

THE PREVALENCE AND ASSOCIATED FACTORS OF OCCUPATIONAL INJURIES IN DEVELOPING COUNTRIES

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Occupational injuries cause 1.1 million deaths worldwide annually; this is equal to the global annual deaths from malaria. This study aims to determine the prevalence and associated factors of occupational injury in developing countries. A narrative literature review was applied. The study reviewed 304 documents to select 24 fulltext, peer-reviewed papers published online through Pubmed, Google scholar, and specific websites run by WHO, CDC, and ILO, and aimed to assess the prevalence and associated factors of occupational injury. The study found that the prevalence of occupational health in developing countries ranged from 24.1% to 80%. The prevalence of occupational injury in construction workers and waste collectors were nearly the same, with 38.3 to 46.7% and 34.3 to 43.7%, respectively. The prevalence of health care worker occupational injury was the highest, from 40.4 to 80%. The factors found to be associated with occupational injury were gender, marital status, education, work experience. It is necessary to evaluate and control these factors in order to prevent occupational injuries in developing countries.

Keywords: Occupational injuries; developing countries, associated factors

I. INTRODUCTION

Approximately 45% of the world's population and 58% of the population over 10 years of age belong to the global workforce. A healthy workforce is vital for sustainable social and economic development on a global, national and local level. The health status of the workforce in every country has an immediate and direct impact on national and world economies.¹

According to ILO,² an occupational injury is defined as any personal injury, disease or death resulting from an occupational accident; an occupational injury is therefore distinct from an occupational disease, which is a disease

contracted as a result of an exposure over a period of time to risk factors arising from work activity. It has been estimated that worldwide there are more than 350,000 workplace fatalities and more than 270 million workplace injuries annually. Occupational injuries resulted in the loss of 3.5 years of healthy life for every 1,000 workers. 300,000 of the occupational injuries resulted in a fatality.³

Each year, work-related injuries kill an estimated 1.1 million people worldwide, which roughly equals the global annual number of deaths from malaria.⁴ Total economic losses due to occupational illnesses and injuries are enormous. According to the International Social Security Association, the financial burden of compensation, health care, rehabilitation and invalidity is huge: a sum equivalent to 4 percent of world GDP for work injuries alone. For some developing countries, the cost can

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be as high as 10 percent of GDP.⁵ However, so far, the method to measure occupational stress among developing countries has not been standardized. Many studies have assessed the relationship between associated factors and the rate of occupational injuries but not on comparable scales. Therefore, this study focused on describing the prevalence and the associate factors of occupational injuries in developing countries. The aim of the study is to provide evidence for further studies in order to prevent and reduce the prevalence of occupational injuries in developing countries.

II. METHODS

1. Research subjects

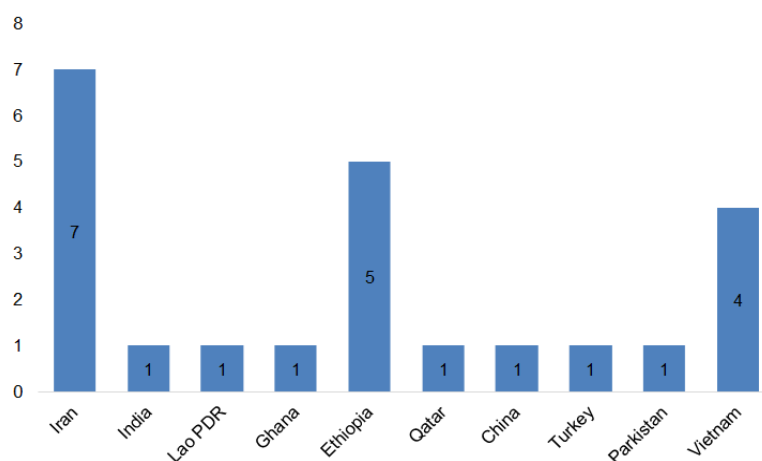


Figure 1. Number of studies by region/country

Study variables: In this study, we collected studies' general information: title, authors, name of journal, sample size, subject occupation, region/country, study design. In addition, the data on causes of occupational injuries, characteristics of occupational injuries, preventive measures of occupational injuries and impact of occupational injuries were collected. The key variables included occupational injuries and types of occupation.

3. Data analysis

Data was extracted and classified by

This study was focused on studies related to occupational injuries in developing countries.

2. Method

For international studies, we searched a combination of key words such as: "occupational injuries" or "occupational accidents" and "developing countries" on Pubmed, Google Scholar, Cochrane.

For Vietnamese studies, we searched key words such as: "tai nan nghe nghiep", "tai nan lao dong", and "cac nuoc dang phat trien" on Integrated Data Center of Ministry of Health and Vietnam Journal of Preventive Medicine.

The study reviewed 304 studies to select 24 studies related to occupational injuries in developing countries.

Excel software, then analyzed by STATA 12 software. Descriptive analysis was applied to describe the prevalence and associated factors of occupational stress in developing countries.

4. Ethics

All studies used were published and data can be used for researching purposes. The proposal of this study has been approved by the Scientific Committee of Institute for Preventive Medicine and Public Health, Hanoi Medical University dated in March 2018.

III. RESULTS

Table 1. Prevalence of occupational injury by occupation

Occupation	Number of studies reported	Prevalence of occupational injuries
Construction workers	2	38.3 – 46.7%
Waste collectors	3	34.3 – 43.7%
Health care workers	4	40.4 – 80%
Others	3	24.1 – 29%
Total	12	24.1 – 80%

The prevalence of occupational injury in construction workers and waste collectors were nearly the same, with 38.3 to 46.7% and 34.3 to 43.7%, respectively. The prevalence of health care worker occupational injury was the highest, from 40.4% to 80%.

Table 2. Characteristics of occupational injuries (%) by gender

Occupation	Number of studies reported	Male	Female
Construction workers	6	62.9 - 100%	0 - 37.1%
Waste collectors	3	16.3- 28.8%	71.2 – 83.7%
Health care workers	4	35.8 – 55.9%	44.1 – 64.2%
Others	11	76.97 – 98.2%	1.8 – 23.03%
Total	24	16.3 – 100%	0 – 83.7%

The majority of construction workers were male, with the percentage ranged from 62.9 % to 100%. There was a large number of waste collectors who were female, with the proportion ranging from 71.2% to 83.7%. The percentage of males and females in health care occupations were nearly similar with 35.8 – 55.9% and 44.1 – 64.2%, respectively.

The above table shows that the majority of injured workers in all of the occupations were married. The category of second-most injuries was single workers. Very few workers were recorded other marital statuses (i.e. separate, widow and divorced).

Table 3. Characteristics of occupational injuries (%) by marital status

Marital status	Occupational injuries							
	Construction workers		Waste collectors		Health care workers		Others	
	NB of studies reported	%	NB of studies reported	%	NB of studies reported	%	NB of studies reported	%
Single	4	24.8 – 58.3	2	21.8 – 24	1	48.4	2	10 - 28.95
Married	4	34.9 – 75.2	2	52.8 – 58.4	1	46.2	2	65.13 - 90
Widowed	4	1.4 – 6.8	2	6.6 – 9.5	1	1.2	1	3.29
Separated	4	1.4 – 6.8	2	10.3 – 12.7	1	1.2	1	1.8
Divorced	4	1.4 – 6.8	0	NA	1	3.0	1	2.63

Table 4. Characteristics of occupational injuries (%) by education

Occupation	Number of studies reported	Occupation injuries by education
Construction workers	2	Illiterate 4.1 – 6.0% Primary school 20 – 40.6% Secondary school 27 - 38.2% High School 14.4 - 30.5% ≥Diploma 6.4%
Waste collectors	3	Illiterate 42% Primary school 22.2 – 54.9% Secondary school and above 23.5 – 28%
Health care workers	1	Primary school 3.5% Secondary school 3.0% Technical and vocational school 3.9% Diploma 18.5% Degree and above 71.1%
Others	5	Illiterate and primary school 49.34 - 54.8% Secondary school 19.5 - 30.92% High school 19.74%

It is clear from the table that half of workers among construction, waste collector, textile factory workers, etc. held education levels that were secondary school level or lower. There was a small number of workers whose level of education was completion of high school and above. However,

among health care workers, two thirds of the injured had a high school degree and above; only 3.5% of cases did not graduate from high school.

Table 5. Characteristics of occupational injuries by work experience

Occupation	Number of studies reported	Occupation injuries by work experience
Construction workers	2	<= 2 years 65- 84.7% > 2 years 15.3 – 35%
Waste collectors	3	<5 years 30 – 56.2% ≥ 5 years 43.8 – 70%
Health care workers	3	<5 years 70.4 – 71.1% 5 - 10 years 13.2 – 29.6% >10 years 15.7%
Others	3	<5 years 21.36 – 55.8% 5-10 years 32.5 – 78.64% >10 years 11.7%

The above table shows that the proportion of occupational injuries among workers who had more years work experience was lower than ones had less than experience, except for waste collectors. Among waste collectors, 43.8 – 70% of injured workers had 5 years of work experience and above.

IV. DISCUSSION

Regarding the characteristic of occupational injuries by gender, the majority of injured construction workers were male. Likewise, the male proportion of injuries in other occupations (i.e. fishermen, railway workers, miners, port workers) were from 76.7 to 98.2%. This might be explained by the notion that male employment is still clustered in certain occupations such as heavy industry and construction . For instance, construction work (building houses, road, workplaces, and repairing and maintaining infrastructures) is a dangerous land based job.⁶ This includes many hazardous tasks and conditions such as working at the following conditions: height, excavation, noise, dust, power tools and equipment, so men represented a higher risk of occupational injuries than women.

The majority of occupational injuries among workers in all of the occupations were married. Specifically, the frequency of occupational

injury among the married workers were higher than single ones, which might be attributed to mental and family problems. The main causes of human errors are complexity, stress, work environment, fatigue, education and experiences.⁷ Stress and fatigue can be higher among the married workers than the single ones because of more responsibilities in life, children, leading more unsafe actions resulting in accidents.⁸

There is a significant inverse relationship between unsafe behaviors and level of education. With the increasing levels of education, unsafe actions are reduced. High rates of unsafe actions among people with low literacy could be due to the following reasons: low level of knowledge and lack of awareness about unsafe actions and being given difficult and dangerous tasks. Thus, based on the results of these studies regarding the effectiveness of training courses on reducing the severity of the work – related injuries, it seems necessary that

social affairs, labor authorities and employers train the workers to reduce occupational injuries among workers, which in turn increases their working performance.⁹

With respect to work experience in the studies, there was an association between occupational injury rates and work experience. Injury at work were fewer among workers who have more experience, except waste collectors. Experienced workers have lower accident rates because they have both life experience and work experience. In addition, they are mature, mindful of workplace hazards better predict job performance;¹⁰ conversely, less experience workers have higher accident rates because they are often young and careless in the workplace.¹¹ Unlikely, work experience is not related to the rate of occupational injuries among waste collectors. This is due to the difference of the occupational hazards among waste collectors compared with other occupations.

This study has some limitations. One of the challenges of this review is the heterogeneity and lack of consistency between studies on the same topic of occupational injuries. Some studies were on the same topic but did not adequately address the data and indicators that this review concerns. For instance, age group, education, years of working experience classification were not the same pattern. Many countries have not yet provided or updated their occupational injury data with publicly available databases. Therefore, despite the fact that there are a large number of articles on occupational injuries, within the scope of this review, only a small number were qualified to be mentioned.

In addition, the majority of studies were cross-sectional studies; cause-effect relationships could not be identified between the different independent variables and injury.

Since the data were self-reported responses, we cannot exclude the possibility of recall bias. Consequently, the cross-sectional studies are less accurate; they can not identify the causes, risks and evaluate the effect of interventions.

V. CONCLUSION

The occupational injury prevalence in developing countries was higher in recent years. Occupational injury brings negative effects not only on workers and their families but also on society at large due to the tremendous costs that it generates; particularly, in terms of loss of productivity and burdening of social security systems. The study showed that the factors associated with occupational injury were gender, marital status, education, work experience. Based on the findings from this study, provision of sustainable and proper health and safety training for workers, regular and continuous workplace supervisions, and standard quality personal protective equipment for all workers with strict follow up of proper utilization, should be encouraged.

REFERENCES

1. Chandrasekaran. Occupational Health – An Investment Benefits of Promoting Employee Health. 2003 Jan; 23 – 6.
2. Occupational injuries statistics from household surveys and establishment surveys. 2012. Available from: http://www.ilo.org/stat/Publications/WCMS_173153/lang--en/index.htm
3. Occupational injury. In: Wikipedia. 2017. Available from: https://en.wikipedia.org/w/index.php?title=Occupational_injury&oldid=811631793
4. Christer Hogstedt, Bodhi Pieris. Occupational Safety and Health in Developing Countries Review of strategies, case studies and a bibliography.
5. Yokoyama K, Iijima S, Ito H, Kan M.

The Socio-Economic Impact of Occupational Diseases and Injuries. *Ind Health*. 2013 Sep; 51(5): 459 – 61.

6. Mrema EJ, Ngowi AV, Mamuya SHD. Status of Occupational Health and Safety and Related Challenges in Expanding Economy of Tanzania. *Ann Glob Health*. 2015 Jul; 81(4): 538 – 47.

7. Kirwan B. Human error identification techniques for risk assessment of high risk systems—Part 1: review and evaluation of techniques. *Appl Ergon*. 1998 Jun; 29(3): 157–77.

8. De Castrom, Fujishiro K, Rue T, Tagalog, Samaco-Paquiz, Gee G. Association between work schedule characteristics and occupational injury and illness. *Int Nurs Rev*. 2010 May 17;57:

188–94.

9. Bhattacharjee A, et al. Relationships of job and some individual characteristics to occupational injuries in employed people: a community-based study. *Journal of occupational health*, 2003. 45(6): p. 382-91.

10. Aderaw Z, Engdaw D, Tadesse T. Determinants of Occupational Injury: A Case Control Study among Textile Factory Workers in Amhara Regional State, Ethiopia. *J Trop Med*. 2011. Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3235897/>

11. Bena A, Giraudo M, Leombruni R, Costa G. Job tenure and work injuries: a multivariate analysis of the relation with previous experience and differences by age. *BMC Public Health*. 2013 Sep 22; 13:869.