



## Original Article

# Psychosocial Factors and Musculoskeletal Pain Among Rural Hand-woven Carpet Weavers in Iran



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## ABSTRACT

**Background:** Musculoskeletal pain (MSP) is a common and disabling problem among carpet weavers and is linked to physical and psychosocial factors of work. This study aimed to determine the prevalence of MSP, its psychosocial risk factors, and association of pain in each pair of anatomical sites among carpet weavers.

**Methods:** A cross-sectional study was performed among 546 hand-woven carpet weavers in rural small-scale workshops of Iran. Data were collected by using parts of a standardized CUPID (Cultural and Psychosocial Influences on Disability) questionnaire focused on MSP in 10 body sites, including the low-back, neck, both right and left shoulders, elbows, wrists/hands, individual, physical and psychosocial risk factors. Statistical analysis was performed applying logistic regression models.

**Results:** Prevalence of MSP in at least one body site was 51.7% over the past month. The most common sites were low back and right shoulder pain 27.4% and 20.1%, respectively. A significant difference was found between the mean number of painful anatomical sites and the level of education, age, physical loading at work, time pressure, lack of support, and job dissatisfaction. In pairwise comparisons, strongest association was found between pain in each bilateral anatomical site (odds ratio = 11.6–35.3;  $p < 0.001$ ).

**Conclusion:** In home-based workshops of carpet weaving, psychosocial factors and physical loading were associated with MSP. This finding is consistent with studies conducted among other jobs. Considering the preventive programs, the same amount of attention should be paid to psychosocial risk factors and physical loading. Also, further longitudinal studies are needed to investigate the relationship of psychological factors.

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## 1. Introduction

Musculoskeletal pain (MSP) is regarded as a major health problem worldwide [1–4], and associated with reducing both work ability [5,6], and quality of life; also, sickness absence and enormous direct and indirect economic costs for individual and society are related to this problem [5–7]. In Iran, Disability Adjusted Life Years (DALYs) indices are almost 307,772, 291,305, and 872,633 for

low back pain, knee arthritis, and other kinds of musculoskeletal disorders (MSDs), respectively [8]. In a previously conducted study in the UK, it was found that 2% of the working population between the years of 2009 and 2010, which is almost 572,000 workers at that time, have MSDs; on average, 13.4 days of sickness absence for each worker were reported [9,10]. In addition, MSDs were the main reason of disability in nearly 25% of the 2.5 million workers who were being paid disability benefit [10]. Furthermore, it is reported

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that the resultant disabilities from MSP increased by 45% from 1990 to 2010 [11]. Neupane et al [12] showed that work related disabilities increased from 15% to 22% in 4 years, and the total of pain sites observed among the workers raised as well. Therefore, identification of the risk factors of MSP can be very helpful in developing prevention strategies. In the majority of studies, physical load (excessive repetition, awkward postures, and heavy lifting), and psychosocial factors (job demands, decision latitude, time pressure, job satisfaction, and job control) have been unanimously found to be the main risk factors of work related MSDs [13–15]. In addition, the occurrence of multisite MSP among different jobs and cultures widely differs [15].

Hand-woven carpet weaving, which is usually done at home in small-scale workshops, is a common job in Iran, China, Pakistan, Nepal, Turkey, Russia, India, Egypt, and Afghanistan [2]. In a comparative study conducted by Awan et al [16] on children selected from 10 villages in Pakistan, it was found that working children (628 carpet-weaving workers) have significantly greater odds in developing joint pain, neck/shoulder disorders, dry cough, and cuts/bruises than nonworking children (292 nonworking children). Chakrabarty et al [17] concluded that there is a positive association between child labor in the Indian carpet production and adult earnings.

It is noteworthy that hand-woven carpets are one of the most valuable goods produced mostly in Iran, and are indeed worthy of being exported to other countries. In fact, the incomes earned from selling such products is valuable, considering the ways by which the country's economy and employment can benefit from them [2].

The time when carpet weaving in Iran was taken as a profession goes back to the ancient times: taking archeological findings as an example, the 2,500-year-old Pazyryk carpet is proven to be from around 500 BC. Hand tying or hand knotting is indeed an art. In order for the workers to produce a carpet, one or more weavers work on a loom. In fact, the number of required workers depends on the size of the carpet.

A loom is a frame within which the carpet is made, and also the warp is tightened. Looms are applied to hold the warp threads under tension so as to facilitate the interweaving of the weft threads. A vertical rather than horizontal loom, is more comfortable for workers and reasonably the most used. It should be mentioned that this kind of loom was used by the carpet weavers who participated in the present study. Weavers sit on a bench next to each other and create individual knots row after row. The designs upon which the carpet is shaped are chartered out on a graph by which a map reader or another weaver instructs the graphic designs to the workers who are knotting the carpet. Required tools in this process are scissors, iron rod, levers, and comb beaters. When the carpet is made, it is taken off the loom and then the designs and patterns are trimmed by scissors.

Based on the previously conducted research, high rates of MSP in Iranian carpet weavers have been indicated [1,2,18,19]. In addition, poor design of hand-tools and workstation (e.g., seat, weaving heights, and loom), awkward posture of the neck, shoulders arms, wrists, and knees for long periods, and repetitive movements are the main known risk factors of MSP found among carpet weavers [1,18] (Figs. 1–4).

Appropriate light and air quality of the home-based workshops are highly important: in other words, these two factors could affect the prevalence of self-reported MSP [20].

In a study conducted by Choobineh et al [2] on 1,439 carpet weavers, 15,368 days of reported sickness absence, due mainly to the MSP, were recorded; 3.76% of the participants were not able to get to their work during the previous 12 months. Based on the results of this study, 2.2 million of Iranian carpet weavers are suffering from musculoskeletal problems, also, these problems are



**Fig. 1.** A woman weaving at a vertical loom with cross-legged on the seat because the seat is low.

considered to be the main reason for 23,496,000 working days being lost [2].

The present study was undertaken because: (1) few studies have been conducted in which home-based hand-woven carpet weavers are taken into account; and (2) almost all the studies in Iran are limited to physical and ergonomic factors. Therefore, it can be implied that there is a great uncertainty about the psychosocial risk factors of MSP.

The aims of this study were: (1) to assess the prevalence of MSP among female rural hand-woven carpet weavers in the north east of Iran; (2) to explore possible work related psychosocial risk factors of MSP among study participants; and (3) to determine the association of pain in each body site with the other sites.

## 2. Material and methods

A cross-sectional study was performed on 546 female hand-woven carpet weavers who had worked for at least 1 year in home-based workshops; these workshops were located in the villages of Torud, Satveh, and Bidestan, in the Torud Rural District, with an area of 24,800 km<sup>2</sup>, and located at the Central District of Shahroud County at the northeastern border of the Great Salt Kavir of Iran.

The female workers of the abovementioned villages were selected for the present study because most of them had carpet looms in their homes and carpet weaving was a part of their daily activities as well as a basic source of their family incomes.

In these areas, the selected 563 women who came from 769 families spend 6 d/wk working as carpet weavers. The carpet weavers were informed about the study by local health staff through public notices in rural health center and also at few workshops.

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