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## Review Article

# Knowledge and Risk Perceptions of Occupational Infections Among Health-care Workers in Malaysia



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## ABSTRACT

Health-care workers are at risk of exposure to occupational infections with subsequent risk of contracting diseases, disability, and even death. A systematic collection of occupational disease data is useful for monitoring current trends in work situations and disease exposures; however, these data are usually limited due to under-reporting. The objective of this study was to review literature related to knowledge, risk perceptions, and practices regarding occupational exposures to infectious diseases in Malaysian health-care settings, in particular regarding blood-borne infections, universal precautions, use of personal protective equipment, and clinical waste management. The data are useful for determining improvements in knowledge and risk perceptions among health-care workers with developments of health policies and essential interventions for prevention and control of occupational diseases.

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## 1. Introduction

Health-care workers (HCWs), whose occupations involve contact with patients and their body fluids, face a risk of exposure to occupational infections with subsequent risk of contracting diseases, disability, and even death. Doctors, nurses, laboratory technologists, and clinical waste handlers are continuously at risk of acquiring blood-borne infections such as human immunodeficiency virus (HIV)/AIDS and hepatitis [1]. Transmission of occupational infections may occur by inhalation route, ingestion of contaminated material, and accidental inoculation by a needle-stick injury (NSI). The pathogen infects the body either through skin wounds or through exposure of the mucous membranes [2]. Any HCW handling sharps such as scalpels and blood-collection devices is also at risk of self-inoculation or an NSI, and subsequent exposure to blood-borne pathogens.

Pruss-Ustun et al [3] reported in 2003 that there were 3 million percutaneous exposures to blood-borne pathogens among health workers worldwide. These were caused by contaminated sharps, such as syringe needles, scalpels, and broken glass. This report, published in the “WHO Environmental Burden of Disease Series, No. 3”, stated that about 40% of all hepatitis B and hepatitis C cases present in HCWs were attributed to sharps injuries. The report also showed that sharps injuries contributed to HIV infections among

HCWs. In Malaysia, comprehensive national data on the annual incidence of needle-stick and other percutaneous injuries among HCWs are not available.

A systematic collection of occupational disease data, especially occupational infections, is useful for monitoring current trends in work situations and disease exposures; however, the data are limited because of under-reporting. Data to determine perceptions of risk among work force are useful to understand the factors that influence safety behavior and compliance with safety requirements. The objective of this study was to carry out an exhaustive literature search on occupational infections among HCWs in Malaysia. The study also aims to review improvements in the knowledge and risk perceptions regarding occupational exposures to infectious diseases, especially blood-borne pathogens, in health-care settings with developments of health policies and essential interventions for prevention and control of occupational diseases.

## 2. Occupational disease notification

The priority in most occupational safety and health agendas is on preventing accidents at the workplace and less on occupational diseases. Occupational diseases are often under-reported; there are many reasons for the gross undernotification [4]. One of the main

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reasons is that they are usually less obvious compared with occupational accidents and injuries. Signs and symptoms of disease manifest long after the exposure to the pathogen. In some cases, the physician is not adequately trained to diagnose and detect an occupational infection.

A robust system for the notification, compilation, and analysis of data on occupational accidents and diseases should be an important part of a national policy on occupational safety and health. Occupational surveillance and data are useful for identifying exposure risk and developing effective strategies for improved workplace safety. Such information is critical for determining the key areas where priority should be given for the prevention and control of risks. Decreases in the incidence of occupational disease cases can indicate the effectiveness of prevention and control measures at the workplace. In most countries, including Malaysia, the actual incidence of occupational infections is not known.

Malaysia has made significant progress in implementing a comprehensive occupational safety and health framework that includes safety legislations, regulations, guidelines, and functional systems. However, there are still gaps in our occupational safety and health governance; for example, the reporting rates for occupational diseases can be significantly improved. Malaysia, like many countries across the world, is working to improve the occupational safety and health system for the identification, recording, and compensation of occupational diseases.

### 3. Occupational exposures to blood-borne pathogens

Several studies conducted in Malaysian health-care environments have shown that sharps and NSIs still occurred among medical officers, nurses, house officers or interns, and medical assistants [5–10]. The data from recent studies showed that less than 20% of individuals reported having experienced NSI, compared with earlier studies conducted between 5 years and 10 years ago, where the proportion of persons who had experienced NSI was between 20% and 30% [11–13]. The causes of NSI were lack of experience, unsheathing needle from cap, recapping needles, withdrawal of medication from ampoules, blood withdrawal, and performing procedures on patients such as minor surgeries and administering injections. Significant differences in the risk perception of infection among HCWs were reported from different hospital units, for example, intensive care units, nephrology hemodialysis units, and diagnostic laboratory. Most HCWs took extra precautions only for certain patients with known or suspected blood-borne diseases.

More recent studies also showed that the level of knowledge on blood-borne pathogen transmission, risk perception, standard precautions, and importance of using personal protective equipment (PPE) were high (>90%), and the majority of HCWs were immunized with hepatitis B vaccination. The studies showed that used needles were disposed of in sharps bins according to hospital policies. However, these studies also reported significant noncompliance to post-exposure protocols as well as under-reporting of NSI exposures by hospital staff. A significant high-risk group for NSIs even in recent years is medical students, whose clinical years of study require postings in hospitals. Min Swe et al [12] in 2014 reported that 19.9% of medical students in their study had experienced an NSI. Juni et al [13] in 2015 also reported that medical students were at high risk of blood-borne pathogen exposures, directly related to knowledge gaps caused by inadequate training and inappropriate perceptions, and attitudes toward universal precautions. Interventions and prevention efforts are important to protect HCWs and medical students, such as training in proper needle handling, universal precautions, and hospital policies on post-exposure prophylaxis of NSIs and sharps injuries. Health-care establishments should also stock and supply adequate

PPE and clothing, and provide immunizations for hepatitis B virus to protect HCWs.

### 4. Challenges in reporting occupational diseases

In Malaysia, the notification of occupational diseases is required by the Occupational Safety and Health Act, 1994. The notification process allows investigation of such cases by the Department of Occupational Safety and Health (DOSH) [14]. In 2004, the Notification of Accident, Dangerous Occurrence, Occupational Poisoning and Occupational Disease Regulations 2004 reinforced this responsibility of all employers to report all cases of occupational-related diseases to the DOSH. Under the Notification of Accident, Dangerous Occurrence, Occupational Poisoning and Occupational Disease Regulations Regulation, all attending medical practitioners who suspect or diagnose a case of occupational disease must notify to the Director General of the DOSH, using prescribed forms [15].

In the Ministry of Health, the Occupational Health Unit complements the functions of the DOSH by compiling data on occupational injuries and diseases. The notifiable conditions include infections due to exposure to biological agents besides poisoning, respiratory conditions, cancer, and diseases related to exposures to various hazards. In addition, some information is also captured from the mandatory notification of infectious diseases that is required under Schedules 1 and 2 of the Prevention and Control of Infectious Diseases Act, 1988. Notification is via an electronic reporting system known as the Communicable Diseases Control Information Systems from the public health facilities consisting of health clinics, outpatient departments, and hospitals, and also from private hospitals and general medical practitioners. In 2005, the DOSH published the “Guidelines on Occupational Health Services” that outline the mechanism to implement occupational health services and functions of an occupational health services unit in an organization, and qualification and roles of various occupational health practitioners involved in delivering the services [16].

Occupational diseases reported to the DOSH have steadily increased since 2005. The increase in the number of cases of occupational diseases has been the consequence of increased awareness and efforts to improve the systems for their recognition, compensation, and training of physicians. Compared with occupational accidents, the improvement of occupational disease reporting is often more complex and requires technical efforts. Frequent campaigns through the mass media, seminars, and training workshops are useful. Training of physicians is important to increase awareness of their legal obligation to notify diseases under the Occupational Safety and Health Act. General medical practitioners, who are often the first point of contact of occupational disease victims, need to be trained regarding recognition and diagnosis of work-related diseases. Victims of an occupational infection exposure need the cooperation of their employers for reporting their diseases to receive proper treatment and compensation, and need practical support from occupational health service providers for proper diagnosis, treatment, and compensation.

Regular monitoring of the working environment, and medical and health surveillance of workers, enable employers to prevent as well as report cases of occupational infections. Health surveillance or monitoring of the working environment helps determine workers' exposure to health hazards and whether a particular infection contracted by workers is related to the work they perform.

### 5. Clinical waste management

Clinical waste from health-care settings include sharps, blood and body fluids, excreta, human tissues or body parts, and other

infectious materials that have to be handled safely by trained persons. All persons handling clinical waste at any stage are potentially at risk. In Malaysia, clinical waste is classified as scheduled waste that is controlled under the Environmental Quality (Scheduled Wastes) Regulations, 2005. In 2009, the Department of Environment, in consultation with the Ministry of Health, developed the “Guidelines on Handling and Management of Clinical Wastes in Malaysia” [17]. These comprehensive guidelines for health-care facilities outline description and categories of clinical waste, safe handling, labeling, treatment, and disposal with proper documentation. A study by Nazli et al. [18] showed that inadequate training among HCWs and inadequate information on clinical waste management resulted in improper disposing of clinical waste. Adequate training is important to ensure safety awareness and knowledge on the proper procedures for clinical waste management in hospitals. The training should cover on-site segregation, packaging, storage, transport, treatment, and disposal of the clinical waste.

## 6. Conclusion

Workers and management have to continuously strive together to ensure a healthy work environment that will improve, protect, and promote the health and safety of all workers. The “WHO Global Plan of Action” on workers’ health encourages all member states to develop national programs for health workers’ occupational health and for promoting immunization of health workers against hepatitis B [19]. The World Health Organization global burden of disease from sharps injuries showed that 37% of hepatitis B among health workers was the result of occupational exposure. Hepatitis B virus infection is 95% preventable with vaccination, but less than 20% of health workers in some parts of the world have received all three doses required for immunity. NSIs account for 95% of HIV occupational seroconversions, although less than 10% of HIV among health workers has been reported to occur from exposure at work [20]. Risk of exposure to hepatitis, HIV, and blood-borne viruses and bacteria can be prevented with economic and practical measures.

In Malaysia, HCWs at the frontline of patient care are supported by various initiatives by the Ministry of Health. These include education and training on workplace safety, adequate stockpile and supply of PPE, and safety-engineered devices to conduct the work, as well as safe handling and disposal of sharps, and clinical waste management policy [21]. Various guidelines have been developed by the Ministry of Health. These are AIDS series documents such as: Guidelines on the Management of Infected Health Care Workers, Ministry of Health, Malaysia, as early as 1995 [22]; Standard Precaution, AIDS/STI Section, Ministry of Health, Malaysia, in 2002 [23]; Guideline on Blood-borne Viral Infections [Including HIV, HBV and HCV], Malaysian Medical Council, Malaysia, in 2011 [24]; and the Guidelines for Oral Health care Practitioners Infected with Blood-borne Viruses, Ministry of Health, Malaysia, 2014 [25]. In health-care settings, HCWs are provided with an adequate supply of PPE that include sterile disposable latex and nitrile gloves, gowns, aprons, and surgical masks. The “Standard Precautions” pocket guideline developed by the Ministry of Health as early as 2002 outlines the appropriate use of PPE.

The hepatitis B immunization program for HCWs was launched by the Ministry of Health in 1989. Post-immunization screening was implemented in 2006 to ensure the immunity status of the HCWs. The Sharps Injury Surveillance Program was another initiative by the Ministry of Health for the notification and management of staff who encountered sharps injuries at the workplace. The program aimed at compilation of data on sharps injuries among HCWs and developing a sharps injury registry [26]. The registry ensures that injured HCWs are provided with effective

medical attention and interventions. However, a continuous promotion of safety culture is needed. Studies among HCWs in Malaysia showed that HCWs were still at risk of sharps injuries while performing surgical procedures, blood collection, and intravenous cannulation. These studies showed that HCWs were still not adhering to safety policies, nor complying with post-exposure precautions and protocols. Staff exposures were still under-reported due to ignorance of hospital policies. Although HCWs were aware of standard precautions, these are not fully practiced. Employers have to enforce the universal precaution practices, and provide regular training and education for all staff. The practice of standard precautions for infection control needs to be strictly adhered to by all HCWs at all times in patient management, irrespective of the patients’ infection status. Occupational exposures require immediate medical attention, and employers should encourage their workers to report an occupational exposure. Standard operating procedures should be available on reporting protocols and details made known to all staff. Occupational exposures may not be reported because of ignorance of these procedures as well as lack of awareness on the risk of blood-borne pathogen exposure. Other reasons for not reporting occupational exposures by HCWs could be due to the fear of punitive action, doubts of their employment status, and social stigma if they were confirmed to have HIV or hepatitis from an infected patient.

## Conflicts of interest

The authors declare that there is no conflict of interest.

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