ABSTRACT

This study delves into the details of patient handling activities in healthcare systems, with a particular focus on three interrelated objectives that collectively contribute to a more comprehensive understanding of the challenges faced by nursing personnel and the potential avenues for improvement.

The primary objective revolves around investigating the profound impact of patienthandling activities on the prevalence of musculoskeletal disorders (MSDs) among nursing personnel. To achieve this objective, an extensive survey is conducted to collect data on various occupational risk factors including age, height, gender, workload, work environment, past health-related issues, and the nature of work. The findings reveal a statistically significant relationship between patient handling activities and a wide spectrum of MSDs, ranging from mild discomfort in the neck, shoulders, elbows, wrists, and knuckles, to more debilitating conditions affecting the spine, hips, knees, and ankles.

Building upon the understanding of how patient handling affects MSDs, the second objective delves into the specific body movements performed by nursing personnel and their implications for MSDs. This objective seeks to pinpoint which movements are correlated with a higher risk of developing MSDs. The analysis provides valuable insights into how nursing personnel's actions may impact their musculoskeletal health, offering practical guidance for healthcare facilities to tailor training programs and to implement ergonomic solutions aimed at mitigating the risk of injury.

Against the backdrop of the healthcare system's growing emphasis on automation, the third objective aims to identify and evaluate the challenges hindering the adoption of automation in patient handling activities. Leveraging the innovative Grey-DEMATEL framework, this research uncovers 15 critical challenges that span a broad spectrum of factors including infrastructure limitations, concerns about system reliability, robustness, and the possibility of system failure. These challenges represent substantial impediments

necessitating resolution to augment patient care, concurrently ensuring the health and safety of nursing personnel.

The synthesis of these three objectives offers a holistic perspective on the intricate ecosystem of patient-handling activities in healthcare systems. Collectively, these findings underscore the critical importance of addressing occupational risk factors, embracing ergonomic design principles, and acknowledging the unique challenges posed by the adoption of automation. On an individual level, a nursing person needs to receive targeted training and educational support to cope up with work-related stress, to develop effective time management skills and to access social support networks. Organisationallevel strategies involve proactive effort to create a work environment that minimises discomfort and ensures safety at individual level. These strategies encompass the implementation of policies, such as flexible work schedules, reduced working hours, well-defined roles, comprehensive work plans, and mechanisms for conflict resolution. Additionally, a concerted effort to apply ergonomic concepts in practice and design workspaces aligned with these principles may significantly reduce occupational risks among nursing personnel. The research not only deepens the understanding of the complex relationship between patient handling activities, MSDs, body movements, and automation challenges, but also provides actionable insights for healthcare facilities to enhance the health and safety of their nursing personnel and elevate the quality of patient care in a healthcare system.

The key risk factors for musculoskeletal disorders are identified as height, workload, frequency of carrying, and body postures like squatting, stooping, and standing. Additionally, complex infrastructure, resistance to change, and the need for tailored training programs are highlighted as significant challenges in adopting automation.

Keywords: Patient handling activities, healthcare systems, nursing personnel, occupational risk factors, musculoskeletal disorders (MSDs), automation challenges