Conference Paper

Health Hazards Related to Workers' Health

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Abstract

Workers are at higher risk of being injured, sick even dying younger compared to the general population. During the past decades, risk management program focused mostly on physical, chemical, biological, ergonomic and psychosocial hazard, yet it still left huge of workers' health problem. The unidentified health hazard is a significant obstacle in risk management. Epidemiological methods used successfully in public health history can be brought into the workplace to deal with occupational safety and health risk. This study aimed to understand and explore further the workplace's hazards in the area of occupational health. This was a compilation of 7 preliminary surveys on occupational health profile using a sequential explanatory method, started with semi-quantitative and followed by a qualitative study, supported by literature study. The Number of respondents was 785 workers and supervisors from 19 workplaces ranging from small to big size enterprises which spread all over the islands of Indonesia. Data were collected by observation and document review, verified by questionnaire and in-depth interview. Our study identified human and organizational factors inevitably influence workers' health besides the risk originated from environmental and ergonomic hazards as the focuses in traditional occupational health management. Occupational health should *deal with all of the determinants discussed.* To achieve freedom from or as lowest as possible health risks, further study or investigation to understand how workers get sick should be anticipated proactively and continuously, particularly the developments and events happened at the workplace that might become determinants of workers' health.

Keywords: Occupational health; workers' health; risk factors

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1. Introduction

Economically, healthy workers become an essential asset called human capital yet workers are at higher risk of being injured, sick even dying younger than the general population. The is due to workers are exposed to many health hazards in the workplace.

Prevention of ill health among workers is conducted by doing risk management, started by hazard recognition as an initial step of risk assessment. Epidemiological methods used successfully in public health history can be brought into the workplace to deal with occupational safety and health.

The effective management of health risks, and also safety risks, is an essential part of good health and safety management. During the past decades, there were still huge of workers' health problem. We failed to answer the questions: "Why the occupational disease does not occur in all workers exposed to the same risk level of physical, chemical, biological, ergonomic or psychosocial hazards?" Lack of knowledge about workplace hazards especially unidentified ones is a significant obstacle in the risk management process that can end on the ill health of workers.

This study aimed to understand and explore further the workplace's hazards in the area of occupational health using the epidemiological approach.

2. Methods

The was a compilation of 7 studies or preliminary surveys on occupational health profile using a sequential explanatory method, started with quantitative and followed by the qualitative approach, supported by literature study. The respondents were workers and representatives from 19 workplaces ranging from small to large enterprises scattered throughout the islands of Indonesia. Data were collected through observation and document review, verified by a questionnaire and an in-depth interview.

3. Results

This research started with workers' health problems not only sign and symptoms detected in periodic medical check-up but also concerned about an extraordinary phenomenon like early death among workers (Table 1). Hazards originated from workers somatic & behavior, and organizational risk factors were found dominantly in our studies (Table 2).

This study proved workers' health disorders were related to multi-risk instead of mono-risk (Table 1). Crystalluria was identified by respondents who stated as calcium oxalate and/or uric acid in the urine from medical check-up data, the risk factors detected were not merely environmental heat, metal particulate, but the workers' behavior worsened it, i.e., reluctant to drink water, infrequent go to restroom. The reasons why welders were seldom to drink during working hours, the complaint about the drinking stations were too far from the workplace, moreover, the weird taste of drinking water often

TABLE 1: Health Problems and Suspected Risk Factors.

Year	Job	# of WP	n	Health Problem	Preval. (%)		Suspected Risk Factors
2016	Welder	1	219	Crystalluria	39.1	E	- Heat
						B	- Reluctant to drink more water
							- Reluctant to urinate frequently (not piss on time)
						O	- Decent drinking water & toilet neglected
							- Lack of support for a healthy lifestyle
							- Workload > 14 h/day (frequently)
2016	Welder	1	62	Restrictive Lung Disorders	22.58	E	- Metal dust (Nickel)
						B	- Smoking
						S	- Obese
							- Genetic Polymorphism (DMT1 IVS 4+44 C/A)
						O	- Work overload, deadline
							- Prioritize productivity over safety
2015	Manufacturing Workers	8	236	Respiratory Symptoms	11.21	E	- Particulate
						B	- Smoking
						O	- Smoke-free workplace policy & consistency of its implementation

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Year	Job	# of WP	n	Health Problem	Preval. (%)		Suspected Risk Factors
2015	Cleaning Workers	6	149 (13 leaders + 136 workers)	Allergic/ Contact Dermatitis	15.66	E	- Chemical cleaning hazards.
						Er	- Awkward postures, excess load
							- Improper used of cleaning equipment
						B	- Lack of working experiences but reluctant to learn
							- Lack of drive or not motivated to use PPE
							- Improper procedure working with chemical agents
							- Poor personal hygiene
						O	- No hazard communication
							- Lack of proper tools and equipment
							- Work instruction without training
							- Multipurpose unlabeled cleaning chemical
							- No, standardize purchasing procedure (only based on the price)
							- Not enough preparation for unskilled labor
							- No written SOP
							- Lack of trolley for many works
							- Poor of fabric cotton waste management after cleaning up hazardous chemical
				LBP	9.77	Er	- Manual handling
				(≥one times)		S	- Old age
							- Anemia, underweight or other condition

Year	Job	# of WP	n	Health Problem	Preval. (%)		Suspected Risk Factors
						B	- Unskilled labor
							- Smoking
							- No stretching habit before or end of work
							- Careless attitude toward LBP symptom
2015	Laborant/ Analyst	1	12	Cancer	3.96	E	- Chemical (>10 items of toxicant)
							- Radiation
							- Testing animals & recombinant organism
						B	- Poor PPE using & maintenance
							- Poor working behavior
							- Lack of knowledge of hazard & risk management
						S	- Genetical susceptibility
						O	- Poor ventilation
							- No hazard communication
							- There SOP and work instruction but not enough training
							- No medical check-up and medical data
							- Lack of written OHS guidelines
							- Poor ventilation and housekeeping, improper storages
							- Eye washer & emergency shower not functioning
							- Lack of and improper PPE for gas and radiation

Year	Job	# of WP	n	Health Problem	Preval. (%)		Suspected Risk Factors
2012	Field Managers	1	240	CVD Related Death	2.18	E	- Benzene, Toluene, Xylene; remote area
						B	- Unhealthy lifestyle and work style in order trying to cope with work-related stress
							- Obese, hypertension, diabetic
						S	- Unfair single grade promotion model
						O	- Lack of support from the top management
							- Social chaos such as horizontal conflicts among citizens and residents demo to depo
							- old equipment
							- 2) 24 hours alert 3) responsibility to stock that beyond their authority
2012	Field Operator	1	16	LBP	43.75	E	- Poor ventilation in lobby offtake
				(≥one times)		B	- no stretching habit before or end of work
							- careless attitude toward LBP symptom
						S	- less care/active co-worker for reminding
						O	- less competent supervisor
							- not enough SOP for manual handling and training for lifting and moving

WP = workplace; E = environmental hazard; B = workers behavioral hazard; S = workers' somatic hazard; O = work organization and work culture hazard

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Table 2: Summarize of Suspected Risk Factors in Indicated Health Problems.

	Environ.	Ergo.	Somatic	Behavioral	Organizational
Crystalluria	✓			✓	✓
Restrictive Lung Disorders	✓		✓	✓	✓
Respiratory Symptom	✓			✓	✓
Contact Dermatitis	✓	✓		✓	✓
LBP-1		✓	✓	✓	✓
Cancer	✓			✓	✓
CVD Related Death	✓		✓	✓	✓
LBP-2		✓	✓	✓	✓
Total (%)	6 (75)	3 (37.5)	4 (50)	8 (100)	8 (100)

smelly, the gallon looked dirty and only two plastic glasses available. They did not have the support for a healthy lifestyle from the employers; this was the example of organizational risk factors. Additionally, their eating pattern, i.e., high oxalate and purine diet, and frequently consume energy drink which often contained diuretic (Kurniawidjaja et al. 2016).

In the case of restrictive lung disorders found among workers exposed to welding fume, the study showed it was related to many risk factors, i.e., respirable particulate from the metal rode. Additionally, 46.65% of exposed workers were smokers, and 50% were seldom to use masker; individual somatic hazards found not only central obesity significantly proved as risk factors in this lung function disorder, but also genetic polymorphism DMT1 IVS 4+44 C/ although it did not involve directly in lung function disorder, it influenced in iron absorption in the lung (Kurniawidjaja et al. 2016).

In the other case, moderate to severe respiratory symptoms like coughing, phlegm, and dyspnea found in 11.21% among 236 workers at eight manufacturing plant, the risk factors detected were particulate and smoking habit. Furthermore, it was found 46.7% successful quitters at the company running smoke-free workplace program compared to 33.30% at the companies with no such plan, besides other factors improving the chance of quitting, i.e., health problem, aging, marriage status, having children and the strength of family support. The facts were, after smoke-free workplace implemented, the mean smoking prevalence decreased 6.3%, the mean daily cigarettes consumption on current smokers decreased 3.8 +/- 7.35 SD (95% C.I. 2.72 – 4.87), i.e., from 9 to 5 cigarettes per day (p=0.0001) Respondents reporting smoking ‘at work’ decreased significantly from 83% to 68%, but there were still 13.2% of them saying sometimes they smoked at smoking prohibited area (Kurniawidjaja et al. 2015).

Allergic contact dermatitis or skin irritation found among 15.66% of 149 respondents, the significant risk factors detected were, of course, the chemical used such as detergent, disinfectant, glass, and toilet bowl cleaner include an all-purpose cleaner, i.e., chlorine, ammonia, 2-Butoxyethanol, and pesticides. Unfortunately, another ingredient was mostly unknown, and few MSDS provided; less cleaning service providers running the essential health and safety program like hazards communications, proper usage of chemical, spill management; all of the providers did not have the standardize purchasing procedure and other written SOP; on the other hand, untrained cleaners used improper system working with chemical agent, poor personal hygiene, poor of fabric cotton waste management after clean up hazardous chemical (Kurniawidjaja et al. 2015).

Low back pain risk factors identified in this study were a heavy object when rigging, pushing and pulling, an awkward position when squatting and binding, only 5 minutes break during working hours, frequent welding activities, not enough stretching and exercises. Other than the events, the poor working station and computer layout itself as the leading causes, the result showed old age, anemia, scoliosis, kyphosis, osteoporosis and other somatic risk factors could lead to LBP. In the organization level, less competent supervisor, less active co-worker for reminding, lack of SOP for manual handling and lack of training for lifting and moving considered as essential determinants to the LBP found(Kurniawidjajaet al. 2013; Fichtenberg 2002).

Unclassified cancer was found 3.96% in an independent food-testing laboratory. All were advanced state and ended with early death. This Laboratory was specializing in chemistry and toxicology, also nutritional and microbial testing for meat, poultry, seafood, spices, and other ingredients. The result showed workers were exposed especially to organic solvents like Acetone, acetonitrile, methanol, n-hexane, and chloroform. Other significant hazards identified were poor ventilation, lack of knowledge of hazard and risk management measures, poor working behavior and personal protective equipment use; no somatic danger assessed due to lack of medical data; hazards related to work for organization and work culture might be lack of written commitment, hazard communication, OSH guideline and supervision, no medical check-up program and no medical data, and lack of established safety and health management system at the laboratory in order to reduce the risk of occupational diseases (Kurniawidjaja et al. 2015). CVD related death at a young age among field managers found in an oil company. The result showed visible individual somatic and unhealthy lifestyle, work organization, and work culture were assumed related to work stress (Kurniawidjaja et al. 2015).

4. Discussion

4.1. The work organization and work culture influenced the workers' health

A systemic review on the effect of smoke-free workplaces on smoking behavior by Fichtenberg CM and Glantz SA (2002) showed that smoke-free workplaces were associated with a reduced daily cigarette consumption by employees and a lower prevalence of smoking. Our study also showed after a smoke-free workplace implemented, the mean smoking prevalence and the mean daily cigarettes consumption on current smokers decreased significantly; respondents reporting smoking 'at work' decreased significantly from 83% to 68% (Kurniawidjaja et al. 2015). These findings proved that how workplace culture affects worker's health behavior. Conversely, work stress could lead to an increase in cigarette smoking (Benach et al. 2007).

After long working hours especially in a big city like Jakarta, studies found that most of the office white collars workers in central business district worked more than 60 hours per week, mostly sedentary work and they stayed in the office from 9 to 9 or more, they did not even have enough time to sleep and not to mention leisure time for physical activity and social activity (Kurniawidjaja et al. 2005). It proved that long working hours (more than 60 h/week) had a significantly increased risk for total coronary heart diseases as compared to those with weekly working hours in 40–48 hand those with daily hours of sleep fewer than 6 h were found to have increased risks for CHD (OR = 3.0) as compared to those with sleeping hours in 6–9 h. (Cheng Y et al. 2014). Our study on psychosocial risk factors among field heads in an oil company indicated that 24 hours 7 days a week standby on call for emergency led them failed to have equilibrium living between life and work and less sleeping hours, these poor conditions had increased the risk of stress. If they were unable to cope with stress, most of them fell into unhealthy lifestyle as an escape, like smoking, drink alcohol even get drunk, sleep debt because of insomnia and distress syndrome, led to eating more and more unexpectedly; all the situation were assumed will be ended up with increasing the incidence of cardiovascular diseases and early death in a sudden (Kurniawidjaja et al. 2013).

The organizational risk factors found at all workers' health problem discussed (Table 2), direct or indirectly, included work organization and culture i.e. lack of standard procedure for purchasing, manual handling, hazard communication, training program, occupational health and safety guideline and supervision, improper or lack of working tools and equipment, no medical check-up program and no medical data, poor housekeeping and lack of support for healthy lifestyle, unfair grade promotion model were all contributed direct or indirectly to workers' health. Overall, the lack of established safety and health

management system was one of the health risk factors should consider. This study concluded, organizational risk factors should include in health risk assessment and control.

4.2. Workers' health behaviours influenced the workers' health

Workers' behavior is one of the human factors concerned. United Kingdom Health and Safety Executive stated that "Human factors refer to an environment, organizational and job factor, and human and individual characteristics which influence the behavior at work in a way which can affect health and safety. A simple way to view human factors is to think about three aspects i.e. the job, the individual and the organization and how they impact peoples' health and safety-related behavior" (Health and Safety Executive 2015).

Level and Clark stated that one of the diseases prevention stages was the specific protection. Specific protection in the occupational health perspective was the basic concept of health risk management. The first step, hazard identification and proper hazard risk assessment must be implemented as well to achieve a healthy workforce. James Reason argued that human could become the cause, victim, or as the primary resource to manage the accidental hazard and risk (in Human Contribution 2008). Human also had an essential role in maintaining the health hazard and risk.

The workers' health behavior as one of the risk factors found at all workers' health problem discussed. There were two aspects of workers' health behaviors which influenced the workers' health, first was the lifestyle and the second was the workstyle (Table 2).

4.3. Workers' somatic conditions influenced the workers' health

Human factors are concerned with the application of what we know about people, their abilities, characteristics, and limitation to the design of equipment they use, environments in which they function, and jobs they perform (Human Factors and Ergonomics Society). In this study, genetic polymorphism was detected as one of the risk factors besides central obesity to the restrictive lung function disorder, also other underlying physical disorder of a work that might be a trigger factor to disease.

5. Conclusions

We concluded that workers' health was related to organization and workers' health behavior. This study had identified five categories of health hazards or risk factors at the workplace contributed to workers' health, i.e., organizational factors and individual

factors besides the risks originated from environmental and ergonomic hazards as the focuses in traditional occupational health management during the past decades. In order to achieve freedom from or as lowest as possible health risks, study or investigation to understand how workers get sick, how things usually go right as a basis for explaining how things go wrong should be anticipated proactively and continuously, particularly the development and event happened at the workplace that might become as determinants of workers' health. Consequently, of all these risk factors are needed to be recognized and controlled well to build healthy workplace and healthy workers.

6. Recommendations

It was suggested to improve environmental health hygiene, ergonomic and OHS culture in the organization, also enhance health promotion to strengthen workers' lifestyle and workstyle. Furthermore, it was strongly suggested to establish a safety and health management system at all work to reduce the risk of total workers' health, accident, and disaster, and lead to higher productivity.

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