, objective and/or research question that examined South Asian women's work experiences in Canada; 3) explicit mentioning of the type of work engaged in and 4) use of high quality and rigorous quantitative and/or qualitative methods of analysis. Papers were excluded if they did not examine SA women in the study, did not conduct research in Canada and did not examine MSDs.

In order to locate primary papers on the aforementioned topic, keyword search terms were entered in databases such as Ovid Medline, CINAHL (Ebsco) and Scholars Portal. We used these databases because they tend to capture manuscripts from a variety of disciplines, including allied nursing, rehabilitation and health sciences. We used key terms as follows: work/occupation/musculoskeletal/MSD/women/Canada/immig* (denoting immigrant or immigration)/South Asian/South Asia (which included India, Pakistan, Bangladesh, Sri Lanka, or Nepal). These searches were limited to the English language, years ranging from 2000 to 2014, and excluded dissertations, conferences and studies involving undocumented migrants. We excluded dissertations and conference papers because these types of papers are usually submitted for publication and would unlikely yield any more relevant articles or information. We excluded undocumented migrants because the scope of our study is limited to employed economic migrants (i.e. permanent immigrants that enter Canada through the skilled worker program and who are authorized to work). Undocumented migrants include temporary visitors, students or asylum seekers who have overstayed their visit beyond visa requirements as they are unlikely to work in the same standard employment conditions as permanent migrants who would otherwise require legal documentation or visas.

Figure 2: Flow diagram indicating search strategy



Search strategies included a primary strategy of electronic resources, followed by secondary search strategies including: manual searches from reference lists of primary papers, and gray literature—textbooks on women's health, institutional electronic publications and websites, such as Institute of Work and Health and Google Scholar. In the manual search section, studies were selected if they were Canadian studies that examined immigrant women or Canadian studies that included subsets of SA immigrant women. The included studies were carefully reviewed and relevant information was extracted and charted (Table 1). The analysis process entailed identification of themes and knowledge gaps such as: non-reporting of MSDs, socioeconomic class effects, high-risk occupations, psychosocial factors, women's roles, dual demands/double workdays and cultural factors. We provide a summary of identified themes along with what is already known from the existing body of literature.

Results and Findings

The scoping review process resulted in 13 peer-reviewed manuscripts that are tabulated and thematically organized in this paper. The gross number of results retrieved from the keyword search was N=18 (Figure 2). Search results retrieved zero returns for the database Medline Ovid, five results for CINAHL (Ebsco), and 13 results for Scholars Portal. After refining and filtering for repeats and relevance to search terms, no studies were found that were specific to work-related MSDs among South Asian women in Canada. This prompted a secondary search in which 13 sources were retrieved from manual search of reference lists and gray literature (Table 1). Datasets comprised of qualitative (n = 6) and quantitative (n = 7) studies, and data generally showed that women experienced MSDs differentially than men and in some cases, were vulnerable to work-related MSDs for a variety of reasons. Several themes and knowledge gaps were identified from the included studies and are also reported.

Non-reporting of MSDs

Non-reporting of MSDs, and in general occupational injuries or illness among immigrants, is an important knowledge gap that was identified from our search. Among the included studies, one study by Thurston and Verhoef (2003) examined Canadian data of immigrant groups[49] (Table 1). Thurston and Verhoef's (2003) study shows that the injury rate from work due to an illness or injury (termed lost-time rate) was higher among the survey sample than the provincial compensation board's lost-time rates. Provincial compensation boards are Canadian government agencies that conduct surveillance and gather data on occupational injuries and illnesses.[50] Thurston and Verhoef's (2003) study indicates that there is serious under-reporting of work-related injuries and illness among immigrant groups. It is also possible that a high injury rate among immigrants partially supports evidence alluding to the phenomenon of the healthy immigrant effect, indicating that immigrants report declining or worsening health due to their working conditions and occupational injuries.

Existing literature suggests knowledge gaps in surveillance of MSDs exist among migrants due to a variety of reasons. For example, one study acknowledged the problem of non-reporting of MSDs in the compensation system in California, and cited numerous reasons for this problem among their Asian immigrant participants, such as lack of knowledge of the compensation system, lack of assistance with using the system, language barriers and limited access to medical services.[51] Although there are no Canadian studies pertaining specifically to MSDs among immigrant women, evidence suggests that Canadian immigrant women also experience problems such as language barriers and limited access to medical services.[52] Premji et al. (2008) showed that occupational health and safety information was not well understood by the immigrant women in their sample due to poor proficiency in English and/or French languages, which could potentially conceal reporting of

Author, Year	Country/Region Population	Aim of Study	Methodology	Relevant Outcome/Results/Summary
Choudhry et al 2002	Toronto: Canada	To examine SA immigrant women's health promotion issues through participatory action	Qualitative	-The SA women in the sample were involved in care of grandchildren and housework; allowing for little time to focus on themselves; -SA women in nuclear families lacked traditional social support networks and lacked assistance with household tasks; -The women viewed themselves as self-sacrificing;
Cole et al 2002[1]	Cole et al 2002 Toronto: Canada	To identify factors (predicting variables) for changes in MSD symptoms and interference of work activities in newspaper employees	Quantitative	-Women had increased odds ratio for symptoms model changes; -Women were less likely to remain from phase 1 to phase 2 due to work interference;
Coutu et al 2005[2]	Quebec: Canada	To evaluate validity and responsiveness of quality of life inventory for workers on sick leave due to MSDs	Quantitative	-In the sample, women tended to have upper extremity MSD pain and men tended to have lower back pain;
Dyck and Dossa, 2007	BC: Canada	To study SA women's experiences in constructing and practicing healthy space	Qualitative	-SA women in the sample worked in low paid jobs; -None of the women translated past education/professional skills into labour market; -They communicated their priorities around their family
Grewal et al 2005	BC: Canada	To examine the influence of family on SA immigrant women's health and health seeking behaviour	Qualitative	-The sample of SA women were expected by their family to hold full-time employment and take responsibility for most domestic chores in addition to traditional roles (obedient wives, dutiful daughters in law; nurturing mothers, self-sacrificing caregivers)
Leroux et al 2006	Quebec City: Canada	To study the association between psychosocial factors at work and prevalence of MSDs	Quantitative	-Women reported more prevalence of neck-shoulder symptoms than men (21.9% vs. 9.7%); -Workers with lower education level, higher domestic load, and experienced 2 or more stressful events in the previous year had higher prevalence of neck and shoulder symptoms -Workers who had high job strain and low social support were associated with neck shoulder symptoms -Workers who worked more than 6 hours a day on a visual display unit had higher incidence of neck and shoulder symptoms
Martins and Reid, 2007	Toronto, Canada	To understand the adjustment experience of South Asian immigrant women regarding influence of their occupations.	Qualitative	All participants had roles of homemaker, housewife, and caregiver; -A majority of the participants felt their education and qualifications from back home were not translated in Canada and they felt they could only work at "McDonalds" or "Tim Hortons".
Messing et al., 2009	Canada: Quebec	To compare strategies to analyze data by gender for the relationship between MSD and risk factors	Quantitative	-Analysis should be stratified by gender to identify risk factors for MSDs; -Working women had significantly higher prevalence of pain of the neck, upper back, shoulder, upper extremity and other regions within previous 12 months;
Premji et al., (2008)	Canada: Quebec	To describe how language proficiency influences occupational health, and how workers use strategies to address communication barriers	Qualitative	-A variety of health problems were attributed to work, with musculoskel-etal disorders being widespread and universal, and injuries and illness were under-declared; -Production demands forced workers to work more, avoid taking breaks, or going to restrooms, indirectly affecting worker health; -Language barriers made it difficult for workers to express themselves, & to understand health and safety information offered by employers;
Smith, Chen and Mustard (2009)[3]	Canada	To examine the proportion of immigrants who worked in more physically demanding jobs than before migration to Canada	Quantitative	-Immigrants from Southern Asia had higher odds of employment in occupation with higher physical demand 2 years after arrival in Canada than their previous job outside Canada; compared to other regions; -Family class, refugees, those with less than a Bachelor's degree education, and those who had non-proficiency in English had higher odds of working in more physically demanding job upon 2 years after arrival in Canada;
Smith and Mustard (2009)	Canada	To examine work-related injuries among immigrants to Canada compared to Canadian-born workers	Quantitative	-Immigrant men with length of stay in Canada from 0- 5 years had significantly higher odds of a work injury requiring medical attention compared to Canadian-born men; -Immigrant women with length of stay of 6-10 years had a slightly higher odds of work injury requiring medical attention compared to Canadian-born women;
Spitzer et al., (2003)	Canadian: South Asian & Chinese East Asian	To examine the intersections of gender, carework, and migration in Canada	Qualitative	-Women's caregiving roles are central to cultural identity and family survival -Women experienced significant strain juggling demands of work and family; especially in low wage employment;
Thurston and Ver-hoef (2003)	Canada: Alberta	To study the rates of occupational injury among an immigrant sample in Alberta	Quantitative	-Lost time injury rate for immigrant workers in the sample was 6.02 compared to provincial worker compensation board's rate of 3.55;

Table 1: Description and Results of Literature Search

musculoskeletal injuries and illness (Table 1).[83]

Connecting socioeconomic class effects and high-risk occupations to MSD morbidity

Two studies highlight class effects among migrants that can be connected to musculoskeletal health, such as downward occupational mobility and participation in low-income occupational positions. Firstly, a study by Martins and Reid (2007) is particularly relevant as it showed that SA participants in Toronto were frustrated by the lack of recognition of their educational qualifications acquired from their countries of origin to Canadian-equivalency (Table 1).[53] All participants in this study reported having a university level education, such as a Master of Philosophy degree and college teaching credentials, but were unable to find meaningful employment in Canada. This failure to secure work left participants feeling compelled to work in low-income occupations in factories or fast food franchises such as Tim Hortons or McDonalds.[53] Other researchers report a similar finding, confirming that their sample of women in British Columbia held low paid occupational positions.[54] Both of these studies would support feminist political economy theory in that they highlight women's adverse employment experiences.

While neither of these studies discussed how migrant women's downward occupational mobility and participation in low-income occupations may lead to differential MSD morbidity, it seems to be an area that requires further research as previous studies support this linkage. For example, one study showed that blue-collar workers had higher overstrain and musculoskeletal morbidity compared to white-collar workers.[55] A Finnish study also showed that women had a profound and consistent occupational class gradient with tendency to have higher odds of MSD in lower occupational class than higher occupational class.[56] Another study further correlated MSD-related sickness leave rates with socioeconomic class gradients.[57] A Canadian study also indicated that blue-collar workers in transportation, processing and construction had higher prevalence of MSDs than other occupational groups.[58] Although there is a lack of significant Canadian research to demonstrate these linkages among immigrants, it is an area for further investigation in which knowledge gaps remain.

Psychosocial factors

Psychosocial factors, defined as factors that psychologically impact workers' health through responses to their work and working conditions, include job demand, job control, social support, time pressure, degree of monotonous work, extent of social reciprocity (or effort-reward balance), autonomy, fairness, job security and social contact between co-workers and supervisors.[59,60,61] Researchers at Simon Fraser University in Canada have developed 13 factors contributing to workplace health: workload management, psychological support, organizational culture, clear leadership and expectations, civility and respect, psychological job fit, growth and development, recognition and reward, involvement and influence, engagement, balance, psychological protection and protection of physical safety.[61,62] Job demand and job control are two types of psychosocial factors that affect health through the modulation of stress and anxiety among workers. Job-demand factors refer to work load, time pressures, work surges, work pace or rest breaks; while job-control factors refer to level of influence on work, level of participation in decisions, job satisfaction/dissatisfaction and level of social support.[63,64,65] Of these factors, some may be particularly relevant to SA immigrant women, such as psychological job fit, job demand and job control.

Psychosocial factors, such as high job demand, high workloads and time pressures can enhance an individual's vulnerability to MSDs and many historical studies have reported on these conditions.[65,66,67,68,69,70,71] Double workdays refer to the dual demands of paid and unpaid domestic responsibilities and are characterized by high job demands, high workloads and time pressures.[72] Immigrant women are vulnerable to double-workday stress due to domestic (unpaid) and paid work responsibilities.[31] Double-workday stress is particularly important as the high demands of paid and unpaid labour pose a potential risk for onset of MSDs.[19]

We identify psychosocial factors such as a high demand, high workload, time pressure and double work-days as themes from the included studies which support theories of feminist political economy and the dual demands placed on women. One study by Grewal et al. (2005) demonstrates double-workday tensions. The SA women in their sample communicated expectations to hold full-time employment and take on responsibility for most domestic chores in addition to traditional roles (Table 1).[73] In addition, another study by Chouhdry et al. (2002) also reported significant demands on SA women, including care for children, grandchildren and housework, which allowed for little personal time to focus on their own health. In this study, one participant reported that women were "martyrs" willing to do anything to provide for their families, and focused on others' well-being rather than their own health,[74] which is a major theme in the study. This result could further elucidate SA women's high workload, double-workday tensions and associated risk to MSD.

From the included studies in Table 1, a particularly relevant study by Spitzer et al., (2003) showed that that SA and East Asian women's caregiving roles are central to cultural identity and family survival,[75] but these women experienced significant strain juggling demands of work and family, especially in low wage employment (Table 1). Familial structure is documented in studies that showed traditional family structure is maintained by so-called "subordinate" roles of SA women.[76,77] Although not discussed in the paper specifically, it is possible that these demands might allude to a psychosocial pathway for musculoskeletal morbidity. For example, patriarchal beliefs and practices might impose high demands on SA women that could lead to fatigue, stress, anxiety and depression, the latter factors of which have been linked to MSDs.[70,78]

Likewise, in a quantitative study in the United Kingdom,[79] researchers reported that SA women experienced more stress in the working day than the general population. From a list of stressful conditions and events, it was reported that 31% of SA women were most stressed/pressured concerning household tasks. Only 4% of women in the general population reported that they were most stressed/pressured concerning household tasks. This study predominately comprised of SA groups that were Punjabi-speaking in origin, included Muslim and non-Muslim groups, and was compared to the general population. The general population was randomly sampled from the Strathclyde Regional Council's enhanced electoral register. Although occupational injuries were not discussed in this study, it is possible that the anxiety that was reported among SA women may be explained by "burnout" conditions (i.e. fatigue and exhaustion) that are common precursors to MSD due to both domestic and paid work.

Psychosocial factors such as low social support at work are associated with MSDs.[80] While this review highlights gaps in data pertaining to social support and its connection to MSDs among SA immigrant women, it is an area that needs to be explored since immigrant women are particularly vulnerable as having limited opportunity or access to help from friends and relatives and lacking social capital.[72] Accordingly, investigation of social support at work and the subsequent reporting of MSDs might be one research area.

Prevalence of MSDs

Studies generally show that more women experience work-related musculoskeletal problems than men.[22] In one study derived from the 1998 Quebec Health and Social Survey, researchers reported that females aged 15 and over, and working at least 25 hours per week had a high prevalence of musculoskeletal pain in the neck (18.4%), upper back (17.1%) and shoulders (15.0%) that interfered with their usual activities compared to men (10.9%, 11.4% and 11.6%, respectively, $P \leq 0.001$).[81] Table 1 tabulates the reviewed studies that examined the prevalence of work-related injuries (including MSDs) among female immigrant workers, in part comprising of SAs. One study by Premji et al. (2008) conducted in a garment factory in Montreal is useful in describing various health problems experienced by immigrant women.[82] In this sample, widespread musculoskeletal pain was reported among participants.

Other studies had prevalence data that seem to be contradictory. For example, while some surveys found that in general, immigrant women reported lower odds of work-related injuries compared to other groups,[49] other researchers found that immigrant women had a higher risk of work injury. For example, immigrant women with a length of stay of six to ten years had a partially increased risk of a work injury requiring medical attention compared to Canadian born women.[83] While this latter study might suggest that this particular group of immigrant women

are vulnerable to work injuries, it is possible that this is under-reported, possibly due to a few limitations. In the latter study, the statistics on work injuries may actually be underestimated as data was derived from the Canada Community Health Surveys, and did not capture injuries that were due to repetitive movements,[84] which would preclude MSDs such as carpal tunnel syndrome. Furthermore, wording such as "limiting normal activities" may have been interpreted differently among the respondents as it would depend on how one would subjectively define a "normal" activity and how that activity is limited by injury.[84] Thus, it seems that knowledge gaps remain warranting further research.

Conclusions

The objective of this paper was to gather information of immigrant women's occupational health, with a novel focus on the SA population in Canada. Although there is no existing literature exploring MSDs among South Asian immigrant women in Canada, we identified several factors influencing knowledge in this area and in this group including: non-reporting of MSDs, possibly due to cultural factors such as language barriers, unfamiliarity with the compensation system, socio-economic class effects that might increase the vulnerability of immigrants and/or participation in high-risk blue-collar occupations. Furthermore, psychosocial factors such as time pressures, double workdays, job demand, cultural factors and/or role expectations might also influence onset of MSDs.

Strengths and Limitations

This paper focuses on the occupational health of SA immigrant women and was based on a refined and novel research question: to examine what is known in the literature about musculoskeletal disorders among SA migrant women in Canada and to identify knowledge gaps in the literature. One of the strengths of this paper is that the search strategy may be useful in its applicability to other global studies involving immigrant groups in which there are similar behavioural, cultural and occupational experiences. While this study employed Arksey and O'Malley's search strategy, it further identifies knowledge gaps fundamental to the field of occupational health research.[6] Furthermore, one may utilize the results for health promotion strategies and interventions for immigrant groups if similar themes and issues are identified, such as language barriers, high workloads, high domestic demands and participation in manual occupations that have high MSD risks.

As with other types of reviews, this paper had some general limitations and epistemological challenges. Firstly, this paper did not assess the quality of the papers themselves, but rather attempted to collect information available on the selected topic that were available to the researchers. Secondly, although the term SA was narrowly defined and precluded migrant subgroups from other geographic regions, it may still pose confusing terminology as individuals may (or may not) self-identify as SA origin, such as those of West Indian, Caribbean, East-African, Tanzanian, Mauritian or other heritage. Although the general definition of SA includes large Indian, Pakistani and Bangladeshi diasporas, the definition is expanded in this paper to include Sri Lankan and Nepali diasporas. Expanding the definition of the SA diaspora is currently being debated for greater inclusivity, but is not expected to impact results significantly. Thirdly, this paper is limited in that a finite number of keyword synonyms were generated by the researchers and entered as the search terms. Nevertheless, the databases themselves also generate synonyms to match keywords, but these are rarely displayed. For example, Ovid Medline, has "controlled vocabulary, [is] professionally indexed, and synonyms are generated by the database, which uses sophisticated matches to subject headings using a tree structure".[84] Finally, another limitation arises from the process of hand-searching, which has drawbacks due to offsite storage away from the main libraries (ibid), which were not accessible to the researchers.

This paper highlights and extends work related to feminist political economy. It suggests that there is a need to examine and broaden knowledge of occupational injury among SA immigrant women and how cultural factors and gendered roles could explain disparities in health and self-reporting of injuries (or a lack of reporting thereof) in this population. Although this paper has a specific population focus, its implications are significant for global health because it highlights a novel and under-researched yet highly health-limiting problem of musculoskeletal disorders that are relevant to global migrants. As musculoskeletal injuries are a major health burden, there is an urgent need to investigate this area in future studies.

Given the above strengths and limitations, the implications of this study's findings are threefold and the authors offer a few recommendations of recourse such as filling data gaps and securing improved working conditions for immigrants, racialized persons and women in order to minimize the risk of MSDs. First, government financial support programs should be considered in order ensure adequate surveillance and data collection of musculoskeletal injuries that is stratified by gender, ethnicity and immigrant status. Secondly, the findings could warrant policy changes that would prioritize occupational health, allow for greater recognition of immigrant skills and experiences and introduce employment models that would in turn allow for increased flexibility to fit the needs of women workers. Finally, the issues presented should also be on the agenda of global public health research, as ignoring them will lead to the possibility of diminished occupational health of workers.

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