

Ergonomic Explorations for the Safety and Health Improvement in Hospital and Healthcare Professions

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Introduction

Hospitals and healthcare industries, which are required to perform patient care and non-patient related tasks, are complex organisations. They count on an extremely diverse group of professions, which are many of them physically demanding [1]. To a certain extent for this reason, hospital and healthcare workers are at particularly high risks for work-related injuries. The problem of work-related injuries amongst the hospital and healthcare workers has been nationally and internationally identified. According to the Occupational Safety and Health Administration and the Bureau of Labor Statistics in 2010, the incident rate of injuries for healthcare and hospital support workers was increased by 6% to 283 days-away-from-work cases per 10,000 full-time workers. This increase shows more than double the rate for all public and private employees. The data also demonstrate that the rate of Musculoskeletal Disorder (MSD) cases with days missed from works for nursing aides, orderlies and attendants increased by 10% [2].

MSDs particularly affect the nurses and nursing aides. According to a recent study, national injury costs for nursing professions in the US have been estimated to be \$1.6 billion, \$344 million, \$192 million, \$65 million, and \$134 million for low back, shoulder, knee, neck, and hand/wrist cases, respectively [3]. The costs of average MSD claim have been reported between \$6,190 to \$93,225 [4-6], and average low-back claim costs ranged from \$2,270 to \$14,235 [7-10]. These cost figures certainly show that MSDs are significant burdens on the health care sector and specifically on the health care workers. Therefore, the effect of MSDs amongst the hospital and healthcare workers needs to be identified and required quantification of the prevalence of pain, and understand the potential risk factors for these health outcomes [11].

Most studies in the literature covering hospitals and healthcare sectors have focused on patient-related tasks such as lifting and transferring by nurses and nursing assistants [12-17]. For those who perform patient-related functions, there is clear evidence that jobs or tasks with poor ergonomics characteristics not only result in higher levels of absenteeism and Work-related Musculoskeletal Disorders (WRMSDs) but also may lead to lower levels of patient safety as well. This makes hospital and healthcare workers an even more important group in which to study such ergonomics problems [18]. Patient perception and dependence levels, nursing skill mix, and staffing levels can all add to the physical and psychosocial strains on the health care providers [19].

These issues have led some organisations to undertake widespread "evidence-based" initiatives to improve the working conditions of hospital and healthcare workers [20]. Despite such initiatives, little effort has been paid out to study the full range of occupations necessary for the operation of this industry, including those not involved in direct patient cares such as housekeeping, maintenance

and food service workers. Accompanying increased awareness throughout such exclusive organisations with high injury and incident prevalence, therefore, ergonomic explorations should promote further progress in addressing this important concern. To keeping employees at their workplaces of hospitals and healthcare sectors, ergonomic challenges need to continually refine focus to determine effective ways to address each issue as they arise.

Ergonomic Challenges on the Hospital and Healthcare Industries

Identifying major safety and health issues

Hospital and healthcare workers involved in direct patient cares are at great risks of back strain(s) and other MSDs from their works [21]. They often experience MSDs at a rate exceeding that of workers in construction, mining, and manufacturing. MSD injuries from the hospital and healthcare workers are largely caused by repeated manual patient handling activities, often involving heavy manual raisings associated with transferring patients and equipment, repositioning patients, and working in extremely awkward postures. The lifting problem of patients seems to be multiplied by increasing the weight of patients to be lifted due to the obesity epidemic in the US and the rapidly increasing number of older people who require assistance with the activities of daily living [22,23].

According to David and Kotowski [11], the prevalence of MSDs in nurses and nursing aides shows that high levels of pain are experienced in the areas of lower back, shoulder, and neck. Many other studies in the literature state a connection between low-back pains in nurses and patient handling, which requires frequent lifting and repositioning of heavy patients [24,25]. Shoulder injuries and pains could potentially be related to the repositioning of the patient in the bed when the nurse leans over the bed and uses his or her upper body to slide a patient up in bed or turn the patient on his or her side. Both actions are routine tasks performed by nurses [26].

The hospitals and healthcare professions also have constantly faced with new practices and policies that directly impact to MSD developments [11]. An absolute example is a no-lift strategy that is likely to reduce low-back injuries, but shoulder injuries may start to increase as a result of pushing force when moving the lift-assist devices. Hence, upcoming studies need to demonstrate this theory with more diverse types of injuries [11]. However, there are still major research gaps in the understanding of musculoskeletal pains amongst the hospital and health care workers. Because most studies in the literature are extremely limited to the investigations, it is necessary to have a better understanding of MSDs and pains in the hospital and healthcare industries [11].

Another issue to consider is that most studies on the hospital and healthcare workers' injury occurrences have utilised subjective surveys to assess MSD hurts, mainly evaluating yearly pains. Consequently, the progression of MSDs from discomfort to disability has yet to be fully understood in the hospital and healthcare industries. Subjective assessments that have been primarily conducted are potentially biased, especially when determining association with exposures [11]. Therefore, robust ergonomics research works are required to thoroughly recognise the exposures and consequential MSD outcomes in all types of hospital and health care facilities.

Ergonomic Controls

The need for ergonomic approaches in hospitals and healthcare industries has been recognised because of its inception for the professions with disciplines and innovations but, developments and growths have been slowed with a dysfunctional separation of the human elements in healthcare systems into occupational safety and health practices for the staff and patients [27,28]. This misunderstanding and restricted application of ergonomics are evident within training programmes for the hospital and healthcare workers with non-technical skills [29].

Management of the hospital and healthcare professions' MSDs requires supporting a comprehensive approach. This means that focusing only on physical hazards or only on psychosocial hazards will not fully address MSD risks. So as to control multiple causes relating to MSDs, risk management may require the following approaches in a given situation [30]:

- A holistic.
- Multidimensional handling.
- Evidence-based models of causation.
- Taking account of the particular combination of hazards presenting.

In order to push overall safety improvements for both employees and patients across the entire hospital and healthcare ecosystem [31], a change in safety concept seems to be crucial to successfully keep up with the demands of this industry [21]. The supportive relationships for safety practices between patients and hospital employees cannot be dismissed. Positive changes in the safety environments for the hospitals and healthcare sectors can only be achieved by focusing time, energy, and investment on employee programs to compliment already robust patient safety programs [21].

Due to the multitude of major issues that hospitals and healthcare organisations are addressing to provide the best cares to their patients, proper attentions have not always been given to solving the problem of workers' compensation injuries in the healthcare and hospital workers. Compounding the problem is the challenge of pulling reliable data on the worker's injuries. This makes it difficult to determine where to focus injury prevention efforts. Therefore, dynamic ergonomic approaches are required to thoroughly understand the exposures and consequential MSD outcomes in all types of hospital and health care facilities.

For this reason, future ergonomics studies on pains and injuries in the hospital and healthcare workers will need to go beyond the common focus on the low-back region and shift to early mobility whereby other healthcare providers besides nurses and nursing aides interact with the patients.

Conclusion

The problem of work-related injuries from the hospital and healthcare industries has been nationally and internationally recognised. MSDs are the leading cause of work-related health problems in the hospital and healthcare workers. The effects for MSDs include sickness absence, injuries and disabilities, increased costs, higher employee turnovers, lower productivities and staff leaving the healthcare profession [32].

Although MSD injuries and pains in the hospital and healthcare professions appear to have been broadly investigated worldwide, there are still major gaps in research findings from the literature [11].

- The majority of studies investigated MSD pains in nurses and nursing aides in hospitals. Few researchers have investigated MSD pains for nurses and nursing aides in home health care and long-term care facilities.
- Limited researchers have investigated the upper- and lower-extremity regions for most of the MSD pain outcome variables. With changes in demands and expected increased handlings of lift assist devices and other safe patient-handling equipment, it becomes important to understand the pains and injuries in the extremities.
- Most studies have applied subjective surveys to assess MSD pains. Given many environmental and social changes in the healthcare industry, including living longer with more chronic diseases, bariatric patients, early mobility, and wanting to be at home during sickness, higher prevalence levels may shift to different populations-home health care and long-term care nurses-as well as in different body regions, such as shoulders and upper extremity.
- Future research needs to track these potential shifts in pains, away from a focus on low-back pain for nurses in hospitals.

In this sense, research explorations should promote further progress in addressing this important concern on the hospital and healthcare professions. To keeping employees at their workplaces of hospitals and healthcare sectors, ergonomic challenges need to continually refine focus to determine effective ways to address each issue as they arise. Therefore, exuberant ergonomic endeavours are required to thoroughly understand the exposures and consequential MSD outcomes in all types of hospital and health care facilities.

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