

# A Review of Occupational Injury Research In Malaysia

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## ABSTRACT

A literature review of 16 papers on occupational injury research in Malaysia published during a 13-year period from 2000-2013 was carried out. The objective of this review and article selection was based on relevance to the research theme and mention of areas for future research. Most of the publications have focused on descriptive epidemiology, management practices, worker's knowledge, attitude, training, and rehabilitation services. The transportation, agriculture and construction sectors were found to be the most hazardous sectors and would benefit the most from Occupational Safety & Health (OSH) research and interventions. There is a strong need to develop a national injury surveillance system and also a mechanism to ensure adherence to the Occupational Safety & Health Act(OSHA) 1994. Detailed description and identification of risk factors for occupational injury in the environment, including machinery and equipment used was generally lacking. Future research on occupational injury should focus on surveillance to determine the magnitude of occupational injuries, determination of risk factors, identifying cost-effective interventions (such as enforcement of OSHA regulations), and assessment of rehabilitation services. Relevant government agencies, universities, corporate sector and occupational safety organizations need to play a proactive role in identifying priority areas and research capacity building. Funding for occupational injury should be commensurate with the magnitude of the problem.

## INTRODUCTION AND METHODS

The Organization for Economic Co-operation and Development (OECD) defines occupational injury as "Any personal injury, disease or death resulting from an occupational accident". Worldwide, there are about 100 million cases of occupational injury each year,<sup>1</sup> resulting in 350,000 deaths.<sup>2</sup> Developing countries have the highest injury fatality rate.<sup>3,4</sup> Occupational safety and health is important for moral, legal and financial reasons. We identified all publications on occupational injury research in Malaysia from year 2000 to year 2013 through a database dedicated to indexing all original data relevant to medicine in Malaysia using the medical subject heading (MeSH) Occupational Injuries.<sup>5</sup> Sixteen publications were selected for inclusion in this review based on relevance to the research theme and mention of areas for future research.<sup>5</sup> A summary of the findings and recommendations was made. The objective of this review article is to summarize what has already been published in Malaysia on Occupational

Injuries, to identify gaps in knowledge, policy and to explore potential areas for future research.

## SECTION 1: REVIEW OF LITERATURE

### Occupational Injury Prevention, Surveillance and Rehabilitation in Malaysia

In Malaysia, the Department of Occupational Safety and Health (DOSH) under the Ministry of Human Resource is responsible for enforcing the law on occupational safety and health, which was introduced in 1994. The Occupational Health Unit conducts surveillance activities. The notification of occupational poisonings, diseases and injuries is done by hospitals and clinics within the Ministry of Health. Malaysia's Social Security Organization (SOCO), also known as *Pertubuhan Keselamatan Sosial* (PERKESO), was set up in 1971 to provide socioeconomic security for non-government employees. The Employees Social Security Act 1969 mandates all employers to insure their employees for workplace diseases or injuries by contributing to SOCO. Data obtained from SOCO are more comprehensive than those obtained from Malaysia's Department of Safety and Health.<sup>6</sup> Up till 2006, SOCO covers 67% of total formal workforce within Malaysia.<sup>7,8</sup> SOCO provides employment injury insurance schemes, disability benefits, rehabilitation programs and certified training programs for disability assessment (CMIA).

Workers compensation for injury is provided by both the government and private sectors. The Persons with Disability (PWD) Act 2008 empowers PWDs to obtain various privileges such as the right to special barrier-free access to public facilities. The Labor Department has various vocational programs for the employment of PWDs.

SOCO introduced the Return-To-Work program(RTW) in the year 2007 to rehabilitate workers suffering from injuries to achieve their maximum functional capacity at work. The RTW process can be divided into 4 phases: (i) Off duty, (ii) Re-entry, (iii) Maintenance and (iv) Advancement. The RTW programs are managed by the Ministry of Human Resource.

### Epidemiology

Adinegara *et al.* conducted a secondary data analysis of the SOCO database to examine the fatal occupational injuries in Malaysia.<sup>7</sup> This refers to the death of an employee in the workplace as a result of any injury occurring during employment. This also included death occurring outside the workplace while performing official duties as an employee.

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This analysis had revealed a total of 2822 fatal occupational injuries with an average annual incidence of 9.2 fatal occupational injuries per 100,000 workers. This figure is higher than that in the United States (4.0 per 100,000 [US Bureau of Labor Statistics, 2006]) and Great Britain (0.71 per 100,000 [Health and Safety Executive UK, 2006]). From the year 2002 till 2006, there was a 16% decline in the annual number and 34% decline in the annual incidence of fatal occupational injury. Older workers in the 60+ and 50–59 age groups had the highest incidence of fatal occupational injury. Indians had the highest average annual incidence compared to Malays or Chinese (17.6 vs 8.7 vs 8.1 per 100,000 workers). Men had a 12 times higher annual average incidence compared to women (13.8 vs 1.2 per 100,000 workers) and the authors suggested it is probably because men are more likely to have high-risk jobs. The transportation sector reported the highest incidence (35.1 per 100,000), followed by the agriculture (30.5 per 100,000) and construction (19.3 per 100,000) sectors. These accidents involved transport and lifting equipment (53%), working-environment (22%) followed by machines (5%). The most common fatal occupational injuries were fractures (15%), unspecified wounds (8%), concussions and internal injuries (6%), and contusions and crush injuries (4%). The main causes of these injuries were falling from height (28%), being struck by moving objects (17%), and struck by falling objects (9%).

Adinegara *et al.* also conducted a secondary data analysis of the SOCSO database to study the non-fatal occupational injuries in Malaysia.<sup>8</sup> Between the years 2002–2006 there were a total of 249,904 non-fatal occupational injuries occurring in 211,875 individuals. There was a decrease in both annual number and annual incidence by 37% (62,737 to 39,366) and 51% (11.4 to 5.6 per 1000 workers [p trend < 0.001]) respectively. The agriculture sector had the highest incidence (24.1 per 1,000), followed by the wood-product manufacturing (22.1 per 1,000) and non-metallic industries (20.8 per 1,000). Highest incidence was seen in the 40–49 year age-group (7.9 per 1000) followed by the 30–39 year age-group (7.5 per 1000) and 19–29 year age-group (7.4 per 1000). Those more than 60 years of age had a lower incidence. The authors suggested that these employees were probably stationed in senior positions which are at a lower risk. Men had a higher average annual incidence (10.7 per 1000) compared to women (3.6 per 1000). Indians had the highest average annual incidence (21.1 per 1000) followed by Chinese (8.9 per 1000) and Malays (6.8 per 1000). Most common injuries were unspecified wounds (55%), superficial injuries (10%), fractures (10%), strains and sprains (7%), concussions and other internal injuries (4%), contusions and crush injuries (4%), dislocations (2%), burns (2%), and amputations (2%). The main causes of these injuries were being struck by moving objects (33%), falling from height (19%), and trapped between objects (17%). These injuries resulted from accidents from within the working-environment (41%), during handling of machines (20%) and during exposure to materials and substances (12%).

There were several limitations Adinegara *et al.* noted in the SOCSO database.<sup>7,8</sup> The database was set up for monitoring the total number of employee related claims/benefits and

was not specifically designed for surveillance. The database does not include data from all categories of employees. Data from four categories of employees are excluded, namely: self-employed, foreign workers, government employees and domestic servants. About half of the reported injuries (47%) were classified as “unspecified”, meaning there is no specific classification suitable for these cases. Though a worker could have died of multiple injuries, only one entry is allowed for classification of injuries. The database does not contain data from certain industries such as mining and quarrying. The database has a risk of under-reporting less severe injuries because willingness-to-report depends in part upon the discretion of the workers. Hence, less severe injuries often go unreported. The authors suggested improvements to the current SOCSO database in order to increase its utility, especially for prevention purposes. Reporting of all injuries (including those less-severe ones) should be made mandatory by SOCSO. Some of the classifications within SOCSO database, such as type of injury, need to be revised to avoid misclassification. A national injury surveillance system (specifically tailored for occupational health surveillance) should be developed to include all categories of employees.

Al-Husuny *et al.* studied work-related hand injuries (WRHIs) in Hospital Universiti Kebangsaan Malaysia (HUKM).<sup>9</sup> The authors found that 24.9% of industrial accidents were WRHIs and 30% of all occupational accidents seen in the emergency department involved the hands. This study found a significant association between the severity of WRHIs and the locations of injury, mechanisms of injury, sources of injury and sectors of industry. WRHIs occurred most commonly in industries such as manufacturing, construction and food preparation. Seventy percent of hand injuries were caused by operating machines. Machine operators were found to be 26 times more prone to experience severe WRHIs. Fifty four percent of workers with WRHIs were from metal machinery industry. Employees in this industry had an 8 fold higher risk of sustaining severe WRHIs.

Abdullah *et al.* also conducted a study on 57 workers admitted to HUKM for acute hand injuries sustained at work.<sup>10</sup> The vast majority (93%) of workers were male. About half (48%) of the workers were between 25 to 35 years old. The right hand was more often affected compared to the left. Most of the injuries involved the fingers. More injuries occurred on the weekends. Lacerations were the most common injury followed by fractures and crush injuries.

Anuar *et al.* conducted a 5-year survey on laboratory-acquired injuries in 3 medical laboratories (Hospital Kuala Lumpur (HKL), HUKM, and Pusat Perubatan University Malaya (PPUM)).<sup>11</sup> The average annual incidence was 2.05 per 100 full-time equivalent (FTE) employees which is lower than that in the United States (2.1 per 100 FTE, BLS 2006). The annual incidence rate in each individual medical laboratory is 2.04 per 100 FTE (HKL), 2.07 per 100 FTE (HUKM) and 2.04 per 100 FTE (PPUM) employees, respectively. From year 2001 to year 2005, the most common injuries were cuts by sharp objects (24 cases, 25.3%) followed by exposure to biohazards and chemical substances (18 cases, 19.9%), needle-prick injuries (16.8%), fire (8.4%), falls/slips (6.3%), gas leak (1 case) and locked in a cold room (1 case). There was an increasing

annual incidence from the year 2001 to year 2004; however, it decreased in the year 2005. The authors attributed this reduction to the fact that these laboratories were seeking accreditation with the relevant agencies and had hence improved their safety practices. This study helped to identify those areas in laboratory safety that needed improvement.

Dayang *et al.* analyzed accidents in the construction industry which were reported to the Department of Occupational Safety and Health (DOSH), Social Security Organization (SOCSCO) as well as the Construction Industry Development Board (CIDB).<sup>12</sup> The authors remarked that the construction sector was a highly hazardous industry and that SOCSCO recorded an increasing incidence of injuries which had resulted in permanent disabilities and fatalities from year the 1996 till 2008. The Department of Occupational Safety and Health (DOSH) under the Ministry of Human Resources recorded an increase in the number of accidents within the construction industry, with severe and fatal accidents occurring every month in the years 2007 and 2008 (17 cases in the year 2007 and 12 cases in the year 2008).

Htay *et al.* conducted a cross-sectional study on the profile of injuries in villages within the Jasin district of Melaka.<sup>13</sup> The study showed that 56% of villagers reported sustaining injuries in the one-year period. Home injuries were the most common (60.2%), followed by road traffic injuries and occupational injuries. Falls were the most common type of injuries at home and mostly occurred in the evening. Road injuries most commonly occurred in the evening and at night. The extremities were the most-severely injured. Most of the injured villagers preferred to seek treatment from the government healthcare facilities.

Jegatheswaran *et al.* studied the occupational accidents among migrant contract workers in the furniture industry.<sup>14</sup> Migrant contract workers were found to be more productive and had a lower incidence of occupational injuries than their local counterparts. The authors attributed this to a better compliance with occupational safety and health practices.

Zainal *et al.* conducted a case-control study on occupational accidents among the Royal Malaysian Navy personnel in Lumut.<sup>15</sup> This study showed that the Malays had the lowest incidence of injuries compared to personnel of other races.

### Prevention and Management

Adinegara *et al.* conducted a study on fatal and non-fatal occupational injuries and found a decreasing annual incidence of occupational injuries.<sup>7,8</sup> The authors attributed this to a more organized workplace, and an increased attention to safety and health practices in the workplace. The government had allocated additional resources under the 9th Malaysia plan (2006 – 2010) for the enforcement of OSHA 1994. However, the mechanisms to ensure universal adherence to this regulation are lacking.

Ahmadon *et al.* published a review on “Occupational Safety and Health Management Systems (OSHMS)”.<sup>16</sup> They concluded that a better understanding of OSHMS helps in its application and enforcement of legislations.

Hassan *et al.* studied the influence of management practices on safety culture and found that organizations with good safety practices had fewer occupational injuries.<sup>17</sup> Such organizations benefited through a reduced loss-of-work hours and amount of compensations offered for accidents. Employees are hence more motivated and this will increase the productivity of the organization. This study also revealed that the attitude of individual employees influenced the incidence of occupational injuries. The authors suggested that further studies on the relationships between workers’ safety awareness, risk perceptions, participation in safety committees and the incidence of workplace injuries.

Dayang *et al.* suggested that it was the employer’s negligence that was responsible for the occurrence of accidents within the construction sector.<sup>18</sup> The Construction Industry Development Board came up with a Master Plan for Occupational Safety and Health within the Construction Industry. The plan helps all stakeholders to strengthen their OSH activities. This master plan focuses on six areas as identified by the National OSH committee for the construction industry. These six areas are (i) Enforcement & Legislation, (ii) Education and Training, (iii) Promotions, (iv) Incentives & Disincentive, (v) Standards and Research & (vi) Development and Technology.<sup>10</sup> Similar plans need to be developed for other high-risk occupational areas.

Ali *et al.* found that only a third (33.6%) of workers received OSH training before or within a month of starting work.<sup>19</sup> This study also found that only 38.9% of workers that felt that they needed PPE were given so by their employers. The authors suggested further research to identify the reasons for the lack of risk reduction practices in the workplace.

Lugah *et al.* conducted a survey to assess OSH knowledge among healthcare professionals.<sup>20</sup> About a third (34.2%) of respondents had a good knowledge of OSH. Doctors had a better knowledge on OSH compared to other healthcare workers. Nurses and administrative staff had the poorest knowledge on OSH. Administrative officers usually represent employers within the OSH committee and this may lead to a less emphasis on OSH within the workplace. This survey also showed that healthcare workers were most knowledgeable about personal protective equipment (PPE) (mean score of 72.0 %) compared to other areas such as the general OSH (58%), legislations (57%), and occupational hazards (64%). The authors suggested for more training workshops to promote OSH knowledge.

Abdullah *et al.* made some recommendations to reduce occurrence of occupational hand injuries.<sup>10</sup> The authors suggested for a proper working technique, a conducive working environment and wearing of protective gadgets. They suggested for a longer period of rest for workers since fatigue may reduce attention to safety practices.

Jegatheswaran *et al.* suggested improving workforce psychology to improve workers attitude towards OSH, and to reduce the rate of occupational accidents.<sup>14</sup>

Htay *et al.* had recommended environmental and behavioral modifications together with community participation at a district level to prevent injuries at home.<sup>13</sup>

Chan *et al.* reviewed the occupational rehabilitation services in Malaysia and Singapore.<sup>21</sup>

Efforts to rehabilitate injured workers are generally lacking in Malaysia. Publications on occupational rehabilitation are scarce. The authors suggested that the Ministry of Health (MOH) rather than the Ministry of Human Resources should be responsible for providing occupational rehabilitation services. MOH has more personnel and expertise to provide occupational rehabilitation services. However, the authors recommended that their clinical skills and knowledge needs to be enhanced. There should also be more awareness among employers and funding for provision of occupational rehabilitation services. A closer cooperation between various ministries and departments is needed to improve the delivery of occupational rehabilitation services.

Murad *et al.* conducted a study to assess the relationship between occupational competence (OC) and emotional health among injured workers participating in the Return To Work (RTW) programs.<sup>22</sup> The results showed that injured workers had a significantly lower OC and a significantly higher NES (Negative Emotional States) especially in the off duty and re-entry phases. This study also showed that lower levels of OC were associated with higher levels of NES. The authors suggested that the RTW programs should focus more on OC and NES and not just on physical defects. The authors also suggested that psychologists and occupational therapists should be given a more active role in the RTW programs.

Rozali *et al.* reported a case study of decompression illness in a diver working for a private company.<sup>23</sup> He developed decompression illness when he ascended suddenly from a depth of 48 meters because his tank ran out of air. The authors recommended that all decompression illness should be notified. All divers should be registered with SOCSO.

## SECTION 2: RELEVANCE OF FINDINGS FOR PRACTICE AND FUTURE RESEARCH DIRECTION

Malaysia is a developing nation undergoing rapid industrialization. OSH practices play an important role in improving organizational efficiency by reducing labour cost and loss-of-work hours due to injuries. They, therefore, have a significant impact on the national economy. Descriptive research helps in identifying the magnitude and impact of occupational injuries while analytical studies on practices of both workers and management helps to examine the causes of injuries with a view to develop preventive measures.

The National Institute for Occupational Safety and Health (NIOSH), United States has recommended an occupational research agenda encompassing the traditional public health model.<sup>24</sup> This includes (a) injury surveillance to identify and prioritize the magnitude of the problem (b) analytic research to establish risk factors and causative mechanisms (c) identification of effective strategies or developing new strategies for prevention (d) effective intervention through widespread communication, enforcement and technology transfer and (e) evaluation of interventions.

Further research should also focus on safety practices and enforcement of OSHA in high-risk industries such as transportation, agriculture and construction. Pilot interventions should be implemented and evaluated for widespread implementation. Studies of hazards in the environment (including machinery and equipment) should be encouraged and preferably carried out by the concerned industries.

Standard operating procedures for the proper handling of industrial equipment should be evaluated for feasibility and compliance. The efficacy of standard safety practices such as rotation of workers in hazardous work areas should be evaluated.

In conclusion, research on occupational injury in Malaysia is generally lacking and needs to be strengthened. Future research should focus on high-risk industries (agriculture, construction and transportation), Future occupational management systems and the role of a safer design of the environment including equipment and machinery. The effectiveness of OSHA should be evaluated and measures to further implement it should be developed. Comparative research into the effectiveness of occupational safety practices in our country with other developed nations will be helpful.

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