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EVALUATING ERGONOMIC RISKS OF WORK-RELATED MUSCULOSKELETAL DISORDERS IN HOSPITAL DOMESTIC WORKERS

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ABSTRACT

The purpose of this project was to assess the ergonomic risk factors of work-related musculoskeletal disorders (WMSDs) in hospital domestic workers at a National Health Service Foundation Trust in North London, the United Kingdom. The ergonomic risks of the domestic workers were recorded using the Ovako Working Posture Analysis System (OWAS). Scores were then tallied against the four categories of the risk corrective action plan. The work tasks that predominantly contributed to the occurrence of WMSDs were lifting and loading of which corrective actions were required as soon as possible. Preventative strategies should be implemented especially for those workers who are more prone to WMSDs.

KEYWORDS

Ergonomic, Risk assessment, Musculoskeletal disorders and Domestic workers.

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INTRODUCTION

Work-related musculoskeletal disorders (WMSDs) have caused significant human suffering, are challenging to manage and are associated with high healthcare costs, often leading to a reduction in work productivity and higher sickness absence rates[1]. The National Institute of Occupational Safety and Health (NIOHS) reported that when WMSDs arise there is usually not a sole basis for causation[2]. The occupational risk factors that are associated with WMSDs include posture, manual handling, dreary work, vibration, energy, psychosocial stressors and personal factors[3]. The factors that can contribute to higher bodily harm include repetitive tasks in awkward positions and forceful movements with minimal periods for rest and recovery[4]. The purpose

of this project was to assess the ergonomic risk factors of WMSDs in hospital domestic workers at a National Health Service Foundation Trust in North London, the United Kingdom.

MATERIAL AND METHODS

Data were collected over a period of six months at an occupational health physiotherapy clinic based within a National Health Service Foundation Trust in North London, United Kingdom. This Trust is one of the main healthcare providers within the North London borough of England. Staff members who are eligible can access the occupational health physiotherapy service for WMSDs. A total of thirteen hospital domestic workers that presented with a WMSD to the occupational health physiotherapy clinic were purposively selected for this project.

Demographic data such as age, duration of employment, weight, height and primary anatomical site of musculoskeletal pain/discomfort were captured on a spreadsheet prior to conducting the ergonomic risk assessment. The ergonomic risks of the domestic workers were recorded using the Ovako Working Posture Analysis System (OWAS)[5]. The OWAS has four categories, namely: (a) back (1=upright, 2=bent frontward or backward, 3=twisted or bent sideways, 4=bent and twisted or bent frontward and sideways), (b) arms (1=the two arms below shoulder level, 2=one arm at or above shoulder level, 3=the two arms at or above shoulder level), (c) legs (1=sitting, 2=staying on the two legs upright, 3=staying on one leg straight, 4=staying on the two knees bent, 5=staying on one knee bent, 6=kneeling on one or the two legs, 7=walking or moving), and load/use of force (1=load or force needed is equal to/less than 10kg, 2=load or force needed greater than 10kg but is less than 20kg, 3=load or force needed higher than 20kg).

The workplace ergonomic risk assessments were carried out by a senior physical therapist, with postgraduate experience and qualifications in occupational health and ergonomics, by observing workers as they were carrying out their tasks for each of the four categories of OWAS for the duration of the tasks. After completing the ergonomic risk assessment, the senior physical therapist tallied the scores against the four categories of the risk corrective action plan, namely: 1=normal and natural posture without harmful effects on the musculoskeletal system (no action required), 2=posture with the possibility of causing harm to the musculoskeletal system (corrective actions required in the near future), 3=posture with harmful effects on the musculoskeletal system (corrective actions required as soon as possible), 4=the load caused by this posture has extremely harmful effects on the musculoskeletal system (immediate corrective actions required).

Data analysis was performed using the Statistical Software for Excel package. This project was classified as a service evaluation and therefore, ethical approval was not required[6].

RESULTS

Worker characteristics of age (years), duration of employment (years), height (meters) and weight (kilograms) are shown in Table 1. The domestic workers were asked to self-report their primary anatomical site of musculoskeletal pain/discomfort based on their work experiences over the past 12 months. During the period of 12 months, the following responses were obtained: 7 (54%) workers reported spinal pain (neck, upper back, lower back), 2 (15%) workers reported upper limb pain (shoulder, elbow, wrist, hand) and 4 (31%) workers reported lower limb pain (hip/thigh, knee, ankle, feet).

The ergonomic assessment scores computed for postural stress analysis in hospital domestic workers for pulling were 2, 1, 7, and 2 for back (bent frontward or backward), arms (the two arms below shoulder level), legs (walking or moving), and force (load or force needed greater than 10kg but is less than 20kg), respectively; for pushing were 2, 1, 7, and 2 for back (bent frontward or backward), arms (the two arms below shoulder level), legs (walking or moving), and force (load or force needed greater than 10kg but is less than 20kg), respectively; for lifting were 2, 1, 2, and 1 for back (bent frontward or backward), arms (the two arms below shoulder level), legs (staying on the two legs upright), and force (load or force needed is equal to/less than 10kg), respectively; and for loading were 3, 3, 2, and 1 for back (twisted or bent sideways), arms (the two arms at or above shoulder level), legs (staying on the two legs upright), and force

(load or force needed is equal to/less than 10kg), respectively as presented in Table 2.

The tally score for pulling was found to be 2 (posture with the possibility of causing harm to the musculoskeletal system - corrective actions required in the near future); for pushing was 2 (posture with the possibility of causing harm to the musculoskeletal system - corrective actions required in the near future); for lifting was 3 (posture with harmful effects on the musculoskeletal system - corrective actions required as soon as possible); and for loading was 4 (the load caused by this posture has extremely harmful effects on the musculoskeletal system - immediate corrective actions required).

DISCUSSION

The primary anatomical site of musculoskeletal pain/discomfort experienced by domestic workers in the period of the 12 months were predominantly spinal and this consistent with previous literature[7,8]. The work tasks that predominantly contributed to the occurrence of WMSDs were lifting and loading. The possible effect of lifting on spinal health can potentially be explained by the high mechanical loads placed on the spine during lifting. Lifting is a dynamic and highly variable type of physical exposure that can be quantified in duration, frequency and intensity (i.e., the weight of the load lifted). Duration and frequency of lifting significantly predict the occurrence of spinal pain whereas the intensity of lifting heavy loads may have a substantial impact on overall musculoskeletal health[9].

The occupational factors that can contribute to the reduction of WMSDs include job rotation to ensure a well-balanced workload, workplace redesign to minimise awkward working postures, reduction in the time workers spend on repetitive activity, especially reducing the demand of frequent rotation and frontward bending movements of the spine. A limitation of this project is that it did not consider the association risk between the age, duration of employment, weight and height of the domestic worker and the tasks being carried out.

Table No.1: Demographic characteristics

Variables	Mean
Age (years)	54.31
Duration of employment (years)	8.76
Height (meters)	1.67
Weight (kilograms)	90.62

Table No.2: Postural stress analysis using Ovako Working Posture Analysis System (OWAS)

Task	Back	Arms	Legs	Force	Tally
Pulling	2	1	7	2	2
Pushing	2	1	7	2	2
Lifting	2	1	2	1	3
Loading	3	3	2	1	4

CONCLUSION

WMSDs are often under-reported despite their major impact on worker health and safety. They are usually viewed as an individual worker's health problem, yet their consequences extend to the broader working environment. To manage WMSDs effectively, it is necessary to assess the risk factors that the worker is exposed to and to implement interventions to reduce them to safe levels. This helps minimise the likelihood of developing musculoskeletal health issues at work. This project explored the ergonomic challenges faced by hospital domestic workers. By using an appropriate assessment tool different work tasks were analysed and potential risk factors identified to improve the long-term wellbeing of domestic workers. In conclusion, the challenges of WMSDs faced by domestic workers relate to the duration, frequency and intensity of lifting and loading tasks and can be traced to the demands of repetitive rotation and frontward bending movements of the spine. Preventative strategies should be implemented especially for those workers who are more prone to WMSDs.

CONFLICTING INTEREST

The author declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

FINANCIAL DISCLOSURES

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