

SIIC030

HIRARC ON WASTE DISPOSAL AT TEACHING AND LEARNING LABORATORY AND SAFETY PRACTICES AMONG LABORATORY STAFF

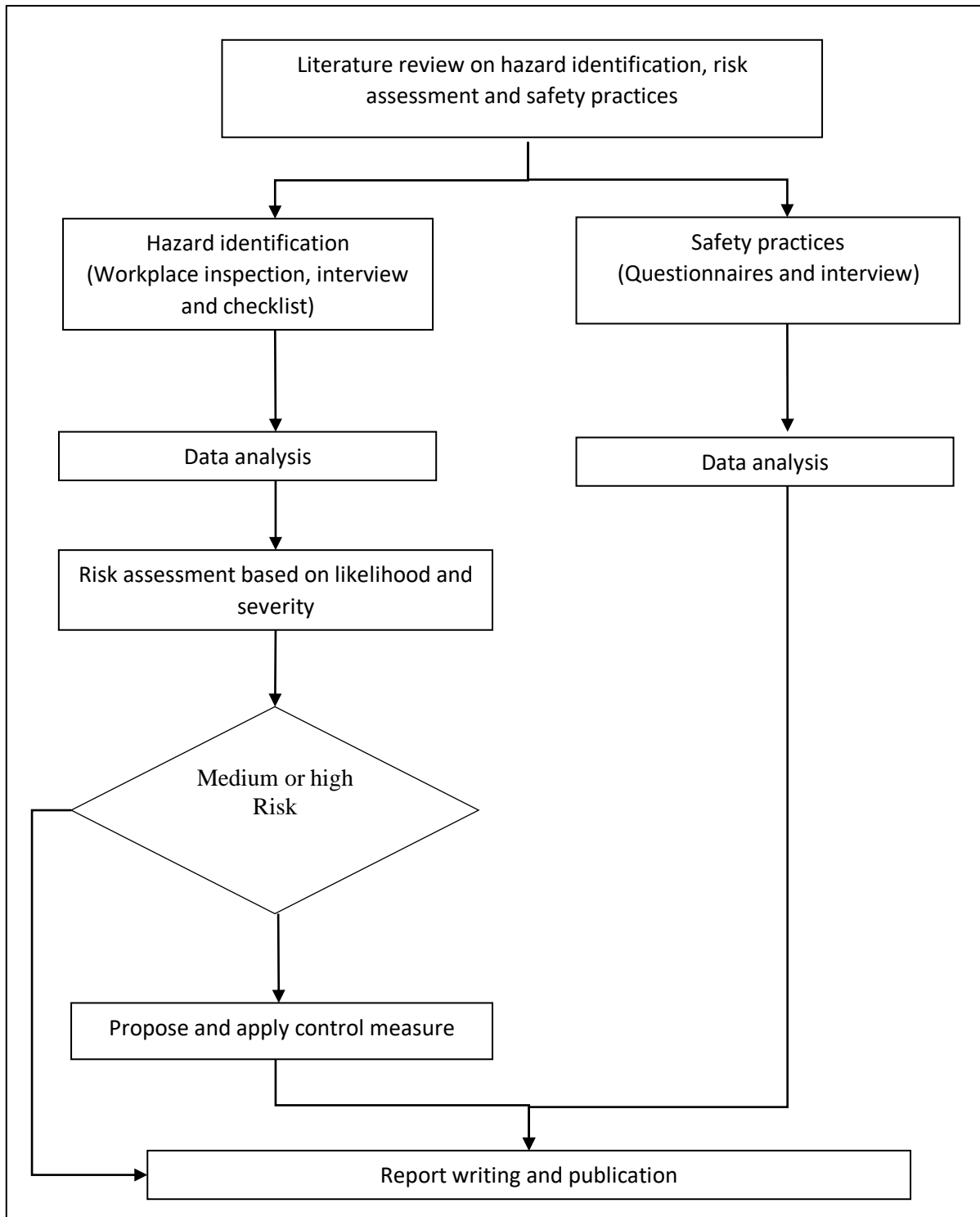
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Abstract: Teaching and learning laboratories provide academic assistance in all subject areas which often generate many types of hazardous wastes such as chemical waste, biological/regulated medical wastes, sharps and laboratory glassware. Proper laboratory waste disposal management as well as safety practice, is significant to maximize safety and minimize environmental impact. This study is initiated to identify the current and potential hazards, to estimate the risk and to propose control measures for waste disposal process at teaching and learning laboratory in UiTM Cawangan Pulau Pinang based on Hazard Identification, Risk Assessment and Risk Control (HIRARC) model. Furthermore, this study also assesses the safety practices on waste disposal of the laboratory staff as well as the individual risk estimate on the hazard at teaching and learning laboratory. The hazard was identified by using hazard checklist, workplace inspection and interview session with the laboratory staff. The risk assessment was carried out for each of the hazard identified and the risk level was determined based on severity and likelihood of occurrence. A questionnaire with a sample size of 50 was distributed among laboratory staff to assess the knowledge and safety practice on the waste disposal process in the laboratory which was analyzed using SPSS. A total of fifty-seven important hazards were identified in the waste disposal process. The HIRARC result shows that 51% of the hazard are of medium risk followed by high risk and low risk at 30% and 19% respectively. This shows that the waste disposal process can be considered as risky to the laboratory staff. Majority of the hazards are chemical hazard at 47%, physical, 30%, biological, 16 % and ergonomics at 7%. High risk was associated with chemical and biological hazard. Control measures should be applied to eliminate or reduce the risk especially for high risk activities. This include engineering control, administrative control and PPE. Safety practices among laboratory staff were acceptable but some improvement are needed in the area of chemical waste management which can be enhanced by providing more education and training for laboratory staff.

Keywords: HIRARC, Teaching and learning laboratory, Laboratory waste disposal, Hazard, Risk assessment

Methodology:



Results:

HIRARC Model

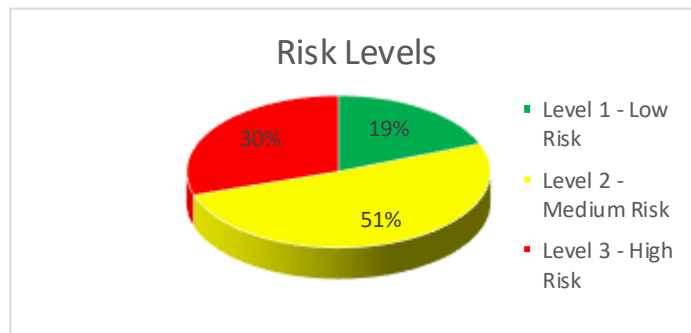


Figure 1: Percentage of Risk Levels on Waste Disposal at Teaching and Learning Laboratory

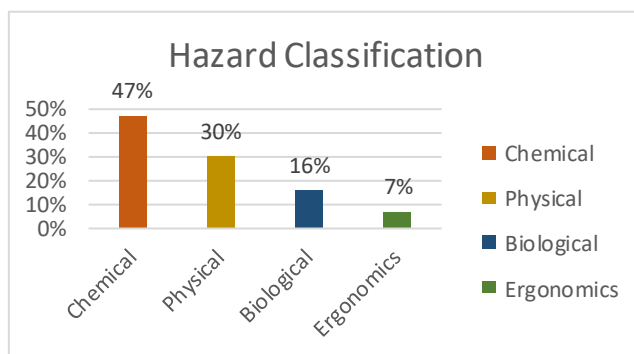


Figure 2: Percentage of Main Classified Hazards in Waste Disposal at Teaching and Learning Laboratories

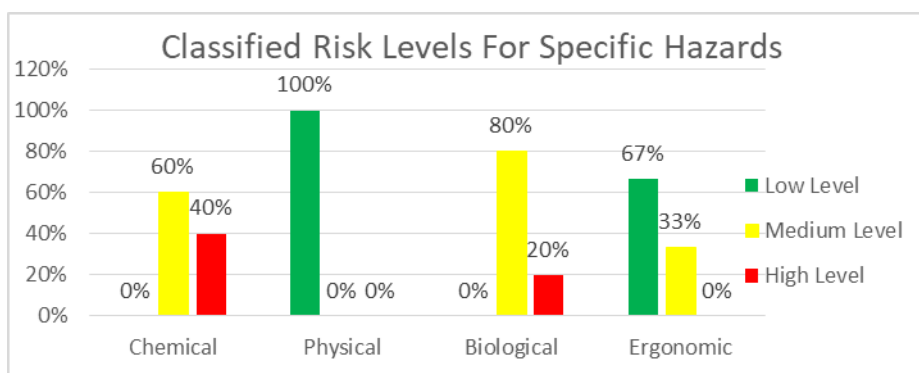


Figure 3: Three Risk Levels for Four Main Hazards in the Waste Disposal at Teaching and Learning Laboratories

Safety Practices

Table 1: Knowledge

Category	Sub-category	Response frequency
Self-perceived level of risk of the work conducted in laboratory	Low to very low	26%
	Moderate	30%
	High to Very High	44%
I received training or workshop regarding chemical waste management	Yes	68%
	No	32%
I know how to categorized chemical waste	Yes	80%
	No	20%
I know the type of container that is compatible with the chemical waste	Yes	76%
	No	24%
I know how to label the chemical waste	Yes	68%
	No	32%

Table 2: Laboratory waste management

Category	Sub-category	Response frequency
The laboratory waste is being stored in compatible containers	Strongly agree	34%
	Agree	38%
	Neutral	26%
	Disagree	2%
	Strongly disagree	0%
Containers of laboratory wastes are clearly labeled in accordance with the types applicable to them	Strongly agree	38%
	Agree	34%
	Neutral	20%
	Disagree	8%
	Strongly disagree	0%
Standard Operating Procedure (SOP) is provided for waste disposal	Strongly agree	36%
	Agree	42%
	Neutral	22%
	Disagree	0%
	Strongly disagree	0%
All expired chemical is disposed according to the Standard Operating Procedure (SOP) of waste disposal	Strongly agree	38%
	Agree	36%
	Neutral	26%
	Disagree	0%
	Strongly disagree	0%
The inventory for categories and quantities of laboratory wastes generated, treated and disposed of are accurate and up-to-date	Strongly agree	34%
	Agree	28%
	Neutral	32%
	Disagree	6%
	Strongly disagree	0%

Table 3: Laboratory safety practices

Category	Sub-category	Response frequency
I am aware of what to do in case of emergencies such as fires, spills, etc.	Strongly agree	28%
	Agree	62%
	Neutral	8%
	Disagree	2%
	Strongly disagree	0%

I have ever sustained an injury of any kind	Strongly agree	8%
	Agree	6%
	Neutral	12%
	Disagree	18%
	Strongly disagree	56%
All accident is recorded in the accident record book	Strongly agree	34%
	Agree	36%
	Neutral	26%
	Disagree	2%
	Strongly disagree	2%
Safety Data Sheets (SDS) for all chemical is provided in my laboratory	Strongly agree	42%
	Agree	34%
	Neutral	24%
	Disagree	0%
	Strongly disagree	0%

Conclusion:

The first step for the protection of workers at the workplace is by defining and analyzing hazards. There is a need for HIRAC study as a routine practice in all teaching and learning laboratory to help in identifying high-risk hazards and applying control measures at the earliest, it reduces the risk to a level considered ALARP. The HIRARC result shows that waste disposal at the teaching and learning laboratory has the greatest amount of medium risk level followed by a high and low risk which can be considered as a risky process to the laboratory staff. There is some control measure that has been applied and needs to be review regularly to ensure the effectiveness such as elimination, substitution, engineering, administrative and personal protective equipment. From the results of the study, it shows that waste disposal at teaching and learning laboratory and safety practices among laboratory staff in Universiti Teknologi MARA, Cawangan Pulau Pinang is following the required standards and regulations. However, there are some deficiencies and weaknesses in management. To manage chemical wastes efficiently, consideration needs to be given to the generation and minimization, source separation and segregation, identification and labeling, handling and storage, safe transportation and treatment.