



Overview of Occupational Safety and Health (OSH) and its Practices in Sri Lanka

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Abstract - Health and safety in the workplace are of utmost importance to provide employees with a secure working environment and minimize the occurrence of accidents and injuries. This responsibility should be shared among the company, management, and employees. Occupational health and safety aim to prevent work-related illnesses and injuries through activities such as identifying and mitigating workplace hazards, educating workers about safe practices, and providing medical care and support when incidents occur. Within the field of occupational health and safety, key areas include hazard identification and assessment, hazard control and prevention, and occupational health and safety training. These components are crucial in effectively managing and maintaining a safe work environment. In this paper, major areas in occupational health and safety, types of OSH training programs, historical background of OSH legal framework, Current OSH legal framework and regulatory bodies in Sri Lanka and implementations, challenges in OSH practices in Sri Lanka have been discussed.

Index Terms— Hazard identification, Occupational safety, OSH-challenges, Safety training

1. Introduction

Occupational safety and health (OSH) can be defined as the science of the recognition, evaluation, anticipation, and control of hazards arising in the workplace that could be affected on health and well-being of employees, taking into account the possible impact on the environment and the surrounding communities. This topic is, encompassing a large number of disciplines and numerous workplace and environmental hazards. To manage and implement all of the "building blocks" that comprise national OSH systems. So that protection is extended to both workers and the environment, a wide range of structures, skills, knowledge, and analytical capacity are required.

Health and Safety in the workplace are crucial to ensure that an organization provides a safe working environment for its employees and to minimize the risk of accidents and injuries. Health and Safety should be a joint responsibility between the company, management, and employees.

The prevention of illnesses and injuries related to the workplace is referred to as occupational health and safety. It involves identifying and removing risks from the workplace, educating workers about safe behaviors, and offering medical care and other forms of support when accidents or illnesses happen. There are some major areas can be identified in occupational health and safety field in industries:

- Hazard identification and assessment
- Hazard control and prevention
- Occupational health and safety training

Hazard identification and assessment - Hazard identification is identifying potential sources of harm, while hazard assessment involves evaluating the likelihood and severity of harm that could result from exposure to the hazard. Hazards can include physical, chemical, biological, and ergonomic hazards. Then identified hazards need to be evaluated based on likelihood and severity of harm that could result from exposure to the hazard.

Once the hazards associated with particular activities have been identified, a risk assessment can be conducted based on the seriousness (severity) and probability of these work-related accidents or illnesses on the of their consequences.

The probability of their occurrence ranges from unlikely to frequent while their seriousness (severity) ranges from negligible injuries to the Fatal injury/death of an employee. The risk assessment example that follows reflects these definitions by using a cartesian graph illustrated in figure 1 [1].



Figure 1. Cartesian graph of a risk assessment [1]

Hazard control and prevention - To prevent or reduce the possibility of accidents, injuries, and other negative impacts that might arise as a result of exposure to dangers is the goal of hazard prevention and control. Hazard prevention and control can be accomplished in several ways, such as through engineering controls, administrative controls, and personal protective equipment. (PPE). Engineering controls entail altering the physical surroundings or machinery to lessen or eliminate dangers. To reduce exposure to risks, administrative controls entail altering work practices or regulations. PPE consists of tools like gloves, helmets, and respirators that are made to shield employees from particular dangers. Based on the risk evaluation, prevention and control measures can be determined according to the following hierarchy which has shown in figure 2 [1].



Figure 2. Hierarchy of controls [1]

Occupational health and safety training – There are various types of training programs available to educate the occupational safety and health related knowledge. Moreover, some training programs also can ensure the employees’ understanding on hazard identification & prevention, risk management. The following table 1 illustrate that different kind of occupational health and safety programs.

Table 1. Occupational health and safety programs conducted in Sri Lankan industries.

Activity/ Program	Application
Safety audits	This procedure involves thoroughly inspecting the workplace to find potential dangers, risky behaviors, and violations of safety rules. Safety audits can assist in locating areas that require improvement and provide guidance for the creation of specific safety training programs.
Job Hazard Analysis (JHA)	A JHA is a procedure for dissecting a job into its component parts and identifying the hazards unique to each one. Employers can identify possible hazards and put measures in place to lower the risk of accident or illness by conducting this type of employment analysis.
Safety training programs	This can be done through classroom instruction, online learning, on-the-job training, and other educational methods that educate staff about dangers at work, safe work practices, and emergency procedures.
Safety drills	Employees are made ready for emergencies through activities including mock drills and fire drills. A mock drill is a type of emergency exercise that simulates a real situation and is used to assess personnel readiness and responsiveness. These drills might simulate situations like fires, calamities, chemical spills, or other catastrophes that might happen at workplace. For example, A mock drill is conducted to check for any weak points in the emergency response plan, gauge how well communication channels are working, and gauge how well staff behave under pressure. Organizations can lower the risk of harm to or injury to employees by regularly performing mock drills to help them prepare for and respond to emergencies.
Ergonomic assessments	This entails inspecting the workplace for ergonomic dangers such

awkward postures, repetitive activities, and carrying heavy goods. Employers can lower the risk of musculoskeletal diseases and other injuries by addressing ergonomic concerns.
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2. Historical background of OSH in Sri Lanka

Sri Lanka's history of industrial health and safety began with the enactment of the Mines and Machinery Protection Law in 1896, . This Ordinance primarily applied to mining and related industries. However, in 1926, the Governor issued a number of regulations that were published in the Ceylon Government Gazette No. 7553 on October 29, 1926, in accordance with Section 4 of this Act. All factories functioning at the time in Sri Lanka had to adhere by these regulations. After that, the government introduced Act No. 19 of 1934, the Workmen's Compensation Ordinance. The purpose of this Ordinance is to ensure that businesses provide benefits to employees who have been injured at work in accidents or who have contracted illnesses associated with their employment, as well as to their dependents in the event that an employee has passed away due to one of these conditions. Finally, in 2005, it was changed. This regulation is governed by the office of the Commissioner for Workmen's Compensation. This office's primary responsibility is to investigate claims made by employees who were injured while on the workplace. This office performs solely judicial duties. The Deputy Commissioner, Additional Commissioner, and Commissioner all work as judicial officers. The Factories Ordinance (Act No. 45 of 1942) was enacted on January 1, 1950, in response to the growth of Sri Lanka's industrial sector. The Factories Ordinance, Chapter 128 of Sri Lanka's Legislative Enactments, is a law that establishes rules for the welfare, health, and safety of factory workers. Thereafter, this Ordinance was altered by a number of Acts in 1961, 1976, 1984, 1998, 2000, and 2002. There are 131 sections in this ordinance that outline the minimal requirements that an employer must uphold in order to give employees a safe place to work. The Industrial Safety Division of the Department of Labour has the authority to enforce the Factories Ordinance. It is administered by the Commissioner of Labour (Industrial Safety) and the Chief Factory Inspecting Engineer, who are supported by a group of Specialist Factory Inspecting Engineers, the Deputy Commissioner of Labour (Technical), and the Deputy Chief Factory Inspecting Engineer. Ten (10) District Factory Inspecting Engineer offices located at Anuradhapura, Badulla, Colombo, Gampaha, Galle, Jaffna, Kandy, Kalutara, Kurunegala, and Ratnapura provide decentralized services for the division. Under their spheres of authority, the District Factory Inspecting Engineers are in charge of enforcing the Ordinance. Each District Factory Inspecting Engineer is supported in this endeavor by a small number of Factory Inspecting Engineers [2].

3. Legal framework and regulatory bodies

National Institute of Occupational Safety and Health (NIOSH): NIOSH is the main regulatory body for occupational safety and health in Sri Lanka. It is responsible for enforcing the Occupational Safety and Health Act and promoting occupational safety and health in the country. NIOSH provides training, research, and consultancy services in occupational safety and health. Moreover, different ministries, local and international organizations have also involved to ensure the safety of employees, maintain industrial peace and distribution of compensation to workers who suffer accidents while performing their jobs.

3.1 National Institute of Occupational Safety and Health (NIOSH)

The National Institute of Occupational Safety and Health (NIOSH) in Sri Lanka is a government entity that aims to enhance occupational health and safety across the country. NIOSH Sri Lanka provides a wide range of services, such as training, research, consultation, and technical assistance to various industries, employers, employees, and other stakeholders. NIOSH Sri Lanka's primary mission is to empower through

education, trainings, research, and other relevant interventions for preventing and controlling all forms of work-related hazards to ensure safety, health and welfare at work places.

The National Institute of Occupational Safety and Health (NIOSH) in Sri Lanka has several goals and objectives to enhance the occupational safety and health of workers throughout the country. One of its key objectives is to advise the government on formulating a national policy that considers the nature of the occupation and the safety of employers and employees. NIOSH Sri Lanka also provides advisory services and education and training to employees, employers, and other stakeholders on the proper use of equipment and avoidance of known hazards. Additionally, NIOSH Sri Lanka conducts investigations, surveys, and research in the field of occupational safety and health to identify emerging hazards and provide evidence-based recommendations. The institution also works to establish national standards and co-ordinates inter-ministerial projects and activities related to occupational safety and health. Furthermore, NIOSH Sri Lanka liaises with relevant national and international institutions, universities, and organizations to promote and advance occupational safety and health practices in the country. Overall, NIOSH Sri Lanka's objectives support the institution's mission to foster a safe and healthy work environment in Sri Lanka by promoting and enforcing occupational safety and health standards, policies, and guidelines [3].

3.2 Department of Labor

Under the Indian Immigrant Labor Ordinance No. 01 of 1923, the Department of Labor was established to provide welfare for traveling Indian estate laborers. Activities related to the security and welfare of the labor force were given to a labor controller as the importance of the local labor force became gradually more apparent. Later, the position of labor controller was renamed as that of labor commissioner, and in 1994, the position of commissioner general of labor was established with broad authority. Over the previous 94 years, the legislature has taken action to pass roughly 50 fundamental laws aimed at the protection and welfare of the labor force. The Department of Labor's primary responsibility is to carry out these laws. 13 Principle Divisions of the Department are responsible for carrying out these duties, and in addition, 11 Zonal Labor Offices, 40 District Labor Offices, 17 Sub-Labor Offices, and 10 District Factory Inspecting Engineer's Offices are operating for this purpose [4].

The Department of Labor in Sri Lanka has several key objectives, including the settlement of industrial disputes through the enforcement of labor laws to maintain industrial peace within the country. Additionally, the department aims to create awareness among the working community regarding labor laws and promote social dialogue to establish industrial peace. Another critical goal is the implementation of labor standards relevant to different trades, conducting surveys on new trades, and forming standards for those trades in line with international standards. The department is also responsible for promoting the Employees' Provident Fund (EPF) and awarding its benefits to members while supervising Approved and Private Provident Funds. Furthermore, the department enforces laws about the security of children, women, and young persons in employment. Finally, the department aims to introduce methodologies that ensure security and health in industries and create awareness while providing supervision to ensure their implementation [4].

3.3 Office of the Commissioner for Workmen's Compensation

The Workmen's Compensation Ordinance No. 19 of 1934 established the Office of the Commissioner for Workmen's Compensation to handle the distribution of compensation to workers who suffer accidents while performing their jobs. Administration of the Workmen's Compensation Ordinance No.19 of 1934 (as later revised) is the primary responsibility of the Commissioner for Compensation, who is endowed with

both civil and magisterial powers. The purpose of the aforementioned legislation is to force employers to compensate employees who suffer personal injuries due to accidents that occur while they are working or whose dependents pass away as a result of such injuries. There are some key functions can be identified as follows; Conducting judicial inquiries into claims of compensation, taking measures to enforce orders when payment of compensation is disregarded or defaulted, and keeping the custody of the compensation entitled to minor dependents of a deceased workman until they reach 18 years of age [5].

3.4 Acts and Regulations

Furthermore, several acts and regulations are related to occupational safety and health in Sri Lanka. Here are some of them as follows (Table 2).

Table 2. Acts and regulations related to occupational safety and health in Sri Lanka [6]

Acts/ Regulations	Description
Factories Ordinance (No. 45 of 1942)	<ul style="list-style-type: none"> • Registration and licensing of factory buildings. • covering some matters such as overcrowding, ventilation, and lighting. In occupations that have a high incidence of injury or disease, health surveillance may be required. • safe use of machinery, boilers, and vessels, and prohibits young workers and women workers from performing certain operations.
Occupational Safety and Health Act (No. 738/2002)	<ul style="list-style-type: none"> • To guarantee and maintain the working capacity of employees, as well as to prevent occupational accidents and diseases and eliminate other hazards from work and the working environment to the physical and mental health, hereinafter referred to as health, of employees, it is necessary to improve the working environment and working conditions.
The Workmen's Compensation Ordinance (No. 19 of 1934).	<ul style="list-style-type: none"> • provide for the payment of compensation to workmen who are injured in the course of their employment.
Employees' Provident Fund Act (No. 15 of 1958).	<ul style="list-style-type: none"> • create a provident fund for particular groups of employees and make provisions for anything related or incidental to that fund.

4. Implementation of industries OHS in Sri Lanka

Many industries in Sri Lanka have implemented OHS programs to protect their employees. Here are some examples of industries and organizations that have implemented OHS practices in Sri Lanka.

1. Agriculture Sector

2.Transport Sector

3.Construction Sector

4.Health Sector

5.Tourism Sector

6.Industry Sector

4.1 Agriculture Sector

‘Lanka Jathika Sarvodaya Shramadana Sangamaya’ (LJSSS): LJSSS is a national cooperative organization in Sri Lanka that represents small-scale farmers and rural communities. The organization has implemented various OHS practices, including the provision of safety equipment such as gloves and boots for farmers, the promotion of safe agricultural practices, and the establishment of medical facilities in rural areas.

Smallholder Tea and Rubber Cooperatives: Smallholder tea and rubber cooperatives in Sri Lanka, which are formed by small-scale farmers to collectively market their produce and access resources, have implemented OHS practices to protect their members. For example, the Smallholder Tea and Rubber Cooperatives (STARC) in Sri Lanka has implemented a program to provide safety training to farmers, as well as the provision of PPE such as gloves and masks [7].

4.2 Transport Sector

In Sri Lanka, the transport sector has implemented several safety measures to prevent accidents and ensure the safety of passengers, drivers, and other road users. These measures include road safety laws and regulations, vehicle inspections, driver training and licensing, road infrastructure improvements, passenger education, enforcement of laws, and emergency response services. The Sri Lankan government places a strong emphasis on safety in the transport sector to reduce the risk of accidents and ensure the safety of the public.

A real-life example of safety implementation in the transport sector in Sri Lanka is the introduction of Automated Ticketing and Passenger Information Systems (ATPIS) in public buses. This system has been introduced in Colombo and other major cities in Sri Lanka to improve passenger safety and convenience. In addition, the system provides data to bus operators on passenger volumes, route performance, and other metrics, allowing them to improve service quality and optimize operations. This helps reduce the risk of accidents and improve the overall safety of public transport in Sri Lanka [8].

4.3 Construction Sector

The implementation of safety measures in the construction sector in Sri Lanka involves various strategies to prevent accidents and injuries in the workplace. These include the use of personal protective equipment, safety training, site inspections, contractor management, and safety committees. These measures are critical to ensuring the well-being of workers and maintaining a safe working environment.

For example, in 2021, the Sri Lankan government implemented a new regulation requiring all construction sites with a height of over 20 feet to install safety nets to prevent falls. This regulation was introduced after a series of accidents occurred due to falls from elevated surfaces.

The construction sector in Sri Lanka implements various safety measures to ensure the well-being of workers and prevent accidents and injuries. Examples include the use of safety nets to prevent falls, safety training for workers, the provision of personal protective equipment, site inspections, hazard identification and control, and contractor management. Regular safety meetings and safety audits are also conducted to ensure that safety procedures are being followed. These measures help to create a safe working environment and protect workers from potential hazards on the job site [9].

4.4 Health Sector

The implementation of Occupational Health and Safety (OHS) measures in the healthcare sector in Sri Lanka is essential to ensure the safety and well-being of both healthcare workers and patients. These measures include infection prevention and control (IPC), risk assessment, safe handling of biological hazards, ergonomic measures, and incident reporting and investigation procedures. These measures are critical to ensuring the safety and well-being of healthcare workers and patients in Sri Lanka, preventing accidents and injuries in the workplace and creating a safe working environment [10].

During the COVID-19 pandemic, Sri Lankan hospitals and clinics implemented strict infection prevention and control measures to prevent the spread of the virus. This included providing PPE, training healthcare workers on proper hand hygiene techniques, and screening patients and visitors for symptoms [11].

A study published in the International Journal of Occupational Safety and Ergonomics in 2018 investigated the prevalence of musculoskeletal disorders among healthcare workers in Sri Lanka. The study found that the use of assistive devices, such as patient lifts and transfer belts, reduced the risk of musculoskeletal disorders in healthcare workers.

Sri Lankan healthcare workers who handle biological hazards, such as blood and body fluids, are trained on safe handling techniques to minimize the risk of exposure to infectious agents. This training has been instrumental in preventing the spread of infectious diseases in healthcare settings.

The Ministry of Health in Sri Lanka has implemented ergonomic measures, such as proper body mechanics and the use of assistive devices, to prevent musculoskeletal disorders in healthcare workers. This has reduced the incidence of workplace injuries and improved worker safety.

Sri Lankan healthcare facilities have established incident reporting and investigation procedures to identify the root cause of incidents and take corrective action. For example, if a worker is injured while handling a patient, an investigation may be conducted to identify the cause of the injury and implement measures to prevent similar incidents in the future.

4.5 Tourism Sector

In the tourism sector in Sri Lanka, OHS measures are implemented to protect workers and tourists from potential hazards and prevent accidents and injuries in the workplace. These measures include providing training on safety and health, conducting risk assessments, safe handling of chemicals, implementing ergonomic measures, and establishing incident reporting and investigation procedures. These measures

ensure a safe and healthy working environment for workers and a safe and enjoyable experience for tourists [12] The following graph (figure 3) shows such measures and their RH values accordingly.

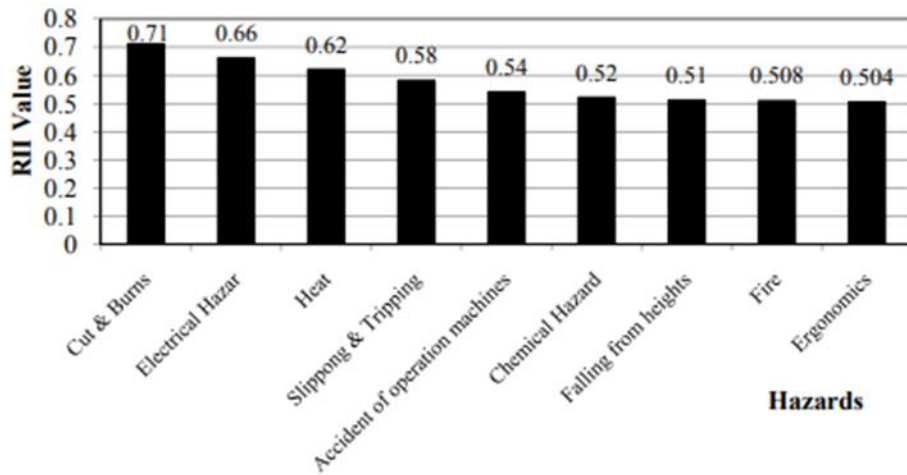


Figure 3. Critical health and safety hazards in hotel industry [12]

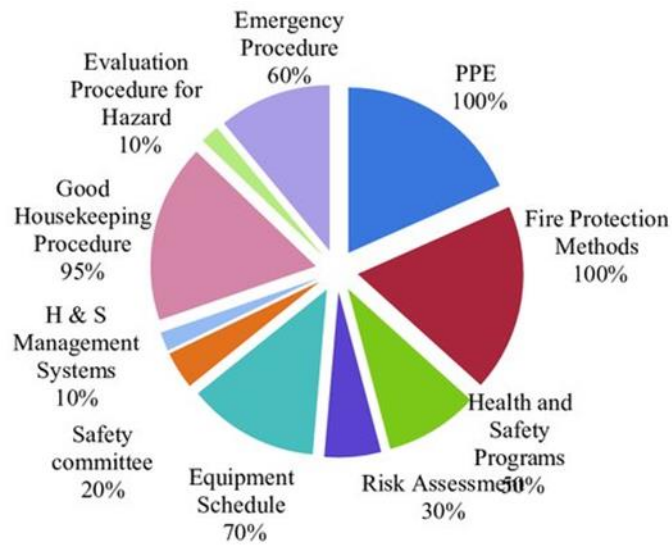


Figure 4. Current Practice of Preventive Methods of Health and Safety Hazards in Hotel Industry in Sri Lanka [12]

5. Challenges in implementing OHS in Sri Lanka

OSH issues are legislated under Factories Ordinance No. 45 of 1942, Workmen Compensation Ordinance Act No. 19 of 1934, Shop and Office Employee Act No. 15 of 1954, Municipal Councils by-laws and regulations. However, the safety and health aspects of the construction industry remains unsatisfactory, and

the country does not have a formal reporting system to capture work-related injuries and diseases. Inadequacy of information about occupational hazards are one of the major obstacles to preventing occupational fatalities and diseases effectively. The Ministry of Health estimates that 15% of the total admissions due to injuries at the Colombo National Hospital in 2011 were work-related. However, only 1% of the estimated work-related accidents are reported in Sri Lanka, and 60% of the labor force is employed in the informal sector.

In Sri Lankan process industries, several accidents are reported. According to M.Y. Gunasekera et al.'s research, accidents can be analyzed based on various factors, including human failure, technical failure, physical or chemical reactions, environmental influences, or unknown causes. Human failures encompass operating errors and inadequate organizational procedures, while technical failures result from inadequate design or processes, as well as component failures due to mechanical damage or corrosion.

The study has found that the highest number of accidents were attributed to technical failures, accounting for 34% of the total. Similarly, unknown causes accounted for 34% as well, indicating a lack of sufficient information to determine their specific origins. Human failures accounted for 29% of the accidents. The following pie chart (figure 5) shows accident percentages with different causes in process industry, Sri Lanka.

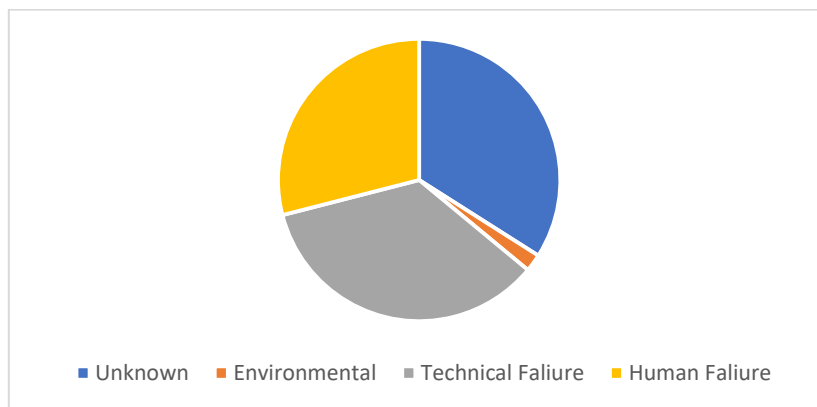


Figure 5. Accident percentages with different causes [13]

In one incident, a fire was caused by a natural factor, specifically lightning. It is important to note that this analysis was based on preliminary accident records collected in the early stages of the accidents. Therefore, the results primarily rely on the available preliminary data at that time. A more detailed investigation could potentially uncover additional information regarding the unknown causes of accidents [13].

Lack of awareness and education, Poor enforcement of regulations, Inadequate infrastructure and resources, and Limited access to healthcare are some issues that can lead to accidents in a workplace. To address these issues, OSH should be viewed as a shared commitment of all stakeholders and an investment for a healthier and more productive labor force [14]. Moreover, some OSH issues and related incidents are listed as follows.

5.1 Lack of awareness and education

In 2020, a worker at a construction site in Colombo fell from a height and sustained serious injuries. Upon investigation, it was found that the worker had not been trained on the proper use of safety equipment such as harnesses and ropes. This incident highlights the importance of providing adequate training and education to workers to prevent accidents and injuries. [15]

5.2 Poor enforcement of regulations

In 2017, there was a major fire at a rubber factory in Horana, Sri Lanka, which resulted in the death of five workers and injuries to several others. The cause of the fire was determined to be a leak in a gas pipeline, which ignited due to a spark from a machine. This incident highlighted several OHS challenges in Sri Lanka. Firstly, the factory was found to be non-compliant with safety regulations, inadequate fire safety measures, and no emergency response plan in place.

Additionally, many of the workers were found to be untrained in fire safety procedures and lacked access to personal protective equipment such as fire-resistant clothing. Furthermore, the lack of proper enforcement of safety regulations was evident, as the factory had been previously fined for safety violations, but had not taken adequate steps to address them. The incident also highlighted the need for improved emergency response services and access to medical care, as the injured workers had to be transported to hospitals over 50 km away.

In the aftermath of the incident, there were calls for stricter enforcement of safety regulations, increased awareness and education on workplace safety, and improved emergency response services. The incident also led to the establishment of a National Council for Occupational Safety and Health, which is tasked with improving workplace safety standards in Sri Lanka.

[16]

5.3 Inadequate infrastructure and resources

In 2018, a fire broke out at a textile factory in Ratmalana, resulting in the death of a worker and injuries to several others. It was found that the factory did not have adequate fire safety measures in place, including fire extinguishers and fire alarms. This incident highlights the importance of ensuring that workplaces have the necessary infrastructure and resources to maintain OHS standards [17].

5.4 Limited access to healthcare

According to a report by the World Health Organization (WHO), there are only 0.26 psychiatrists per 100,000 people in Sri Lanka. This means that many people with mental health issues are unable to access proper care and support. For example, a 2019 study found that over 90% of Sri Lankan university students who reported symptoms of depression had not sought professional help. [18]

6. Conclusion

Ensuring the well-being and safety of employees in the workplace is of utmost importance for any organization. It aims to create a secure working environment and minimize the chances of accidents and harm. The responsibility for maintaining health and safety lies collectively with the company, management, and employees, working together towards this common goal.

In the realm of occupational safety and health within an industry, there exists a vital interconnection among key points such as hazard identification and assessment, hazard control and prevention, and occupational health and safety training. It all begins with the crucial step of hazard identification and assessment, where potential risks and dangers present in the workplace are identified and evaluated. This knowledge forms the foundation for implementing effective hazard control and prevention measures, aiming to mitigate or eliminate the identified hazards. However, the success of such measures relies heavily on the awareness and competence of employees. This is where occupational health and safety training plays a pivotal role by equipping workers with the necessary knowledge and skills to identify hazards, understand

control measures, and actively contribute to maintaining a safe working environment. By intertwining these elements, organizations can create a comprehensive approach to occupational safety and health, ensuring the well-being and protection of their workforce. There are legal framework and responsible bodies are existing in Sri Lanka. The National Institute of Occupational Safety and Health (NIOSH), Department of labor, Office of the Commissioner for Workmen's Compensation. Furthermore, several acts and regulations are related to occupational safety and health in Sri Lanka to ensure the employees' safety.

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