

The Role of Occupational Medicine, Nursing and Radiology in Diagnosis and Managing Work-Related Injuries

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Received: 15.09.2024

Revised: 28.10.2024

Accepted: 26.11.2024

ABSTRACT

Occupational medicine physicians, nurses, and radiologists all work together in the diagnosis, management, and prevention of occupational injuries. Each of them provides vital pieces in a collaborative, multidisciplinary approach to ensure that safer work environments are created and support the rehabilitation of injured workers. The occupational medicine physicians spearhead injury assessment and prevention; the frontline caregivers who provide initial treatment and education are the nurses. The radiologists make crucial imaging diagnostics that provide guidance in the development of treatment plans. This paper explores the roles of these professionals in the management of work-related injuries and how collaboration and prevention efforts can be enhanced at the workplace.

Keywords: occupational medicine, injury prevention, multidisciplinary approach, radiology, nursing, work-related injuries.

INTRODUCTION

Work-related injuries are a considerable global public health problem since millions of workers suffer such injuries every year. Its impact goes beyond the actual physical health of the persons involved but may also trigger decreased productivity, increased medical costs, and strain in social support. Occupational medicine, nursing, and radiology professionals are all significantly involved in the diagnosis and treatment of work-related injuries and in the prevention measures that may be adopted. These sets of skills are precisely those toward promotion of worker health and safety as well as decreased individual, corporate, and social burdens in regards to occupational injuries which bring all these disciplines together but require close cooperation (Hämäläinen et al., 2017).

METHODOLOGY

It reviews the roles of the occupational medicine physician, nurse, and radiologist involved in the management and prevention of workplace injury. Articles related to research in PubMed, Google Scholar, and other medical databases were gathered from studies between 2005 and 2023. Keywords included "occupational medicine," "workplace injury," "nursing care," "radiology in injury diagnosis," "injury prevention," and "multidisciplinary approach." Initially, 40 articles were chosen because of their relevance to the role of healthcare professionals in

managing work-related injuries. The studies included in this review were selected for their value to the understanding of the collaborative process, diagnostic accuracy, and strategies in injury prevention. Data extraction involved best practices, treatment protocols, and how collaboration can reduce the rates of injury.

LITERATURE REVIEW

The literature review has shown that it is the collaboration of occupational medicine physicians, nurses, and radiologists that really ensures proper care for work-related injuries. Occupational medicine physicians spearhead diagnosis and treatment for occupational diseases and injuries while trying to formulate preventive measures so that risk factors are lessened in the workplace. A few of the strategies involved are ergonomic evaluations, risk factor assessment, and even safety procedures (Levy, 2005). Nurses play a crucial role as frontline caregivers, immediately providing first aid, injury assessment, and educational interventions to help prevent injury recurrence (Dressner & Kissinger, 2018). They are also collaborating with physicians and radiologists to monitor the recovery of injured workers. For their part, radiologists contribute in diagnostic imaging, providing fundamental information regarding the severity of the injury and guiding the treatment plan. Advanced imaging techniques, such as high-resolution CT scans and MRIs, have a great bearing on improving the accuracy of diagnosis in and effectiveness of musculoskeletal injury treatment: Widmer & Thrall, 2024).

Key findings include the fact that collaboration improves the productivity of work-related injury management. There is also evidence indicating that interdisciplinary teams composed of physicians, nurses, and radiologists can reduce downtime due to injuries, shorten recovery time, and improve long-term worker health. Moreover, ergonomic interventions, such as workstation adjustment, are needed to reduce the incidence of musculoskeletal disorders (Soares et al., 2020). Nurses also contribute to this end by identifying emerging trends in injury cases, which may assist in initiating early intervention plans and targeted preventive measures (Hu et al., 2021). This literature further emphasizes that decreasing psychosocial factors such as stress and emotional exhaustion are necessary to attain optimal recovery results and also to ensure appropriate return to work (Leiter & Maslach, 2009). Thus, the reviewed studies emphasize the need to continue research and standardize practices while optimizing injury prevention programs and improving the collaborative approach within workplace health management.

DISCUSSION

Occupational Medicine's Role

Occupational medicine physicians are the first physicians who diagnose and manage work-related injuries. They have had specialized training in the identification and management of occupational diseases and injuries; hence, they are better equipped to deal with the subtle interplay between the nature of the work environment and the health of the workers (Levy, 2005). Upon presentation of an injury by a worker, an occupational medicine physician performs a comprehensive assessment, paying particular attention to the specific workplace hazards and the mechanism of the injury. This thorough examination will allow them to correctly diagnose the situation and subsequently develop a treatment program that would meet the demands of the injured worker.

Occupational medicine doctors not only diagnose and treat injuries but are also proactive participants in preventing injuries. They evaluate the workplace hazards in detail, suggest an appropriate ergonomic intervention, and facilitate proper implementation of a safety protocol system (Odebisi & Okafor, 2023). Occupational physicians help bring safety to the workplace by reducing work-related injuries through identification of potential hazards for further mitigation. This has not only enhanced the health and wellbeing of the worker but also generalized productivity within the organization.

Another important aspect of occupational medicine is collaboration with employers. The physicians collaborate with companies to implement and design broad injury prevention programs (Abdalla et al., 2017). They give expert advice on making a culture of safety, educating the workers on how to perform their duties safely, and adhering to occupational health requirements. They function as facilitators: that is, they are taking professional medical knowledge and injecting it into the reality of the workplace through active involvement with employers.

Nurses contributions

Nurses are the first point of response to work-related injuries. In many cases, they are the first point of contact for the affected workers. Their role is not limited to medical treatment but encompasses the entire continuum of care. When an injured worker presents for medical care, the nurse quickly evaluates the seriousness of the injury, begins first aid, and starts triaging patients based on the acuteness of their condition (Dressner & Kissinger, 2018). Through the treatment process, the nurse closely monitors patients' vital signs, gives patients medications as needed, and offers wound and other bodily injury care. Thus, it assures injured workers to achieve high quality care and support, which enables them to recover very well.

Apart from direct patient care, nurses are involved in injury prevention education. They act as knowledge liaisons to the worker population by teaching them optimal body mechanics, ergonomics, and safety measures that would lessen the chances of injury to the worker (Vendittelli et al., 2016). They empower the worker with

facts and skills that would result in a safer worker as well as an informed, more proactive workforce. Nurses work closely with occupational medicine physicians and other medical professionals in designing and implementing comprehensive injury prevention programs. Their experiences and first-hand knowledge will be invaluable in making the interventions appealing and effective to workers, promoting long-term behavioral changes.

Nurses are in close interaction with their patients and have a keen sense of observation, which puts them at a unique position to look out for potential workplace hazards. They are usually first to notice patterns or trends in injuries, and reporting such observations to occupational medicine physicians and safety professionals could contribute to a data-driven approach to injury prevention. Their views inform interventions, policy reform, and education aimed at addressing the causes of work-related injuries (Hu et al., 2021).

Radiology's Diagnostic Role

Radiology plays an essential role in determining the injuries associated with the workplace accident, more so the ones related to the musculoskeletal system. Among the diagnostic studies, these will include the X-rays, CT, as well as the MRI. Each provides an image of the injury at greater resolution (Widmer & Thrall, 2024). This can be termed as the basis through which further diagnosis and thus appropriate treatment is undertaken given that healthcare providers understand all aspects regarding the nature and extent of the injury.

Radiologists play a very important role in identifying fractures, dislocations, soft tissue injuries, and other pathologies because they specialize in interpreting imaging studies. They have a sharp eye for even slight abnormalities that may have an immense impact on patient care due to their in-depth knowledge of anatomy and physiology. Giving detailed reports, while consulting with occupational medicine physicians and medical practitioners, would enable radiologists to be involved in targeted treatment and rehabilitation planning accordingly (Widmer & Thrall, 2024).

The field of radiology has witnessed tremendous changes in the last few years. The latest technologies have revolutionized the diagnosis of work-related injuries. High-resolution imaging modalities, for example, advanced CT scanners and MRI machines, now offer unprecedented levels of detail and precision that enable radiologists to visualize anatomical structures in unparalleled clarity (Widmer & Thrall, 2024). These technological advancements not only help in improving the accuracy of diagnosis but also lead to more personalized and effective approaches toward treatment. Applying these state-of-the-art tools, radiology professionals push the limits of what is possible in the diagnosis and management of work-related injuries.

Collaborative Approach

Collaboration between occupational medicine, nursing, and radiology in the teamwork and cooperation necessary for effective diagnosis and management of work-related injuries will determine what has been described. These fields offer a variety of skills, different kinds of knowledge, and different perspectives that need to be brought together in order to have a holistic, well-rounded understanding of the injured worker and development of the care plans (Albanesi et al., 2022).

This collaborative approach has at its core the occupational medicine physician as they coordinate and oversee all of the care process for that individual. They work directly with the nurses and radiologists so as to ensure every other concern of the care provided would be met from diagnosis through to treatment, rehabilitation, and finally back into the workplace (Levy, 2005). This relationship has to include nurses; the lifeline between the patient and the physician; they should be key in this care scenario. This makes them very valuable to the physician when trying to decide what to do as they help the physician know what happened to the patient concerning treatment and how his health progresses generally.

The involvement of radiologists with specialized knowledge in diagnostic imaging makes the collaborative approach very relevant. They are always hand in glove with occupational medicine physicians and nurses during the interpretation of imaging studies, identification of key findings, and guidance in treatment planning. In this approach, radiologists' contribution to this is in detailed reports and participating in interdisciplinary discussions that help enhance the understanding of the injury and its implications on recovery and return to work.

The collaborative spirit goes beyond the clinical setting, with occupational medicine physicians, nurses, and radiologists actively participating in research initiatives to advance the understanding and prevention of work-related injuries (Fuller, 2021). By pooling their expertise and resources, these professionals can conduct rigorous studies, develop evidence-based guidelines, and identify best practices for injury prevention and management. They add to the body of knowledge by collaborative research on the field and drive innovation as they contribute to the advancement of occupational health and safety towards the future.

Psychosocial factors

Work-related injuries often have deep psychosocial consequences which can greatly affect the worker's recovery and overall wellbeing. People who experienced a work-related injury are very common cases with occupational stress, burnout, and emotional exhaustion. The psychosocial factors are risk factors for the initial injury and

further prolong the recovery process as well as hinder successful return to work (Leiter & Maslach, 2009; Zadow et al., 2017).

Occupational medicine physicians and nurses take an enormous role in evaluating and guiding the mental health of injured workers as they acknowledge that psychosocial factors have to be considered. A work-related injury extends far beyond mere pain and the limitations that it puts on the body to worth, security at work, and relations with others in society. This enables occupational medicine practitioners to identify the workforce that may be susceptible to mental health issues, thereby enabling them to provide timely interventions and treatment (Colligan & Higgins, 2006).

Occupational medicine physicians and nurses provide a comprehensive plan to assist the injured in rehabilitation work. Such a rehabilitation program does not only include the injury itself but the psychological or social aspect of a person at work. They arm the injured worker with some strengths such as resilience, ability to cope, and improved general mental health. They provide them with referrals to psychological specialists such as psychologists or counselors who can give them professional advice and guidance on recovery (Albanesi et al., 2022).

The professionals deal with the psychosocial factors around injury in the workplace, assisting in the recovery of the injured party in a holistic, effective way. Supporting their mental health is important since this would ensure that workers safely return to work and their condition in the long term is preserved. Through a compassionate and patient-centered approach, occupational medicine physicians and nurses provide an environment that will allow the injured worker to cope and be empowered to challenge life, build resilience, and get back to feeling more purposeful and fulfilling in both personal and professional settings (Albanesi et al., 2022).

Ergonomics and Injury Prevention

Ergonomics plays a paramount role in the prevention of work-related injuries, and hence, professionals in occupational medicine, nursing, and radiology are on the forefront in championing ergonomic principles in the workplace. Ergonomics simply seeks to optimize the interaction between workers and their working environment to reduce the risk of musculoskeletal disorders and other injuries from poor posture, repetitive motions, and poor workstation design (Hoe et al., 2018).

Occupational medicine physicians and nurses directly take part in the assessment of the workstation, tool, and equipment to see whether there is any possible risk factor that can be related to an ergonomic. They also closely observe the physical demand of a certain job for lifting requirements, awkward postures, and repetitive movements. Based on this observation, they recommend possible changes that are ergonomic, which may include adjustable furniture and proper lighting, as well as tools that reduce strain and help to ensure good body mechanics (Soares et al., 2020).

Radiology professionals also contribute to the development of ergonomic assessments by providing information in the form of imaging that can be helpful in understanding possible ergonomic problems. This can be achieved through diagnostic imaging to determine the effects of repetitive motions and awkward postures on the musculoskeletal system. Such information will therefore guide the development of focused ergonomic interventions and support the implementation of prevention measures (Fisher et al., 2009).

Besides individual workstation analysis, occupational medicine providers collaborate with the employer to design an overall ergonomic program. Occupational medicine providers inform the employer on designing an ergonomically safe workplace, teach employees how to use the ergonomics appropriately, and improve the work environment and safety. Occupational medicine providers consequently reduce workplace injury incidence through identification and management of potential risk factors the moment they arise in the workplace (Fisher et al., 2009).

Education and training are the bedrock of prevention and management of occupational injuries in the workplace. Occupational medicine physicians, nurses, and radiology professionals play an important role in educating workers, employers, and the community at large on occupational health and safety. The health care professionals plan and deliver a wide range of training courses, which address the different needs of the various industries and occupations. These programs include topics such as proper lifting techniques, ergonomics, personal protective equipment, and safe work practices (Fisher et al., 2009). They train the employees in practical, hands-on activities, which help to give them the tools and confidence to take proactive measures for their health and well-being.

In addition to training the worker, occupational medicine professionals place much emphasis on educating the employer on his crucial role in building a safe and healthy working environment. They assist employers in following occupational health and safety laws, help them develop policies related to safety, and also help them to implement an injury prevention program. By developing a culture of safety and ensuring the welfare of the employee, these professionals ensure that employers make safe settings for their employees. With this in mind, occupational medicine professionals, nurses, and radiologists are constantly upgrading their medical knowledge and technology advancement by learning and gathering new information (Fuller, 2021). They ensure that their

care and prevention efforts are based on the most up-to-date, evidence-based practices through conferences, workshops, and training.

Despite all these efforts, workplace injuries still constitute some significant problems in all sectors. Underreporting remains an essential problem because workers do not report their injuries mainly out of fear of losing their jobs, being shunned, or lack of information on their rights (Boden & Ozonoff, 2008). Resource constraints aggravate injury prevention, and for small and medium-sized businesses, which cannot afford investment in high-end occupational health programs, ergonomic interventions, or high-end diagnostic tools, complicate the situation. There is, therefore, a change in the nature of work itself—for example, remote workers, the gig economy, and increased automation, bringing new challenges to occupational health that require fresh solutions. All of this can only be overcome through further research, collaboration of various disciplines, and advanced tools like wearable sensors, telemedicine, and artificial intelligence for monitoring and preventing injuries and better access to care (Fuller, 2021). Occupational medicine professionals, safety engineers, occupational therapists, and data scientists can work together across disciplines to develop safer and healthier workplaces that fit the changing needs of the modern workplace (Belyayev & Smith, 2022; Darragh et al., 2012).

CONCLUSION

Occupational medicine, nursing, and radiology professionals play a very essential role in the diagnosis, management, and prevention of occupational injuries. It is through such knowledge by these professionals, combined with their collaborative approach towards worker health and safety, that a difference is made in the life of an injured worker or in the overall well-being of the workforce.

Constant scientific advance, improving educational programs, and encouraging evidence-based practice bring the professionals of occupational medicine, nursing, and radiology into a vanguard position facing work injuries that often combine difficulties and complexity. It is on such a way of efforts made through prevention of injuries, quick and precise diagnosis, and more effective care that the heavy burden of occupational injuries falls less heavily on individuals, their families, and society at large.

But whatever work is being done will continuously change, and thereby the strategies and approaches especially for occupational medicine professionals; all these can be fostered or promoted by innovation further interdisciplinary collaboration. Adaptation to the changing needs of the workers will ensure that this professional too experiences advancement in the safety of all whose health is protected and for their safety. Their dedication and professionalism lead occupational medicine, nursing, and radiology professionals in ensuring the recovery of many persons suffering work-related injuries but are developing a future whereby each workman flourishes in his safe, sound, healthy, and conducive environment at work.

REFERENCES

1. Abdalla, S., Apramian, S. S., Cantley, L. F., Cullen, M. R., Mock, C. N., Nugent, R., ... & Smith, K. R. (2017). Occupation and risk for injuries. Injury Prevention and Environmental Health. 3rd ed. The International Bank for Reconstruction and Development/The World Bank.
2. Albanesi, B., Piredda, M., Bravi, M., Bressi, F., Gualandi, R., Marchetti, A., ... & De Marinis, M. G. (2022). Interventions to prevent and reduce work-related musculoskeletal injuries and pain among healthcare professionals. A comprehensive systematic review of the literature. *Journal of safety research*, 82, 124-143.
3. Belyayev, A., & Smith, T. D. (2022). Exploring Certified Hand Therapists roles in workplace injury prevention, treatment, rehabilitation, and collaboration with occupational safety professionals. *Work*, 73(3), 1037-1043.
4. Boden, L. I., & Ozonoff, A. L. (2008). Capture–recapture estimates of nonfatal workplace injuries and illnesses. *Annals of epidemiology*, 18(6), 500-506.
5. Colligan, T. W., & Higgins, E. M. (2006). Workplace stress: Etiology and consequences. *Journal of workplace behavioral health*, 21(2), 89-97.
6. Darragh, A. R., Campo, M., & King, P. (2012). Work-related activities associated with injury in occupational and physical therapists. *Work*, 42(3), 373-384.
7. Dressner, M. A., & Kissinger, S. P. (2018). Occupational injuries and illnesses among registered nurses. *Monthly Lab. Rev.*, 141, 1.
8. Fisher, T. F., Brodzinski-Andreae, B., & Zook, S. (2009). Effectiveness of work injury prevention education and safety training by an occupational therapist. *British Journal of Occupational Therapy*, 72(10), 450-457.
9. Fuller, T. P. (Ed.). (2021). *Improving Global Worker Health and Safety Through Collaborative Capacity Building Initiatives*. CRC Press.
10. Halbesleben, J. R. (2010). The role of exhaustion and workarounds in predicting occupational injuries: a cross-lagged panel study of health care professionals. *Journal of occupational health psychology*, 15(1), 1.

11. Härmäläinen, P., Takala, J., & Kiat, T. B. (2017). Global estimates of occupational injuries and work-related illnesses 2017. Singapore: Workplace Safety and Health Institute.
12. Härmä, M., Koskinen, A., Sallinen, M., Kubo, T., Ropponen, A., & Lombardi, D. A. (2020). Characteristics of working hours and the risk of occupational injuries among hospital employees: a case-crossover study. *Scandinavian Journal of Work, Environment & Health*, 46(6), 570.
13. Hoe, V. C., Urquhart, D. M., Kelsall, H. L., Zamri, E. N., & Sim, M. R. (2018). Ergonomic interventions for preventing work-related musculoskeletal disorders of the upper limb and neck among office workers. *Cochrane Database of Systematic Reviews*, (10).
14. Hu, L., Sae-Sia, W., & Kitrungrrote, L. (2021). Intensive care nurses' knowledge, attitude, and practice of pressure injury prevention in China: A cross-sectional study. *Risk Management and Healthcare Policy*, 4257-4267.
15. Imes, C. C., Barthel, N. J., Chasens, E. R., Dunbar-Jacob, J., Engberg, S. J., Feeley, C. A., ... & Baniak, L. (2023). Shift work organization on nurse injuries: A scoping review. *International journal of nursing studies*, 138, 104395.
16. Leiter, M. P., & Maslach, C. (2009). Burnout and workplace injuries: A longitudinal analysis.
17. Levy, B. S. (Ed.). (2005). Preventing occupational disease and injury. American Public Health Association.
18. Odebiyi, D. O., & Okafor, U. A. C. (2023). Musculoskeletal disorders, workplace ergonomics and injury prevention. In *Ergonomics-new insights*. IntechOpen.
19. Soares, C. O., Pereira, B. F., Gomes, M. V. P., Marcondes, L. P., de Campos Gomes, F., & de Melo-Neto, J. S. (2020). Preventive factors against work-related musculoskeletal disorders: narrative review. *Revista Brasileira de Medicina do Trabalho*, 17(3), 415.
20. Vendittelli, D., Penprase, B., & Pittiglio, L. (2016). Musculoskeletal injury prevention for new nurses. *Workplace health & safety*, 64(12), 573-585.
21. Widmer, W. R., & Thrall, D. E. (2024). Radiation protection and physics of diagnostic radiology. *Thrall's Textbook of Veterinary Diagnostic Radiology-E-Book*, 1.
22. Zadow, A. J., Dollard, M. F., Mclinton, S. S., Lawrence, P., & Tuckey, M. R. (2017). Psychosocial safety climate, emotional exhaustion, and work injuries in healthcare workplaces. *Stress and Health*, 33(5), 558-569.