SOCIAL SECURITY MANAGEMENT JOURNAL
https://e-journal.uum.edu.my/index.php/ssmj

How to cite this article:
Aminullah Abdulrasheed Abdullah, Zulfitri Razali, Ahmad Shah Razin Shahril & Muhamad Arif Ahmad Rashidi. Examining the impact of healthcare workers' knowledge and attitudes on musculoskeletal disorders (MSDS) and their involvement in MSD prevention practices among healthcare workers. *Social Security Management Journal*, *1*(2), 26-38. https://doi.org/10.32890/ssmj2024.1.2.3

EXAMINING THE IMPACT OF HEALTHCARE WORKERS' KNOWLEDGE AND ATTITUDES ON MUSCULOSKELETAL DISORDERS (MSDS) AND THEIR INVOLVEMENT IN MSD PREVENTION PRACTICES AMONG HEALTHCARE WORKERS

[1]Abdulrasheed Aminullah Abdullah, [2]Zulfitri Razali, [3]Ahmad Shah Razin Shahril & [4]Muhamad Arif Ahmad Rashidi
[2&4]Master of Science Student, Occupational Safety and Health Management Program,
[3]PhD Student, Occupational Safety and Health Management Program,
[1]School of Business Management,
Universiti Utara Malaysia, Malaysia

[1]Corresponding Author: *alfarasheed@yahoo.com*

Received: 28/10/2024 Revised: 12/11/2024 Accepted: 13/11/2024 Published: 31/12/2024

ABSTRACT

This study investigated the impact of the knowledge and attitude of health care workers (HCWs) and their engagement in MSU prevention practice in Malaysia. One hundred and ten consenting HCWs participated in this cross-sectional survey. They responded to a structured questionnaire investigating socio-demographic and occupational characteristics, knowledge, and attitudes for the prevention of musculoskeletal conditions. The statistical data were analyzed using descriptive statistics and Pear-son's chi-square test, which had a significant level of 0.05 using SPSS 27.0. The study utilized cluster disproportional simple random sampling. The study explored the relationship between healthcare providers' knowledge and attitudes towards MSDs and their involvement in prevention practices. Results revealed a significant positive relationship between attitude and MSD prevention, while on the contrary, the relationship between knowledge and MSD was not significant. The study highlights the inadequate knowledge of MSD among HCWs and the need for improved availability of MSD knowledge, and special training on the utilization and interpretation of MSD. These implications underscore the importance of this research in improving the musculoskeletal health of healthcare workers, with the potential to impact healthcare practices and policies significantly.

Keywords: Attitude, health care workers, knowledge, musculoskeletal disorder, Malaysia,

INTRODUCTION

Such work-related disorders as MSDs develop among healthcare providers because of the strenuous activities involved in the healthcare profession; they result in temporary or permanent disability (Molina-Garcia et al., 2024). Appreciating the view of the healthcare workers towards MSDs is paramount in putting measures in to prevent the ailment. The study conducted by Gorce and Jacquier-Bret (2024) reveals that HCPCs remain in the strategic position of encouraging discourse and practice concerning several conditions of health. Prior research has also described a range of healthcare providers' attitudes and behaviours that relate to various health matters ranging from depression to HIV/AIDS (Sindicich et al., 2024; Tefera et al., 2024). Furthermore, the understanding of specific disorders, for instance, depression and binge eating disorders among physicians prescribe alterations in practice and patients' well-being (Ekhammar et al., 2024). Also, the level of ergonomics participation demonstrated by the healthcare employees helps in predicting their susceptibility towards MSDs (Wassell et al., 2024). Nevertheless, knowledge and attitudes of the HC providers remain an important facet of healthcare delivery that requires investigation of their perceptions of MSDs and their prevention. The purpose of this study will be to assess healthcare providers' existing knowledge about MSDs and their practices in preventing MSDs and improving the occupational health and well-being of healthcare workers.

Remarkably, MSDs are already known to be responsible for great disability and pain. They reduce the quality of life of millions of people and are a global burden on healthcare and economies (Shivakumar et al., 2024). These disorders such as back, osteoarthritis, and tendonitis are common in different groups of people and workforce. Health care practitioners play a significant role in timely and correct identification, treatment, and control of MSDs. It helps in understanding their knowledge and attitudes towards these disorders hence affecting the quality of care offered and the effectiveness of the set strategies towards preventing the disorders. Although certain number of studies focuses on the incidence, risk factors and effects of MSDs in healthcare workers, controversy appears when it comes to investigation of how MSD knowledge and attitudes of the healthcare providers are influencing the MSD involvement and contribution to prevention. While epidemiology and management of MSDs across the different workplace categories have been investigated in previous literatures, few manuscripts were found to examine the key constructs that determine knowledge and attitude of healthcare providers toward MSDs and subsequent participation in primary prevention of MSDs. The knowledge, attitude, and preventive behaviour of the healthcare providers are vital for designing moderate-to-large scale interventions to promote musculoskeletal health in healthcare providers. Thus, it becomes crucial to conduct studies that would focus on how the knowledge and attitude of the healthcare providers towards MSDs as well as their involvement in the prevention of the MSDs to fill the gap that is left open by the existing literature. Based on the previous discussions, the research specifically aims to:

1. To investigate the effect of knowledge on musculoskeletal disorders among healthcare providers.
2. to examine the impact of attitudes on musculoskeletal disorders among a particular healthcare provider.

THEORETICAL JUSTIFICATION

Health Belief Model (HBM) is used in the current discussion as a well-known theoretical model that can be used to measure perceptions and beliefs regarding health problems and predict subsequent behaviours (Shanthi Johnson et al., 2008). HBM has proposed that perceived susceptibility of a disease, perceived severity of the disease, perceived benefits of acting against the disease, perceived barriers to

acting against the disease, cues to action and self-efficacy are the factors that may affect one's health-related behavior (Shanthi Johnson et al., 2008). When applied to MSDs in HCWs, the study's findings can shed light on how HBM's knowledge, perceived efficacy, barriers, and facilitators of MSD prevention affect their behaviours. By using the HBM in the research topic, it will be possible to determine the perceived vulnerability and consequences of MSDs and the HCPs' perceptions of the benefits of prevention practices. These perceived interpersonal and intrapersonal barriers are associated with prevention measures and self-efficacy concerning MSD prevention. Vividly perceiving these components in the context of the HBM can reveal the major determiners of healthcare providers' behaviours in relation to MSD prevention. Hence, through the lens of HBM, we have a well-defined and systematic template for studying the influence of knowledge and attitudinal factors of healthcare providers in MSDs and their participation in the prevention process. Using the HBM, the study will establish the pattern of relationship between the variables of perception, attitude, and behaviour of the health care providers regarding MSD prevention to contribute towards the formulation of health programs for improving the musculoskeletal health of health care workers.

LITERATURE REVIEW

Musculoskeletal Disease

The musculoskeletal system may be described as a combination of organization of the body's various organs, such as bones, joints, muscles, tendons, ligaments, nerves, skin, blood vessels, spine and so on (Brandl et al., 2024). Together, they support the human body's weight, maintain posture, and help the movement of humans. A disorder is a disturbance of function, structure, or both resulting from a genetic or embryonic failure in development or exogenous factors such as poison, trauma, or disease (Talapatra et al., 2024). Therefore, MSDs are the collection of injuries or disorders that affect the human musculoskeletal system (Kantasrila et al., 2024). Common musculoskeletal disorders include Carpal Tunnel Syndrome, Tendonitis, Muscle/Tendon strain, Ligament Sprain, Tension Neck Syndrome, Thoracic Outlet Compression, Rotator Cuff Tendonitis, Epicondylitis, Radial Tunnel Syndrome, Digital Neuritis, Trigger Finger/Thumb, DeQuervain's Syndrome, Mechanical Back Syndrome, Degenerative Disc Disease, Ruptured/Herniated Disc, and many more (Tolera et al., 2024). Other common names for MSDs are 'repetitive motion injury', 'repetitive stress injury', 'overuse injury', and many more (Ekhammar et al., 2024). Lifting heavy weights, repetitive force, vibration, and incorrect posture cause musculoskeletal wear and strain (Shoemaker et al., 2024).

The Trend of Musculoskeletal Disease in Malaysia

In Malaysia, a comprehensive review of occupational diseases from 2016 to 2021 has identified musculoskeletal disorders (MSD) as a prevalent health issue among workers (Alias et al., 2020). A study in a Malaysian hospital reported a staggering 95% prevalence of MSD among healthcare staff (Amin et al., 2014). Moreover, local studies have underscored the occurrence of MSD, particularly low back pain, across different healthcare worker categories. Further research indicates varied rates of MSD among different healthcare roles, with nurses experiencing a prevalence between 73.1% to 76.5%, ambulance drivers at 65%, and physicians at 19% (Isa et al., 2021; Shamsudin et al., 2016; Taib et al., 2017; Tamrin et al., 2014). Additionally, physiotherapists have been found to suffer from MSD at high rates, with the condition often linked to fatigue and burnout (Albeeli et al., 2020). The DOSH report published a yearly report on occupational poisoning and disease in Malaysia, which shows increasing trends from 454 cases in 2005 to 9860 cases in 2019 (Ng et al., 2019). The documentation of

occupational disease is important for workers' compensation due to occupational disease or injury. Besides that, the information is useful for the stakeholders in planning for a preventive program at the national level in line with the healthy workplace campaign (Maakip et al., 2015). In Malaysia, the highest number of reported cases was recorded in the manufacturing sector, and the highest number of diseases was occupational noise-related hearing disorders (Lop et al., 2019).

Knowledge

Knowledge concerning MSDS can be defined as the level of awareness that people have of the potential risk factors of MSDS these measures can be taken to prevent the occurrence of MSDS at workplaces, as well as the means that can be employed to manage MSDS when they do occur (Nordin et al., 2018). it covers the degree of awareness of the ergonomic principles, biomechanics and workplace factors that may lead to MSDS. also, abilities and willingness to identify MSDS signs and symptoms, understand early prevention, and intervention as well as identify available resources for MSDS issues in a workplace are part of job knowledge. the literature reveals that job knowledge is significant in MSDS avoidance and control (Da costa & Vieira, 2010; Padula et al., 2017).

Attitude

Concerning MSDs, attitudes refer to the beliefs, appraisals, and emotions that people, especially carers, have towards the prevention, treatment, and effects of MSDs in the workplace (Ariff et al., 2020). They found cognitive per sweetheart strongly impacts behaviour and tended decision-making processes concerning musculoskeletal health and safety measures. Early intervention, more modifications to the workplace environment and positive attitudes towards ergonomics will go a long way in preventing MSDs and enhancing musculoskeletal health (Ling et al., 2016). It has been discovered that positive attitude towards musculoskeletal health enhances willingness to perform preventive actions, adhering to safety measures and seek for required help in case of musculoskeletal symptoms among the healthcare professionals (Shariat et al., 2016). Thus, there are possibilities on how musculoskeletal disorder attitudes can influence the pragmatic ergonomic plan of action, preventive measures, and the safety climate in the workplace (Harithasan et al., 2024).

The Relationship Between Knowledge and Musculoskeletal Disorder

Knowledge has been an area of focus in occupational health regarding MSDs (Yoon et al., 2014). This paper aims to consider the role of knowledge in relation to the prevention and management of MSDs in different contexts, to improve musculoskeletal health outcomes among the workforces. Some researchers have been conducted to investigate this relationship to give an understanding of the contribution of knowledge in preventing MSDs and on the welfare of those who are vulnerable to MSDs. Therefore, it is hypothesized that:
H1. Knowledge is positively associated with Musculoskeletal Disorders.

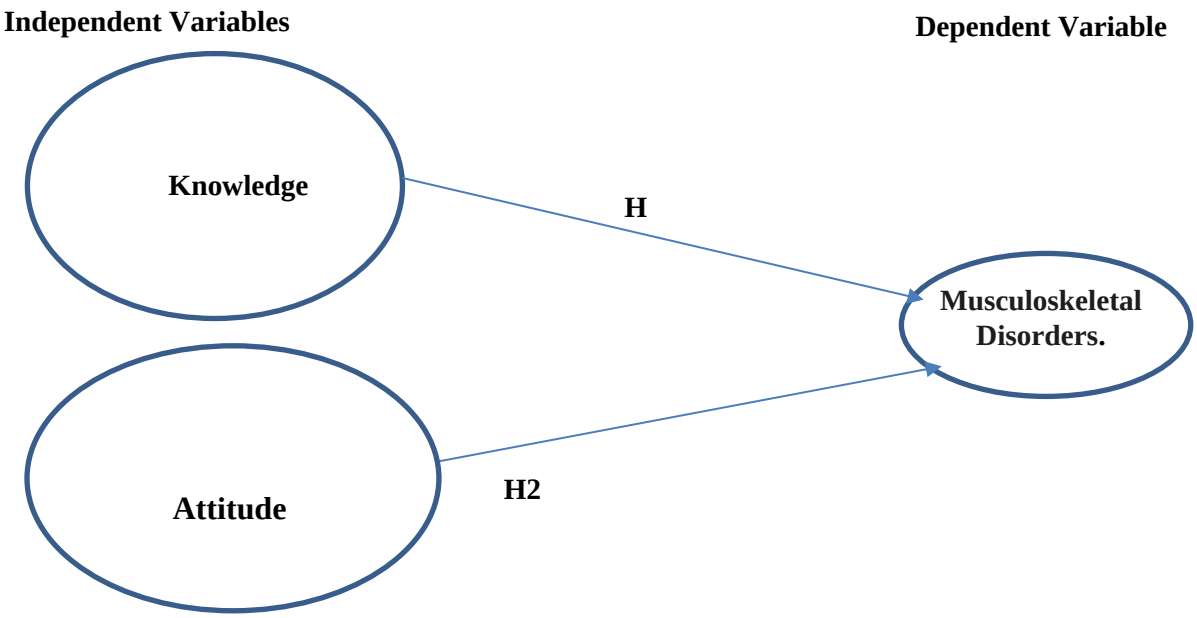
The Relationship Between Attitude and Musculoskeletal Disorder

Attitude as one of the psychosocial factors has been an area of interest to occupational health researchers in their effort to explain the role of attitudes in prevention, tackling and effects of MSDs (Yoon et al., 2014). Some of these include a study examining attitudes to work-related musculoskeletal disorders; a study of attitudes to prevention of work-related musculoskeletal disorders and posture in nursing students; a study of the impact of attitudes to work-related musculoskeletal disorders on mechanical

exposure of upper extremity muscles among computer clerks; and Musculoskeletal health and attitudes of professional nurses, another prospective study on regional musculoskeletal symptoms in a general working population. Furthermore, Ephraim-Emmanuel et al. (2019) examined the knowledge, attitude, and practice of preventing work-related musculoskeletal disorders among doctors. Despite having good knowledge and attitude towards applying ergonomics for MSD prevention, the study revealed a gap in translating this knowledge into practice, emphasizing the need for interventions to bridge this gap and improve musculoskeletal health outcomes. Accordingly, it is hypothesized that:
H2. Attitude is positively associated with Musculoskeletal Disorders.

Figure 1

Research Model



METHODOLOGY

The study population for this research HCWs (Health care workers) are those professional doctors, nurses, assistant medical officers, and healthcare assistants. Based on Krejcie and Morgan (1970) table, for a population of 145 with an additional 10% estimated dropout rate, 110 samples are adequate for the data collection. This sample size was also according to Roscoe's rule of thumb cited in (Sekaran & Bougie, 2016) which stated that a sample of more than 30 and less than 500 is appropriate for most research (Sekaran et al., 2013).

A cluster disproportional simple random sampling was utilized in this research. It gives everyone an equal chance to be sampled. It is an unbiased strategy of sampling. This approach entails the division of a population into clusters, from which samples are selected. The selection process within each cluster is determined by its size. The likelihood of selecting 33 clusters is disproportional to their size, resulting in larger clusters having a greater likelihood of selection than smaller clusters. Regarding the measures and instruments of research, a self-administered questionnaire was adopted from Abidin et al. (2018) and Ephraim-Emmanuel et al. (2019) for the knowledge (12 items) and attitude (13 items). The

questionnaire adopted in the prior study conducted by Abidin et al. (2018) targeted the Malaysian employers of industrial workers. In a study conducted by Abidin et al. (2018), the tool was said to have achieved satisfactory internal consistency, where Cronbach's Alpha values of 0. 8, 0. 7, and 0. 9 as GA to be used in the KAP components. The reliability score of a set of items should be over 0. 8 reflects high reliability in measurement instruments (Ali et al., 2023).

RESULTS

Respondents' Demographics

In this study, descriptive analysis was used to portray the demographic background of the population or samples in terms of gender, age, highest education level, years of experience, and job position. It offers a view of the population parameters regarding participants, which clearly outlines the diversified backgrounds and contexts. A look at these demographic factors was conducted to contextualize and identify any likely patterns or trends that could be witnessed and, in the final sense, influence the outcomes of this study. On the other hand, the average age of the participants in the study was 31.1 years, with most respondents belonging to the age group of 30-40 years, at 49.2%. The gender split was nearly even, with 50.8% (66) male and 49.2% (64) female respondents. Regarding the education level, the highest level of education attained among the respondents is a diploma or equivalent, with 69 (53.1%) people. Following that, there are 32 respondents (24.6%) who hold a bachelor's degree, 14 respondents (10.8%) possess a master degree, and 15 respondents (11.5%) with SPM. Regarding work experience, 30% of the participants had been with the organization between 1-5 years, 37.7% between 5-10 years, and the remainder had more than 10 years of experience. These demographic details offer a thorough overview of the study's population, aiding in the subsequent analysis and interpretation of the data. For a detailed breakdown of the participants' characteristics, please refer to Table 1.

Table 1

Demographic Data (n=110)

Variables	Frequency(n)	Percentage (%)
Gender		
Male	66	50.8
Female	64	49.2
Age		
< 30	48	36.9
30 – 40 years	64	49.2
> 40 years	18	13.8
Highest education level		
SPM	15	11.5
Diploma	69	53.1
Bachelor's degree	32	24.6
Master's degree	14	10.8
Years of experience		
1-5 years	39	30.0

Variables	Frequency(n)	Percentage (%)
5-10 years	49	37.7
> 10 years	42	32.3
Job Position		
Medical officer	45	34.6
Assistant Medical Officer	46	35.4
Nurse	24	18.5
Healthcare Assistant	15	11.5

Analysis of Mean and Standard Deviation

Table 2 shows the interpretation of the mean score used by the researcher as a reference for level of mean value for the descriptive analysis. The overall findings are measured based on the interpretation of mean score values adapted from Moidunny (2009) based on a 5-point Likert scale (1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree). The knowledge and attitude, toward musculoskeletal disorders prevention among healthcare workers in the Emergency Department of Hospital Tuanku Jaafar Seremban, Negeri Sembilan, was assessed using data analyzed with the SPSS program version 27.0. Table 2 displays the mean score of knowledge and attitude, concerning musculoskeletal disorders. Notably, knowledge of MSD prevention practice mean level scored the highest among the variables, with mean score of 4.22 across 12 items. The attitude towards MSD was also classified as high, with a mean score of 4.20 across 13 items.

Table 2

The Mean Score of Knowledge and Attitude on MSD toward Musculoskeletal Disorders (n =110)

Variable	Item	Total (n)	Mean
Knowledge of MSD	12	110	4.22
Attitude Towards MSD	13	110	4.20

Regression Analysis

Table 3 presents the regression analysis results of the relationship between the study variables and prevention practices for musculoskeletal disorders (MSD). The variable of interest is MSD prevention practice, with knowledge of MSD and attitude towards MSD as predictors. The table displays each predictor variable's beta coefficients, t-values, and significance levels (Sig.). For knowledge of MSD, the beta coefficient is 0.016, with a t-value of 0.312 and a non-significant p-value of 0.999, indicating that knowledge of MSD does not significantly predict MSD prevention practice. In contrast, attitude towards MSD shows a strong positive relationship, with beta coefficient of 0.472, and a highly significant t-value of 15.897 ($p < 0.001$),suggesting that attitude towards MSD is a significant predictor of MSD prevention practice. Additionally, the overall model fit statistics are provided, with an r^2 value of 0.664, indicating that the predictors can explain approximately 66.4% of the variance in MSD prevention practice. The F-test result is highly significant ($F = 252.713$, $p < 0.001$), indicating

that the regression model is statistically significant in predicting MSD prevention practice. These findings underscore the critical role of attitude in influencing the implementation of preventive practices for musculoskeletal disorders among healthcare workers.

Table 3

Regression Analysis

Variable of the study	MSD Prevention Practice		
	β	**t**	***p***
Knowledge of MSD	0.016	0.312	0.999
Attitude towards MSD	0.472	15.897	< 0.001
$r^2 = 0.664$ F=252.713 Sig. $p =< 0.001$			

DISCUSSION

The first objective of this study is to examine the correlation between knowledge about musculoskeletal disorders and MSD. The results indicate that even when a large percentage of healthcare workers know about MSDs, it is significantly does not have an impact on their practice of MSD prevention. This finding is consistent with earlier research on MSD prevention at the workplace, which showed that, while knowledge is moderate, its application is inconsistent (Van Eerd et al., 2022). This finding identifies a knowledge gap regarding MSD risk factors, types of injuries, and preventive interventions. It would be important to narrow this gap with further training and awareness campaigns for staff and leadership (Van Eerd et al., 2022). Although HCWs have a high knowledge of musculoskeletal disorders (MSDs), they are usually unable to apply that knowledge when implementing practical MSD prevention. This may cause a disparity in the figures, which may be attributed to the work environments that staff are subjected to, especially in an emergency department. Workers in this setting come across critical cases and states urgently demanding their attention, with a core goal of delivering timely and best care to the patient. Therefore, effective communication on MSDs is warranted to promote improved interactions among colleagues and enhance team effectiveness (Greenet et al., 2012).

The European Agency for Safety and Health at Work and the National Institute for Occupational Safety and Health advocate for comprehensive training programs covering various aspects of MSD prevention. These programs aim to enhance healthcare workers' understanding, enabling the prompt identification and resolution of issues, thereby contributing to a safer work environment (Elements of Ergonomic Programs | NIOSH | CDC, 2020). On the other hand, most participants did not see the need to change how they work because of MSD injuries and believe that some health and safety rules can be overlooked to complete tasks safely. This lack of motivation to change may arise from various factors such as the organization's culture, lack of awareness, orperceived obstacles to making changes (Van Eerd et al., 2022). Under such conditions, employees will work in a pressured environment to continue doing things that will lead to work-related MSDs. If workers do not see themselves at risk or do not believe that modifying their work practices to prevent injury will prove effective, they are less motivated to change.

Concerning hypothesis 2, attitudes toward MSD and its prevention practices are strong. This implies that being positive about preventing MSD is a major predictor of carrying out activities for its prevention. There is a need to promote positive attitudes toward prevention of MSD for them to translate to best practices within healthcare settings. This finding is consistent with that of Karibasappa (2014), which reveals that respondents having a right working attitude showed a positive attitude among 34–49% toward the implementation of MSD prevention practices (Karibasappa, 2014; Rajeshwari et al., 2014). A study conducted on the attitudes towards MSD discloses the fact that almost all respondents realize their duty in identifying risks of MSD, and the role of education and training in this regard. Beyond that, workplace culture has much to say in as far as the practical utilization of preventatives is concerned. If an organization neglects doing anything against MSD or an unsupportive culture, well-educated personnel will hardly be able to practice preventative measures rightly. Effective leadership in combination with the right type of training can go a long way in the right direction. Awareness education for HCWs, continuous promotion of the safety culture, and extensive advocacy for preventive measures by leaders certainly work. However, there is that gap between knowledge and practice which can be filled with awareness campaigns and tailored training programs. For example, OSHA requires employers to provide a safe and healthful workplace. However, adherence to OSHA's regulations clearly defines the framework for preventing MSDs and enhancing workers' safety in healthcare facilities (Rani et al., 2016). A culture of preventing mishaps by following safety standards ensures that HCWs are guaranteed protection in healthcare facilities. Generally, findings bring out the fact that a positive attitude, detailed training and education, and availability of necessary resources are the key factors to be ensured for the successful prevention of MSDs in hospitals. Giving healthcare professionals and organizations the tools for safety and prevention can help develop a workforce in which their workplace is safer, healthier, and better overall.

STUDY IMPLICATIONS

The current study indeed emerges as an excellent contribution to the healthcare sector. Less research has been conducted in this industry regarding the prevention practices of MSDs compared to other industries like manufacturing, construction, or settings categorized as industrial. So, there lies a great opportunity for future researchers in this regard. Study participants were HCWs who work as government employees in a hospital emergency department. Indirectly, this allows the field to be contrasted with other health-related professions and compared for in-depth study by other researchers. The additional research, carried out in this organizational setting, may serve to further build upon past findings by improving the prevention strategies and knowledge base around MSDs, and it may directly benefit HCWs by improving productivity and job quality.

Implication for Management

Health policies and legislation significantly depend on the practice and performance of healthcare workers (HCWs). Keeping the practices of HCWs transparent regarding their efficient and timely services is necessary for the credibility of policies. When the practices regarding MSDs prevention are not carried out correctly, then not only does HCWs' health get affected, but also the purpose of policies is lost upon this ignorance. The efficacy of HCWs' capacities in dealing with patients is significant to ensure the policies are followed according to patient safety. Positive relationships

between HCWs and management promote adherence to policies and create an environment of organizational harmony. Organizational harmony positively contributes to regulatory compliance. The adaptability of HCWs to organizational changes is important for keeping policies relevant and applicable. Policies cannot be too strict and rigid; they must be modified from time to time to incorporate changes in healthcare practices that are occurring constantly without losing their effectiveness. Recent research has found the established significance of existing policies, which are silent on some specific healthcare issues, even in unfamiliar sectors.

Implications For Policies and Strategies

Policies and procedures of healthcare are essentials that can ensure the safety of patients and HCWs. The effectiveness of HCWs depends on their knowledge and attitude regarding preventing musculoskeletal disorders. Therefore, this means that to institute a policy effectively, the attitude and knowledge of MSDs among HCWs must be assessed. The hospital management can assess the knowledge and attitudes of the HCWs from the study insights toward prevention strategies. The results obtained from KAP studies are important insights that have tremendous implications when it comes to policy formulations in the MOH, particularly when setting stringent regulations for Musculoskeletal Disorders. Considering these findings, the MOH can develop general solutions to prevent MSDs in other occupational settings. In addition, working closely with organizations such as DOSH will help to make the regulations take effect. The MOH could use DOSH as a resource partner, which is more effective in implementing and ensuring preventive measures.

LIMITATIONS AND RECOMMENDATIONS FOR FUTURE STUDY

The study faced few limitations due to time constraints. The findings are limited by stratified random sampling and data collection from only one emergency department unit, which reduces the generalizability of the results. Given the time limitations, scope, and sample size, several recommendations are proposed for future research on interventions aimed at preventing musculoskeletal disorders (MSDs) among healthcare workers (HCWs). Future studies should extend the study duration and include more participants to uncover the long-term effects of occupational factors on MSDs in HCWs. This approach allows for a better exploration of trends, risk factors, and effectiveness of interventions across different population groups, job roles, and occupational settings. Incorporating longitudinal studies is also crucial to evaluate the relationships between occupational factors and the development of MSDs over time. This type of research allows for identifying causal relationships and effective interventions, providing evidence-based recommendations for reducing MSD risks and promoting musculoskeletal health in healthcare settings. Further research should also explore psychological, organizational, and sociocultural factors related to MSDs among HCWs. Evidence suggests that non-ergonomic factors, such as job satisfaction, psychosocial stressors, and organizational culture, play a significant role in the development of MSDs alongside physical workload. These factors should be considered in future research and intervention strategies.

CONCLUSION

A comprehensive understanding of healthcare providers' knowledge and attitudes towards musculoskeletal disorders (MSDs), as well as their adherence to MSD prevention practices, is essential

for promoting musculoskeletal health within clinical settings. The reviewed empirical literature highlights the importance of healthcare professionals' knowledge and attitudes in preventing, managing, and reducing symptoms related to MSDs. The balance between healthcare providers' knowledge and attitudes towards MSD prevention practices is crucial for fostering a culture of musculoskeletal health awareness and enhancing the well-being of healthcare workers. Further research is needed to explore the factors associated with MSDs, the effectiveness of interventions to prevent them, and ways to reduce their burden in healthcare settings. By addressing knowledge gaps, promoting positive attitudes, and implementing evidence-based practices, healthcare organizations can create a safer work environment and reduce the burden of musculoskeletal diseases among healthcare providers. With ongoing research and strategies to address workplace musculoskeletal exposures, better outcomes can be achieved for healthcare providers and patient safety.

ACKNOWLEDGMENT

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

REFERENCES

Abas, N. H., Zamzam, M. S. S., & Mohamad, H. (2020). Work-related musculoskeletal disorders (WMSDS) survey among workers at two precast concrete plants in Johor, Malaysia. *International Journal of Academic Research in Business and Social Sciences*, *10*(5), 843-856.

Abidin, N. Z., Rohani, J. M., Nordin, A. N., Zein, R. M., & Ayak, A. (2018). Financial impact and causes of chronic musculoskeletal disease cases in Malaysia based on social security organization of Malaysia claims record. *Int J Eng Technol*, *7*(3.24), 23-27.

Albeeli, A., Tamrin, S. B. M., Guan, N. Y., & Karuppiah, K. (2020). Musculoskeletal disorders and its association with self-reported productivity: A cross-sectional study among public office-workers in Putrajaya, Malaysia. *Malaysian Journal of Medicine & Health Sciences*, *16*(4).

Alias, A. N., Karuppiah, K., How, V., & Perumal, V. (2020). Prevalence of musculoskeletal disorders (MSDS) among primary school female teachers in Terengganu, Malaysia. *International Journal of Industrial Ergonomics*, *77*, 102957.

Amin, N. A., Nordin, R., Fatt, Q. K., Noah, R. M., & Oxley, J. (2014). Relationship between psychosocial risk factors and work-related musculoskeletal disorders among public hospital nurses in Malaysia. *Annals of Occupational And Environmental Medicine*, *26*, 1-9.

Brandl, C., Bender, A., Schmachtenberg, T., Dymke, J., & Damm, P. (2024). Comparing risk assessment methods for work-related musculoskeletal disorders with in vivo joint loads during manual materials handling. *Scientific Reports*, *14*(1), 6041. doi: 10.1038/s41598-024-56580-7.

Das, D., & Singh, A. K. (2024). Interactions between work-related factors, perceived fatigue and musculoskeletal disorders among handicraft artisans: Structural equation model analysis. *Ergonomics*, 1-17.

Diego-Mas, J. A. (2020). Designing cyclic job rotations to reduce the exposure to ergonomics risk factors. *International Journal of Environmental Research and Public Health*, *17*(3), 1073.

Ekhammar, A., Grimby-Ekman, A., Bernhardsson, S., Holmgren, K., Bornhöft, L., Nordeman, L., & Larsson, M. E. (2024). Prevention of sickness absence through early identification and rehabilitation of at-risk patients with musculoskeletal disorders (PREVSAM): Short term effects of a randomised controlled trial in primary care. *Disability and Rehabilitation*, 1-14.

Ephraim-Emmanuel, B. C., Ogbomade, R., Idumesaro, B. N., & Ugwoke, I. (2019). Knowledge, attitude and practice of preventing the occurrence of work-related musculoskeletal disorders among doctors in University of Port-Harcourt Teaching Hospital. *Journal of Medical Research and Innovation*, *3*(2), e000161-e000161.

Harithasan, D., Sean, L. P., & Singh, D. K. A. (2024). Unveiling the key elements of effective preventive strategies: Insights into addressing work-related musculoskeletal disorders among physiotherapists. *Research Square*, 1-26, https://doi.org/10.21203/rs.3.rs-4361768/v1

Isa, M. S. M., Omar, N., Salleh, A. F., & Salim, M. S. (2021). A literature review on occupational musculoskeletal disorder (MSD) among industrial workers in Malaysia. *Intelligent Manufacturing and Mechatronics: Proceedings of SympoSIMM 2020*, 1069-1079.

Kantasrila, R., Pandith, H., Balslev, H., Wangpakapattanawong, P., Panyadee, P., & Inta, A. (2024). Ethnobotany and phytochemistry of plants used to treat musculoskeletal disorders among Skaw Karen, Thailand. *Pharmaceutical Biology*, *62*(1), 62-104.

Khoshakhlagh, A. H., Al Sulaie, S., Mirzahosseininejad, M., Yazdanirad, S., Orr, R. M., Laal, F., & Bamel, U. (2024). Occupational stress and musculoskeletal disorders in firefighters: the mediating effect of depression and job burnout. *Scientific Reports*, *14*(1), 4649. doi: 10.1038/s41598-024-55468-w.

Krejcie, R. V., & Morgan, D. W. (1970). Determining sample size for research activities, educational and psychological measurement. *Educational And Psychological Measurement, 30*(3), 607-610.

Lop, N. S. B., Salleh, N. M., Zain, F. M. Y., & Saidin, M. T. (2019). Ergonomic risk factors (ERF) and their association with musculoskeletal disorders (MSDs) among Malaysian construction trade workers: concreters. *International Journal of Academic Research in Business and Social Sciences*, *9*(9), 1269-1282.

Maakip, I., Keegel, T., & Oakman, J. (2015). Workstyle and musculoskeletal discomfort (MSD): Exploring the influence of work culture in Malaysia. *Journal of Occupational Rehabilitation*, *25*, 696-706.

Moidunny, K. (2009). The effectiveness of the national professional qualification for educational leaders (NPQEL). *Unpublished Doctoral Dissertation, Bangi: The National University of Malaysia*, 1-789.

Ng, Y. M., Voo, P., & Maakip, I. (2019). Psychosocial factors, depression, and musculoskeletal disorders among teachers. *BMC Public Health*, *19*, 1-10.

Sekaran, U., & Bougie, R. (2016). *Research method's for business: A skill-building approach* (7th ed). Wiley & Sons.

Sekaran, U., & Bougie, R. (2013). Research methods for business (6th ed). Wiley & Sons.

Shamsudin, M. Z., Vijayakumar, V., Daud, M. Y. M., Adman, M. A., Arshad, M. A., & Mustaffa, M. J. (2016). Work-related musculoskeletal disorders (WMSDs) among industrial packaging workers in Malaysia. *Proceedings of UNISEL Bestari Research Projects*, 142-147.

Shoemaker, M. J., Gluch, C. J., Preston, K., Van Dam, A., & Fagan, M. (2024). Commentary on diagnosis of deep vein thrombosis in outpatients with musculoskeletal disorders: A survey of orthopedic and sports academies. *Cardiopulmonary Physical Therapy Journal*, *35*(3), 80-81.

Taib, M. F. M., Bahn, S., Yun, M. H., & Taib, M. S. M. (2017). The effects of physical and psychosocial factors and ergonomic conditions on the prevalence of musculoskeletal disorders among dentists in Malaysia. *Work*, *57*(2), 297-308.

Talapatra, S., Parvez, M., Saha, P., & Kibria, M. (2024). Assessing the impact of critical risk factors on the development of musculoskeletal disorders: A structural equation modelling approach. *Theoretical Issues in Ergonomics Science*, *25*(3), 343-368.

Tamrin, S. B. M., Yokoyama, K., Aziz, N., & Maeda, S. (2014). Association of risk factors with musculoskeletal disorders among male commercial bus drivers in Malaysia. *Human factors and ergonomics in manufacturing & service industries*, *24*(4), 369-385.

Tolera, S. T., Assefa, N., & Gobena, T. (2024). Global prevalence of musculoskeletal disorders among sanitary workers: A systematic review and meta-analysis. *International Journal of Occupational Safety and Ergonomics*, *30*(1), 238-251.