

**CHALLENGES IN EFFECTIVE REPORTING OF  
OCCUPATIONAL DISEASES OF MUNICIPAL  
COUNCIL WORKERS IN SRI LANKA**

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**(159170L)**

**Degree of Master of Science in  
Construction Law and Dispute Resolution**

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Sri Lanka**

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**Dissertation submitted in partial fulfillment of the requirements for the degree**

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## DECLARATION

“I declare that this is my own work and this dissertation does not incorporate without acknowledgement any material previously submitted for a Degree or Diploma in any other University or institute of higher learning and to the best of my knowledge and belief, it does not contain any material previously published or written by another person except where the acknowledgement is made in the text.

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The above candidate has carried out research for the master’s dissertation under my supervision.

.....

Dr. (Mrs.) Nayanthara De Silva,  
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November 2019

**This research dissertation is dedicated to my  
Wife, Daughter & Son.**

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## **ABSTRACT**

Municipal Councils (MC) in Sri Lanka have hardly any occupational diseases (ODs) reporting system to trace the ODs among municipal council workers. For last several decades there has been no reported cases of occupational diseases (ODs). Therefore, need of mitigation, litigation or compensation had not arisen. When compared to the similar scenarios in the neighboring countries, occupational disease reporting system operated in municipal councils in Sri Lanka is exceptionally inactive. It is pretty clear that the occupational disease cases among MC workers were not reported not due to non-availability of OD patients. There should be an effective reporting system for the workers to get the benefit of it. Now the problem prevailing in the MCs is that, the MC is legally bound to comply with the Factories Ordinance of 1942, where occupational diseases as well as occupational accidents should be properly recorded and informed to the factories engineer, but the mechanism utilized to trace the potential patients of OD is not adequate to fulfil that objective. Only thing happened is the loss incurred due to occupational diseases is compensated by the other resources of the Municipal Councils.

National Institute for Occupational Safety and Health (NIOSH) has been encouraging the use of Electronic Health Records (EHR) which has created opportunities for keeping health records in an easily accessible mode for the benefit of the patient and for the public health surveillance. It is highly recommended to include the individual's occupation and industry into the standards of EHR. However, at this time, the EHR is continually evolving and the standards have not been finalized and established. As the collection of occupation and industry is not yet a standard in the EHR, this method of surveillance was not among the listed recommendations. However, should occupation and industry become standard variables captured in the EHR, this issue will be reviewed, and the opportunities and limitations provided by this data source will be explored fully for occupational disease surveillance.

**Key Words:** Occupational Diseases, Municipal Council workers, Solid Waste and Sewer Handlers, Screening, Reporting

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## **LIST OF ABBREVIATIONS**

BLS: Bureau of Labour Statistics

CEC: Commission of European Countries

CMC: Colombo Municipal Council

EHR: Electronic Health Record

EU: European Union

Eurostat: Statistics agency of the European Union

GP: General Physician

ILO: International Labour Organization

MC: Municipal Councils

NIOSH: National Institute of Safety and Health

OD: Occupational Diseases

PHI: Public Health Inspector

SENSOR: Sentinel Event Notification System for Occupational Risks

WRA: Work Related Asthma

WRI: Work Related Illness

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**CHAPTER – 01**  
**INTRODUCTION**

## **CHAPTER – 01: INTRODUCTION**

### **1.1 Background**

Local authorities do not derive their powers from an individual source but from numerous Acts and Ordinances. The main Acts relating to local government in Sri Lanka are the *Municipal Council Ordinance No. 29 of 1947*, the *Urban Councils Ordinance No. 61 of 1939*, and the *Pradeshiya Sabha Act No. 15 of 1987*. As a consequence, the three different types of local authorities have slightly different powers. Municipal Councils have more powers than Urban Councils and Divisional Councils. As of November 2017, there were 341 local authorities (24 municipal councils, 41 urban councils and 276 divisional councils). According to the Municipal Councils Ordinance No. 29 of 1947, the main scope of municipal councils is to provide the public with a number of welfare facilities including waste collection, recreational facilities, roads, libraries, drains, maintenance of public parks, health, housing, and sanitation by means of rates collected from the residents themselves. The Municipal Councils are authorized to provide those particularized functions. Therefore, it is the responsibility of the Municipal Councils to provide the comfort, convenience, and well-being of the community (Leitan et al., 1998).

Solid waste management and sewerage maintenance handled by MCs are accepted to be highly vulnerable areas for workers to be contracted with occupational diseases which might affect the workers in health, financial and social attitudes (Bowers, 2014). Uyangoda & de Mel (2012) stated that due to financial constraints and duty requirements at the workplaces, most workers tend to resort to least possible measures to attend to their diseases and continue their presence in the workplace. Uyangoda & de Mel (2012) further stated that this practice has led to more severe consequences for the worker and the employer, i.e. the worker getting the occupational disease worse and the employer getting less work done for the wages he pays for the worker.

The occupational diseases are very difficult to link to the current workplace of the worker due to its inherent nature of the long latent period. (Zimmer and Hoffer, 2009). Leitan et al. (1998) stated that once the symptoms are developed the employers may

not be ready to accept the causation of the disease due to this long latent period and also the worker may not be in a position to confront with the employer for the obvious reason of losing his job. Leitan et al. (1998) further stated that due to this long latency period, there may be a too long delay between the exposure of the disease and the removal or reduction of the causes of ill health.

## **1.2 Research Problem**

Perera (2003) stated that workers absenteeism and attending to work without required physical fitness is regularly affecting the daily schedule of works in the departments of solid waste management and sewerage in Municipal Councils, Urban Councils, and Pradeshiya Sabhas since garbage handling is solely done by these local government bodies in the country. Perera (2003) further stated that occupational diseases have seriously affected the productivity of the workers causing heavy losses to the municipal councils in their day-to-day activities. This aspect has to be considered seriously in order to reduce the causes of issues. One of such considerations is to improve the reporting mechanism for early detecting occupational diseases and make further improvements (Wanasinghe, 2003). Currently, MCs are mainly practicing mechanisms to report occupational injuries according to the Factories Ordinance No. 45 of 1942 but there is hardly any mechanism available to report occupational diseases (Leitan et al., 1998).

Wanasinghe (1999) stated that while the tasks of collecting and disposal of solid waste and to providing sanitary facilities to the residents of the municipal council area are performed, the safety and health issues of the workers are coming under the purview of the Factories Ordinance No.45 of 1942. According to Fernando (2013) as far as the productivity of the above workers is concerned, productivity has come down with a considerable number of workers suffering from occupational diseases, are working among the cleaning gangs while no reporting of such diseases has been done to the relevant authorities. Fernando (2013) further stated that this situation has been critical as there is no mechanism to report and screen their diseases at early stages and take

preventive actions in order to minimize productivity losses caused by serious health issues.

Employers and employees are equally affected by occupational diseases. Therefore, it has become a timely step to reduce the possibilities of spreading the occupational diseases in worksites. Employers are benefitted by minimizing the number of affected cases and frequency of identification of cases whereas employees are benefitted by regularizing the medication process while strengthening the compensation mechanism provided by the legislation. It is observed that early detection of occupational disease-causing- agents in workplaces would minimize the damages to both parties.

Therefore, this research is focused on identifying the challenges prevailing in the currently practiced system of screening and reporting of occupational diseases in solid waste management and sewerage maintenance workers in municipal councils.

### **1.3 Aim and Objectives of this Research**

#### **1.3.1 Aim of the Research**

Improving the early detection mechanism of occupational diseases in municipal council workers has become the aim of this research.

#### **1.3.2 The Objectives of the Research**

- Identifying health issues of municipal sanitary workers.
- Study occupational diseases reporting systems currently practicing in municipal councils.
- Analyze the challenges in the current occupational diseases reporting system.

**CHAPTER-02**  
**LITERATURE SURVEY**

## **CHAPTER – 02: LITERATURE SURVEY**

### **2.1 Introduction**

Walters (2007) stated that the classification of occupational diseases is different from country to country. According to Walters (2007) occupational diseases are listed and recognized as ‘Occupational’ in all the countries. This occupational disease list is developed and updated time to time by relevant authorities and since this process involves regulatory provisions in all countries, their respective states are also involved in that process. Schubeler (1996) stated that the composition of the advisory committees involved in such activities varies in different countries. For an instance, according to Schubeler (1996) in Germany this committee comprised only of medical experts, whereas in Denmark it can include representatives of employers and workers. In case of France, this committee comprised of representatives from social insurance funds also. International Labour Conference held in 2010 the List of Occupational Diseases was revised, and it can be used as a guideline for any state. List of Occupational Diseases (revised 2010) is annexed as Appendix 02.

ILO (2013) stated that work-related accidents or diseases are causing serious effects on the day-to-day life of the workers, and also to their families while affecting to the production status of the enterprises. ILO (2013) further stated that the costs incurred to the employers by occupational diseases can be enormous. In the side of employers, main areas of loses may be the cost of compensation payments, cost of payments for unattended days of the worker and repair cost of damaged machinery and equipment.

Cass and Musgrave (2017) stated that the waste handling and waste transport system vary from region to region, country to country. Cass et al. (2017) further stated that there are waste management concepts that are universally accepted and implemented under the area of waste hierarchies that included 3Rs (Reduce, Reuse, and Recycle). This is further elaborate under extended procedure responsibility (EPR) and the polluter pay principle. Ministry of Health (2018) consolidated this matter directed on



the implementation of a solid waste management program in every region in every country. Ministry of Health (2018) further stated that solid waste management programs are particularly designed to better management of solid wastes for the purpose of protecting environment.

Dorevitch and Marder (2018) stated that all activities in solid waste management and sewerage maintenance involve risk, either to the worker directly involved, or to the nearby resident. Dorevitch et al. (2018) further stated that risks occur at every step in the process, from the point where residents handle wastes in the home for collection or recycling, to the point of ultimate disposal. Bunn, Slavonva, and Tang (2017) stated that in developing countries, workers and waste pickers handling waste throughout the world are exposed to occupational health and accident risks related to the content of the materials they are handling, emissions from those materials, and the equipment being used. Bunn et al. (2017) further stated that people living and working in the vicinity of solid waste processing and disposal facilities also are exposed to environmental health and accident risks. These risks relate to the emissions from the wastes, the pollution control measures used to manage these emissions, and the overall safety of the facility. According to Englehardt, Fleming, and Bean (2016) as with occupational risks, these risks are being substantially managed in high-income countries, but are still largely unmanaged in most developing countries. Englehardt et al. (2016) stated that in developing countries, the health-related underpinnings of waste management still need to be addressed. In developing countries, while the per capita quantities of wastes and labor costs are low, the costs of providing waste management (even at their current lower standard of operation) are not proportionately low. National Social Welfare Board, Department of Drugs (2017) stated that equipment capital costs and fuel costs in low-income countries are comparable to those in high-income countries, and sometimes are higher because of importation costs and currency exchange variations. According to National Social Welfare Board, Department of Drugs (2017) to overcome safety and health issues of waste management in developing countries, governance needed to have efficient planning for short term, long term, and special program for waste picker toward sustainable development in solid waste

management at national level. According to the American Journal of Medicine (2010) health conditions related to occupational diseases are associated with particular occupational exposure conditions. Common Health Conditions Associated with Occupational Exposure are annexed as Appendix 01.

## **2.2 Solid Waste and Wastewater Management Process in Municipal Councils**

According to David (2018) e-waste being hazardous in nature demands scientific management thereby protecting and safeguarding the health of the workers. David (2018) stated that a major chunk of e-waste ends up in informal sectors where crude methods are employed thereby risking the health of workers. The current scoping review based on Arksey and O'Malley's framework was done to explore the available literature to summarize the perceived and manifested health problems among informal e-waste workers. David (2018) had done a literature search in three databases namely PubMed, Web of Science, and ScienceDirect between 1/01/2010 and 1/01/2018. All the titles and abstracts were scrutinized to include only those studies on the basis of health symptoms/problems among workers. Mustajbegovic, Zuskin, Kern, and Kos (2017) stated that health problems, could be categorized into five broad categories i.e. physical injuries, respiratory, skin, musculoskeletal, and other general health problems. Mustajbegovic et al. (2017) further stated that major factors which could be related to health problems were job designation, age, non-usage of personal protective equipment, exposure to dust, and hazardous chemicals.

Amangabara et al. (2007) explained that due to increasing population in urban areas wastewater management has also become a mandatory requirement as water borne diseases are becoming more and more prevalent in urban areas due to bad practices in handling wastewater by municipal councils. Fernando (2013) explained that it is the responsibility of the municipal council to ensure that the wastewater created by the population of the municipality is properly disposed so that the wastewater is no longer a public health issue for the residents of the area.

### 2.3 Occupational Diseases Associated with Waste Handlers

Froines, Wegman and Eisen (1989) stated that waste handling process is a diversified activity ranging from road sweepers to disposal site workers. Froines et.al. (1989) further stated that exposure conditions vary from activity to activity depending on the act the waste handler is doing and also commonly, all waste handlers are vulnerable to get respiratory and skin diseases while some of the workers are running a risk of having infectious diseases spread through water and air. Bowers (2014) classified the occupational diseases depending on the type of exposure condition associated with the waste handlers as follows:

- **Respiratory diseases** affect the respiratory system, which includes mouth, nose, throat, and lungs. The main reasons for occupational respiratory diseases are wood dust, stone dust, and fumes.
- **Skin diseases** are afflicting workers in many industries. The approach called APC (Avoid, Protect, and Check) can reduce or sometimes eliminate the chances of skin diseases.
- **Asbestos-related diseases** have been the greatest cause of work-related deaths in UK. Asbestos is still not banned in many countries.
- **Cancers** are caused by harmful substances called ‘carcinogens’. The carcinogens may affect the workers due to prolong exposure conditions in workplaces.
- **Noise-induced hearing damage** is due to long exposures to noise.
- **Hand-arm-vibration syndrome** may develop due to regular exposure to vibration and may affect lasting damage to fingers and hand.
- **Musculoskeletal disease** affects the back and limbs.
- **Stress** is a critical factor for undercutting the productivity of the worker.

Another type of disease the waste handlers are liable to be caught as Rebecca Tooher, Griffin, Shute, and Maddern (2016) stated is vaccine –preventable diseases. A vaccine-preventable disease is an infectious disease that can be prevented in an individual by administering a vaccine. Rebecca et al. (2016) further states that there are three vaccine-preventable diseases which are thought to be potentially hazardous for waste

handling workers: hepatitis A, hepatitis B, and tetanus. According to Rebecca et al. (2016) exposure to these diseases can theoretically occur at a number of different stages or processes in the management of waste. Work at different locations (for example in a compactor truck, sewer manhole or at a landfill site) exposes workers to a range of hazards. Rebecca et al. (2016) further stated that potential pathways of infection for vaccine-preventable diseases in waste handling workers are hypothesized to be the following:

- **Hepatitis A** – contact with contaminated water and/or fecal matter (in disposable nappies and other waste);
- **Hepatitis B** – cuts, abrasions, and lacerations from waste contaminated with blood or blood products, needle stick injuries from contaminated waste; and
- **Tetanus** – puncture wounds and other abrasions and lacerations from contaminated waste, particularly metal, wood splinters, and waste contaminated with soil and animal manure.

#### **2.4 Cost of Occupational Diseases**

According to International Labour Office (ILO, 2013) main loss in the employer's concern is that the ill-worker has to be replaced by a new worker who has no proper experience as much of the previous worker was having and the employer has to train the new worker and wait until the new worker gains the full potential which might take some time. Fobil, Armah, Hogarh, and Carboo (2018) stated that another factor that affect the enterprise is the negative influence the fellow worker would get as a result of the disease. According to Fogil et al. (2018) this influence is so strong that sometimes it might lead to the fellow workers to leave the enterprise. Abou-ElWafa, El-Bestar, El-Gilany, and Awad (2017) stated that the most damaging factor is the public might get an alarming signal that the enterprise is producing hazardous out puts which have caused the workers diseases that might put the public relations of the enterprise in to trouble.

The Bureau of Labor Statistics (BLS) estimated that in 2017 nearly 3.8 million workers were injured or developed a work-related illness and 5342 workers died as a result of

those injuries or illnesses in USA (BLS, 2018). Steenland, Burnett, Lalach, Ward, and Hurrell (2003) estimated that occupational fatality ranked as the 8th leading cause of death in the United States for the year 1997. Steenland et al. (2003) stated that the impact of occupational disease and injury is widespread, affecting the individual, the family, the workplace, and society. Moscato, Dellabianca, Perfetti, Brame, Galdi, Niniano and Paggiaro (1999) stated that occupational disease or injury can significantly affect an individual's socioeconomic standing, mental health, physical health, and family life. Moscato et al. (1999) investigated an individual's socioeconomic standing after the development of work-related asthma (WRA) and found that individuals who have been diagnosed with WRA experienced up to an 8% decrease in income and socioeconomic standing. Ameille, Pairon, Bayeux, Brochard, Choudat, Conso, and Iwatsubo (1997) found that three years after diagnosis of WRA, almost 46% of individuals had experienced a loss in income and 44% had left the job that had either caused or exacerbated their asthma. Ameille et al. (1997) further stated the impact of the occupational disease is not confined to the individual; there are substantial productivity and financial losses due to these illnesses and injuries.

## **2.5 Common Challenges in Current Systems of Screening ODs**

Arnaud et al. (2010) & Souza et al. (2010) stated that physicians reporting of occupational disease presents a unique set of challenges when used to conduct surveillance. According to Arnaud et al. (2010) the challenges associated with physician-based disease reporting systems have been well identified in the literature. Arnaud et al. (2010) further stated that most challenges are associated with the completeness and accuracy of reporting and are the two concerns most frequently cited in the literature. Carlson (2018) stated that coupled with secondary data sets, physician reporting could provide a complete picture of occupational disease and injury. According to Carlson (2018) underreporting is a commonly cited concern when using workers' compensation data or physician reporting of occupational disease or injury.

EPA (2017) stated that the significantly high prevalence of health hazards may be due to the lack of concern of the public regarding the safety of garbage worker by

discarding harmful objects without necessary precautions. EPA (2017) further stated that the risk of needle stick injuries and exposure to infectious diseases is a particular concern on routes near medical facilities. According to Lundholm, and Rylander (2018) the workers are also responsible for these accidents as many do not use the available safety measures. Lundholm, and Rylander (2018) stated that the authorities too have the responsibility of supplying standard safety equipment to the employees in adequate quantities. According to Straub, Pepper, and Gerba (2017) at first glance, garbage collecting may not seem extremely hazardous but in reality, it comprises of many health problems. Straub et al. (2017) recommended that health education programs should be conducted on a regular basis for both the workers and the relevant authorities regarding occupational health diseases and health hazards, and their prevention with emphasis on the advantage of prevention over cure. Trout, Mueller, Venczel, and Krake (2017) stated that hospitals should use appropriate containers for the disposal of sharps. Special bags/tags or signs should be used for them. Trout et al. (2017) further stated that hospitals and house holders must take extra care when discarding sharp objects, toxins, and irritants into garbage so as to prevent injury to others. Scarlett- Kranz, Babish, Strickland, and Lisk (2018) stated that Workers should be provided with and encouraged to use safety equipment such as slip-resistant footwear to prevent falls, nose-and-mouth masks to prevent respiratory problems and heavy gloves during work in the field.

Azaroff, Levenstein and Wegman (2002) described several “filters” that may explain the underreporting of occupational diseases that occur in OD reporting systems as follows:

- Employee’s fear of disciplinary action for reporting
- The partial wage replacement on workers’ compensation may be inadequate
- Long latencies or unusual etiologies may prevent workers and health care providers from recognizing work-relatedness

- Health care providers' unfamiliarity with work-related conditions or the impact workers' compensation claims have on insurance premiums may lead some employers to respond against reporting
- Company employed occupational health and safety personnel's unfamiliarity with reporting and recording requirements

Unfortunately, data to quantify to what degree these filters bias (undercount) in occupational disease reporting is unavailable, (Azaroff et al., 2002).

According to Rushton (2017) in developing countries, the waste discharged for collection is seldom stored in closed containers and is dumped on the ground directly, requiring that it be shoveled by hand, or left in an open carton or basket to be picked up by hand. Rushton (2017) stated that workers, therefore, have significantly more direct contact with solid waste than their counterparts in high-income countries, who predominantly handle sealed plastic bags and covered dustbins. Wouters, Hilhorst, Kleppe, Douwes, Peretz, and Heederik (2017) stated that the exposure to the health-risks were not yet identified as a special occupational problem. According to Wouters et al. (2017) in most high-income countries data on health and accident consequences is inadequate, and in developing countries almost non-existent. Norman, Kretchy, and Brandford (2017) stated that in developing countries like India, there has been little study of the health and injury incidence of waste workers. Norman et al. (2017) further stated that most of the reviewed studies suffer from limitations related to poor exposure assessment, and lack of information on relevant confounders. Gutberlet, Baeder, Pontuschka, Sonia, and dos Santos (2018) stated that waste work is overridden by the social, economic, and environmental deprivations and also involves gender issues. According to Gutberlet et al. (2018) the working conditions for women sweepers are often very poor, they may have no protective wears, or equipment but few complain about the situation. Gutberlet et al. (2018) further stated that in these contexts, to understand and assess the health-risks involved in municipal solid waste management, a study was conducted among women Municipal solid waste workers in Kerala state, India where the problem has worsened due to high consumption pattern and per capita solid waste generation and low per capita availability of land.

According to Zimmer and Hoffer (2009) although the insurance system has helped the employer and the worker in a favourable manner sometimes, it might cause additional obstacles to the compensation process. Zimmer and Hoffer (2009) further stated citing a Tanzanian case study that sometimes the cost that a worker incurred in the process of claiming for compensation was much higher than the compensation amounts paid.

Hottle, Bilec, Brown, and Landis (2017) stated that unlike other waste streams, municipal solid waste (MSW) is collected manually, and MSW collection has recently been found to be among the highest-risk occupations in the United States. Hottle et al. (2017) further stated that however, as for other occupational groups, actual total injury rates, including the great majority of injuries not compensated and those compensated by other insurance, are not known.

Yodaiken and Bennett (2017) stated that the production, segregation, transportation, treatment, and disposal of health-care waste involve the handling of potentially hazardous material. According to Yodaiken and Bennett (2017) protection against personal injury is therefore essential for all workers who are at risk. Yodaiken and Bennett (2017) further stated that the individuals responsible for management of health-care waste should ensure that all risks are identified and that suitable protection from those risks is provided.

According to Cherry and McDonald (2002) a number of countries have national occupational disease and injury reporting systems. Cherry and McDonald (2002) stated that while they operate under different legal jurisdictions and funding support, the experiences and developed methodologies are worthy of evaluation and consideration. Cherry and McDonald (2002) further stated that the United Kingdom, France, and Canada have implemented national physician reporting systems using a variety of methods including: sentinel reporting, targeted physician reporting, and universal reporting for the capture of occupational disease and injury. The statutes, Ordinances and Acts referred relating to Sri Lankan perspective is listed in appendix 04.

Nordman, Karjalainen and Keskinen (1999) compared the reporting systems of different countries for occupational asthma and found that the Finnish compulsory



reporting system was the most complete and robust, and concluded that adequate funding and authority are necessary components for complete case capture.

Meyer, Cherry, Holt, Chen and McDonald (2001) stated that, in late 1980's and early 1990's, a significant effort was put forward to create and pilot test the Sentinel Event Notification System for Occupational Risks (SENSOR) surveillance model. SENSOR required immediate or timely reporting of a case to the designated authority, most often a health department. Meyer et al. (2001) further stated that the necessary staff and professional expertise to conduct this work is critical to the accuracy and completeness of the data collected.

According to Kadiri (2016) there has been growing concern over the disposal of solid waste, which may contain small amounts of hazardous waste. Kadiri (2016) stated that hazardous products generated in the informal enterprises, just like those generated in the domestic and industrial sectors, pose a threat to human health and the environment in their use and disposal.

Moscato et al. (1999) stated that workers' compensation data is a data source often utilized for estimation of the burden of occupational injury and illness within a state. Moscato et al. (1999) further state that the use of workers' compensation data as a method of surveillance is limited and often an underestimation of work-related injury and illness. According to Moscato et al. (1999), this underestimation is due to restrictions and exemptions of employee populations from participating in workers' compensation as well as underreporting by employees, employers, and physicians.

According to Chernova and Shepovalova (2017) it was revealed through risk assessment that most of the waste workers as well as enterprise operators had been affected by cuts and skin rashes that were caused by substances and insects associated with the disposed solid waste. Chernova and Shepovalova (2017) further stated that the open wounds were also at risk of being infected by tuberculosis in such unhygienic working conditions.

Many states had expanded the requirement of physician reporting to include laboratories and other healthcare systems providers such as clinics, hospitals, nursing homes, and other provider groups (Bakerly, Moore, Vellore, Jaakkola, Robertson, and

Burge 2008). Meijer, Grobbee and Heederik (2004) stated that it appears that despite the increase in the number of required reporting entities, it is still very challenging to get these groups to report. Laboratories are the most consistent and reliable reporting entities. Minnesota (2015) expressed a few states have also accessed medical and health records to bolster the information and confirm the reports of occupational disease, though this was not an activity that all states were able to pursue as it can be quite resource intensive.

Mishara (2019) stated that the safety interventions in many Asian countries are complicated by the fact that solid waste collection is undertaken through labour intensive systems and hence workers experience high physical loads and inadequately stored waste.

According to Bonnetterre, Bicout, Larabi et al. (2008), encouraging and enforcing disease reporting by physicians and other healthcare providers is a much more challenging task. Cherry et al. (2002) stated that, States have tried mailings, phone calls, newsletters, articles, thank you cards, in-person visits, and surveys in varied attempts to inform providers of their responsibility and to maintain reporting. Even states with the ability to provide financial incentives to physicians and occupational health clinics to support reporting found it necessary to continually remind providers of the reporting requirement. Cherry et al. (2002) further stated that, it was very clear from the conversations with states that initiating and maintaining reporting of occupational diseases with the physician population was the most challenging aspect of the reporting system.

Nordman et al. (1999) stated that National Institute for Occupational Safety and Health (NIOSH), has been encouraging the use of Electronic Health Records (EHR) which has created opportunities for keeping health records in an easily accessible mode for the benefit of the patient and for the public health surveillance. It is highly recommended to include the individual's occupation and industry into the standards of EHR (NIOSH, 2015). In 2011, an Institute of Medicine report made five recommendations to NIOSH for evaluating the feasibility of including occupational information in EHRs (Minnesota, 2015). According to Nordman et al. (1999) the

possibility of using EHRs to conduct surveillance of occupationally related diseases, as well as providing clinicians with important patient information, certainly present “meaningful use” of EHRs. . Paul (2015) expressed that however, at this time, the EHR is continually evolving since 2005 and the standards have not been finalized and established. Paul (2015), further expressed that as the collection of occupation and industry as data is not yet recognized as standard in the EHR, this method of surveillance was not among the listed recommendations. Institute of Medicine (2011) stated that however, should occupation and industry become standard variables captured in the EHR, this issue will be revisited, and the opportunities and limitations provided by this data source will be explored fully for occupational disease surveillance.

## **2.6 Issues in Identification of Occupational Diseases**

Drummond (2007) expressed that employers have formulated the principles of sick pay and sick leave, depending on the terms and conditions of the contract of employment to partially contribute to the compensation process. Takala, Urrutia, Hämäläinen, & Saarela, (2009) stated that underreporting has been acknowledged by most of the European countries according to a survey done in Europe from 2002. Turner, Carder, Hussey, Zarin and Agiue (2006) stated that it was understood that the reluctance of the employees to provide information, the lack of awareness and in-service-training provided for general physicians about ODs, the employees' uncertainty of job loss, and the insufficient number of industrial doctors were among the reasons to hinder the identification of ODs. Turner et al. (2006) further stated that long and tedious examination procedures, difficulties associated with providing proof of exposure to risk and poor knowledge about litigation among workers are also issues relating to identification of ODs.

Zimmer and Hoffer (2009) stated that the work-related diseases tend to be more and more meshed up with occupational diseases due to poor mechanisms practiced in many countries to identify the causes of the diseases. The other reason for this is the deficient recognition of occupational diseases. Sambo (2009) stated that work-related diseases refer to the diseases where work is a contributory factor while occupational diseases

are a list of agreed diseases which are recognized to be caused by occupation-related agents. Sambo (2009) further stated that the annual cases of occupational and work-related diseases have amounted to be 160 million according to ILO.

**CHAPTER-03**  
**RESEARCH METHODOLOGY**

## **CHAPTER – 03: RESEARCH METHODOLOGY**

### **3.1 Introduction**

One of the largest municipal councils was selected for the purpose of data collection and analysis of this research. The Municipal Council (MC) is the competent authority to provide welfare facilities to the residents of the municipality (Municipal Councils Ordinance No.29 of 1947). According to the said Ordinance it bears the responsibility of providing favorable conditions for a high-quality life for the population of the municipal area as well as for the floating community. With a view to satisfying the above requirement, the MC has established a Solid Waste Management Department for planning, organizing, and carrying out the collection and disposal of solid waste while a Drainage Department for maintenance and improvements of sewer lines and for new house connections. IWMI (2019) stated that the quantity of solid waste produced by the households, businesses, and industries located within this city is about 700 metric tons per day while nearly 120000m<sup>3</sup> of wastewater is pumped to the sea daily.

According to the organizational chart this Municipal Council has its own Health Curative Department and Free Dispensary system. Qualified medical practitioners and para medical staff is employed in each Free Dispensary. That unpublished organizational chart stated that altogether 25 Free Dispensaries are located in entire Municipal Council Area. In addition to those 25 free dispensaries there is one staff clinic, 05 Dental clinics, 04 Eye Clinics and 01 ENT Clinic are available for general public. Other than the general public MC employees also can get their service at free of charge.

Target group in this research is solid waste and drainage workers currently employed in the Municipal Council (MC). According to an unpublished internal document the available labor force in the MC in the solid waste department is around 200 and in the drainage department it is about 175. That internal document further stated that solid waste collection in three municipal districts has been outsourced to private contractors

while remaining three districts are operated by the MC itself. The drainage work in the total municipal council area is operated solely by the MC.

Although it is important to address the issues of retired labourers who might have contracted some disease-causing agent in their occupation and elapsing latent period of the disease by the time of their retirement, those who are still in the service are only taken into account for avoiding the additional burden of searching those retired individuals by their own residences scattered throughout the island.

### **3.2 Research Process**

Focus group discussions were used for sample collection. A questionnaire survey was done among a sample of 52 workers employed in Solid Waste Department and Drainage Department of the Municipal Council. A Questionnaire was prepared to interview the workers. It was prepared in both English and Sinhala languages. In case of Tamil speaking workers, questions were explained in Sinhala as all Tamil workers could speak and understand Sinhala well, and got their feedback to fill the blanks in Sinhala format. From a population of around 300 workers a sample of 52 workers were taken.

This questionnaire was looking into the areas of previous work history, types of diseases identified so far, discomfort, and symptoms prevailing at present, whether reported them to the authorities and outcome of the reporting. The types of occupational diseases which might possibly be found among solid waste and sewerage workers were selected by consultation of medical practitioners working in the MC before the questionnaire was prepared.

Three separate groups of experts were used to get views. One group composed of 10 Medical officers who were working in the Health Curative Department of the MC and were supposed to be maintaining the screening and reporting records of the workers in solid waste management and drainage departments. These records were expected to be used to establish the screening and reporting mechanism currently practiced in the MC.

Out of a population of 10 medical officers, three numbers of them were selected considering the close proximity of their dispensaries to the regional depots of sanitary labourers. It was assumed that the workers were likely to attend to the clinics in the nearby dispensaries rather than going to a clinic in a faraway dispensary.

Another group comprised of fifteen numbers of nurses who were working in municipal dispensaries in the close proximity of regional depots of solid waste and drainage departments. A sample of three nurses were selected for the data collection purposes.

Out of a population of ten top management engineers a sample of three engineers were selected whom were administering the solid waste management and sewerage departments of the MC. The views of those engineers were expected to be used to establish the implementation mechanism practicing in the CMC with regard to the prevention and minimizing occupational diseases and work-related illnesses while investigating the measures taken to improve the productivity among ill-affected gangs of solid waste and drainage workers.

Primary data were collected through a questionnaire survey from a selected sample of solid waste and sewerage workers. To get expert opinion, doctors, nurses, and engineers were interviewed.

A special care was maintained to protect the privacy of the workers in dealing with sensitive areas like personal details, income, expenses, and health issues.

In the case of doctors, nurses and engineers also same care was maintained as all of them were public servants and were governed by a set of rules where they were given a limited room to expose the shortcomings and grievances associated with their job.

The Questionnaire prepared for collecting data from the solid waste and sewerage workers is annexes as Appendix 03

The details of responded participants among the populations of doctors, nurses, and administrating engineer are tabulated as follows;



Table 3.1 Details of selected sample of doctors

Designation	Type of physician	Working experience (years)	No. of regular patients treated per day
Doctor 01	GP	12	75
Doctor 02	GP	14	60
Doctor 03	GP	06	75

Table 3.2 Details of selected sample of nurses

Designation	Working Experience (Years)	Patients attended per day
Nurse 01	21	20
Nurse 02	11	30
Nurse 03	14	25

Table 3.3 Details of selected sample of administration engineers

Designation	Type	Working Experience (Years)	No: of workers monitored daily
Engineer-01	Drainage	08	40
Engineer-02	Drainage	15	32
Engineer-03	Solid waste	14	42

**CHAPTER-04**  
**DATA ANALYSIS AND DISCUSSION**

## **CHAPTER – 04: DATA ANALYSIS AND DISCUSSION**

### **4.1 Introduction**

In this research total number of workers interviewed was 52. Out of them 28 from Sewerage Department and 24 from Solid Waste Management Department. None of the workers had reported of any work-related disease although some of them had a feeling that they have got some disease related to their occupation. Especially in solid waste handling workers, some had got back-bone-pains and rashes on their skin. But they had never reported them to their employer nor to a doctor. They do not consider those symptoms to be treated by a doctor instead they apply some medicinal creams which are available in the local market. They do not consider the long-term consequences of back bone pain which might ultimately lead to permanent disability. In the case of rashes also the workers' idea is same. If the disease gradually comes to a stage where the worker is unable to report for duty only, he bothers about the disease and goes to a doctor.

Some workers expressed their symptoms which might have a link to occupational diseases. But they were not willing to relate their symptoms to a work-related disease simply because of the fear that it might affect their job and other thing is they are still capable enough to proceed with their job even after showing the symptoms.

### **4.2 Primary Data Analysis**

The most difficult part of the data collection was to convince the workers that this data collection would not be used to interfere with their day-to-day labour scheduling work, or their health screening programs. Many workers were reluctant to expose their health conditions and their expenses for work-related ailments. Some workers had worked more than a decade in either Solid Waste Management or Drainage Department without any transfer to any other department and were even willing to work in the same department until they get their retirement at the age of 60 years. None of the doctors, nurses, and engineers had encountered any worker with occupational diseases.

This data collection was solely done on the basis that the workers are telling truth on their medical history. Most common ODs were selected for this review, so that a sound conclusion could be achieved in the long run. But since a medical observation was not done, the findings may be inaccurate as some of the workers seemed to be lying about their medical conditions. For an instance, the occupational deafness and blindness require medical investigation to diagnose properly as they are not observed by external appearance. While having those diseases in their body, knowingly or unknowingly workers may not admit that they are suffering from those diseases and the data collectors also have no qualifications to diagnose such diseases rather than notifying what the workers say as the answer for the question. The most crucial area in this type of data collection is that if the worker is reluctant to expose himself for a medical diagnosis, whether the data collector is a doctor himself, he has no right to investigate the worker further for ODs. Therefore, this type of data collections are unavoidably depends on the trustworthiness of the worker. In the case of the doctors, nurses and administrators also, the accuracy of the data depends on the trustworthiness of the individuals themselves.

Data collected for seven ODs which were selected after consultation of doctors working in the MC, i.e. asthma, diarrhea, musculoskeletal, typhoid, tetanus, blindness, and deafness. Fifty-two workers were randomly selected from the population of potential cases, three doctors were selected from the diagnosing staff, three nurses were selected from the recording staff, and three engineers were selected from the administrating staff. Observations received from each category is tabulated in Table 4.1.

Out of the 52 workers interviewed only 03 expressed that they have back bone pains but did not agree to mark it as a work-related disease and they explained it as an inherent pain due to their age. Any of the other seven occupational diseases i.e. asthma, Diarrhea, Musculoskeletal, Typhoid, Tetanus, Blindness, Deftness, asked in the interview were not found among them. It was observed that many of them refrained from exposing themselves in the areas of diseases, setbacks, and shortcomings. They always tried to pretend that they are fit for their job.

Table 4.1 Details of Recorded Occupational Diseases

Occupational Diseases commonly found among workers	No. of affected workers	No of cases reported to CMC	No of cases refrained from exposing	OD cases identified by Doctors	OD cases identified by Nurses	OD cases identified by Engineers
Asthma	0	0	0	0	0	0
Diarrhea	0	0	0	0	0	0
Musculoskeletal	<b>3</b>	0	0	0	0	0
Typhoid	0	0	0	0	0	0
Tetanus	0	0	0	0	0	0
Blindness	0	0	0	0	0	0
Deftness	0	0	0	0	0	0

Data collected from the Questionnaire survey with regard to the vaccination is tabulated in Table 4.2.

Keeping documentary evidence for the vaccinations for diseases likely to spread through water and wastewater among municipal worker was very poor. But some of them had keen memory of vaccination some years back while some could not have any memory regarding vaccinations. For instance, only 06 out of 52 had got Hepatitis B vaccination and 14 had not got it while 32 had no memory relating that vaccination. But none of them had any documentary evidence.

Data collected from the Questionnaire survey with regard to the symptoms related to occupational diseases is tabulated in Table 4.3.

Table 4.2 Records of Vaccinations

List of Diseases the participants were asked to provide documentary evidence which demonstrated their immunity (and to trace the vaccination history)	Number of participants responded verbally			Documentary Evidence Provided
	Yes	No	Could Not Remember	
Hepatitis B (Please ensure dates of primary course and booster)	06	14	32	0
TB (BCG scar check or Montoux within past 5 years)	42	0	10	0
MMR (Measles, Mumps, Rubella) either immunizations or serology for measles and rubella	6	2	42	2
Hepatitis A	6	10	36	0
Varicella (Chicken Pox)	1	28	23	
Have you ever had Chicken Pox?	14	38	0	0
TDP (Tetanus, Diphtheria, Polio)	8	0	38	6
MenC(Meningococcal A&C)	0	38	14	0
Other?	0	0	0	0

Table 4.3 Records of symptoms relating to occupational diseases

Type of the symptom	Responses		
	Yes	No	Declined
Illness, impairment, disability (physical or psychological) which may affect the routine work	0	49	3
Illness, impairment, or disability which may have been caused or made worse by the work	3	48	1
Currently having or waiting for treatment / under investigation at present	3	49	0
Any allergies the current work might have made worse (e.g. latex)	3	49	0
Presently having or previously had any one of the following symptoms.			
• Cough which lasted for more than 3 weeks	22	28	2
• Sudden weight loss	2	50	0
• Intermittent fever with night sweats	15	35	2
• Investigation for Tuberculosis	0	52	0

Majority of workers responded negatively for any symptoms relating to occupational diseases while a few of them declined to respond. None of the workers agreed to mark them as positive cases of occupational diseases. 42% (22/52) of workers had cough lasted for more than three weeks while 28% (15/52) had intermittent fever with night sweats.

Data collected from the Questionnaire survey with regard to health problems related to shift-basis work is tabulated in Table 4.4.

92% of the workers had worked in shift basis before and did not have any health problems due to that. 46% of workers had worked in night shifts before and they also did not state any health problems due to that.

Table 4.4 Illnesses due to shift-basis work

Description	Number of participants responded			
	Yes		No	Declined
	Worked	Suffered Health Problems		
Whether worked in shift basis before and if yes: Any health problems suffered as believed to be directly related to shift work.	48	0	4	0
Whether worked in Nights before and if yes: Any health issues suffered as believed to be directly related to night work.	24	0	28	0

Data collected from the Questionnaire survey with regard to medical treatments, expenses and leave is tabulated in Table 4.5.

80% of the workers had got treatment from municipal dispensaries while 11% had not gone to municipal dispensaries for treatment. But none of them had reported any occupational diseases. 34% of workers had got medicines from external medical institutes for which they had expended Rs. 800.00 per visit. None of the workers mentioned that they had got medical leave for occupational diseases. Monthly average leave days was four.



Table 4.5 Records of medical treatments, expenses, and leave

Description	Number of participants responded		
	Yes	No	Declined
Whether medicines were taken / reported any occupational disease to a Municipal Dispensary ever.	42 had got medicines from Municipal Dispensaries but nobody had reported any occupational disease	6	4
Whether medicines taken from external medical Institutes	18	12	22
Expenditure	Rs. 800.00 per visit		
Whether medical leave taken for any work-related disease	0	45	7
Monthly average leave days	4 days		

### 4.3 Challenges to the OD Reporting System

It was obvious that the occupational diseases reporting system available in the Municipal Council was obsolete and the labourers were also not aware of such a system. Since the labourers were not educated enough to find out the possible means to get any redress for their work related diseases, the employer was in a comfortable zone for there was no any sign of filing any compensation claim by a labourer for any such case in near future. But the hidden loss due to occupational diseases to municipal council is continuing in an accelerated manner as it is not attended by the authorized officers simply due to its hidden nature itself. Workers, doctors, and administrators are by and large contributing to the loss due to ODs. For worker, “it is a risk of losing the job,” for Engineer “we have not found OD patients,” for doctor “it is an unnecessary burden.” Some of the challenges for effective OD surveillance system observed in this research are summarized as follows:

- Employee's fear of disciplinary action
- The partial wage replacement on workers' compensation
- Long latencies or unusual etiologies
- Physician based disease reporting system
- Tedious and lengthy litigation process
- Bureaucracy

#### **4.3.1 Employee's fear of disciplinary action**

Almost all the labourers who participated in the data collection were reluctant to expose their work-related diseases since they had a feeling that such an exposure may lead to an unnecessary trouble of facing medical boards where there is a possibility of losing the job. The other aspect is that by reporting an occupational disease the labourer is deemed to be challenging the authority of the municipal council against the health conditions provided by the MC while highlighting the safety precautions are not adequate enough and those health conditions are causing hazardous exposures leading to ODs which might be lethal. In data collection interview Doctor-01 admitted that workers are reluctant to expose their occupation and the place of work. The workers had a fear of being recorded and reported as an OD patient for it might lead to a disciplinary action. Nurse-03 also accepted that the workers always try to provide fake details regarding the occupation and place of work. All three engineers accepted that they had not found any OD patient working in labour gangs. That means no worker had reported of OD so far.

Therefore, after analyzing the facts in this research it is assumed that the employees are fear of reporting of OD is acceptable.

#### **4.3.2 The partial wage replacement on workers' compensation**

Most of the workers had no pleasant feeling on claiming for compensation for ODs for the outcome of the claim is heard to be inadequate when compared to the expenses needed to be incurred. Almost all workers were at the bottom of poverty and they had no excess money for litigation against their employer. When compared to the risk of

losing both money and the job their attitude towards claiming is very grim. Most possible compensation a worker might get is the wages for the unattended days. For that also the worker has to prove the root cause of the disease to be work-related where he again needs the doctor's medical certificate proving that the disease is work-related where there is hardly any possibility to get that certificate.

The doctor-02 explained that the medical staff has no time to attend to a particular OD case while there is a long queue of patients waiting outside the room to get medicine for more severe cases. It may be true that the medical staff is not enough to cater the huge in-flow of patients to the municipal dispensary making it hardly possible for a worker to get a medical certificate proving an OD. The engineer-01 also accepted that according to the government regulations they pay full-day or half-day wages for work-related diseases depending on the medical certificate of the doctor. Due to the impossible nature of having a medical certificate from a doctor for OD, ill-affected workers opt to come for duty rather than running a risk of losing the day's wage, while staying at the work place under capacity and get the full-day wages.

#### **4.3.3 Long latencies or unusual etiologies**

In the data collection process three numbers of workers were found having backbone pains which might have links to musculoskeletal diseases although etiology is not easy to prove the OD. Workers simply avoid diagnosis having a feeling in mind that muscle pains, backbone pains and total body pains are inherent nature of hard working whereas they have no idea about the consequences of backbone pains. In the engineers' interviews, they accepted that if the worker provides a medical certificate to prove the OD, then they proceed to pay compensation according to government regulations. But the problem is long latency periods and unusual etiologies hinder the recognition of the disease as an OD. This is a very common gap found in the OD screening system and the practice.

#### **4.3.4 Physician based disease reporting system**

This is the most highlighted factor in this research for hindering the process of screening and reporting occupational diseases. It was noted that the total screening process is based upon the physician's medical certificate where underreporting, underestimation and inaccuracy are common inherent factors, and due to these shortcomings, it has become unavoidable that the total OD screening process is ultimately leading to an abandoned state. The scarcity of physicians practicing in government hospitals, lack of vocational training received by physicians in ODs, tedious nature of identifying an OD, burden of proof of medical diagnosis is coming to the physician in litigation process, inadequacy of financial capacity of sanitary workers to afford the cost of hiring a physician in compensation process are the key factors played in keeping the doctors away from the OD related cases.

#### **4.3.5 Tedious and lengthy litigation process**

In the litigation process of OD compensation claims, the burden of proof goes to the patient who is in almost all cases a very poor worker indebted to the employer and many other money lenders. For repayment of his loans he has to continue his job and if he is in the meantime entangled with a litigation process which goes for years with his employer, he will be in real trouble to survive.

#### **4.3.6 Bureaucracy**

Unattended bitter truth is that the MCs are losing money by employing unhealthy workers suffering from ODs while paying them full day salaries. The reality associated with this situation is that losing money by employing unhealthy workers does not affect any officer, but paying compensation directly affects to the authorized officer i.e. engineer designated for looking after the safety of the workers. Therefore, the engineer is in a vulnerable position in occupational safety issues. As a result of that the workers employed under such officers might run a risk of being subject to some bureaucratic activities leading to discouraging the workers from claiming for compensation.

#### **4.4 Discussion**

In Sri Lankan scenario of work-related diseases and its reporting system has always coupled with the employer vs. employee battle. In the case of MCs, the employer is always the State. Total process is governed by the government regulations which need strict adherence to the accuracy, proof of causation, compliance with the legal procedure and many more which requires the assistance of the legal professionals. In developed countries the litigation process is affordable to the working community and the duration of a law case is short making it accessible to both employer and employee. The main objective of a litigation process is to get the benefit of the justice in a short period of time before the side effects of the cause of action would aggravate the situation. In Sri Lanka it is hardly possible to get the justice of a law suit within the life span of a worker or most possible case is that by the time he gets the compensation it is not sufficient to get treatments to the aggravated disease and survive, for he is getting weaker and weaker due to the OD and on the other hand the value of money is also depreciating. Therefore, in Sri Lanka the litigation has not become affordable to the worker-community due to the high charges of lawyers and at the same time the long delays in the courts would add more and more days to pay for lawyers. The most common scenario is that the worker can hardly cover up his expenses for the lawsuit by the compensation he is ultimately given.

In western and developed countries, the worker community is educated and has got some knowledge in personal hygiene, safety at site, repercussions of occupational diseases and the utilization of available reporting systems of ODs. The workers should be more or less aware of the symptoms of ODs and the relatedness of the disease to the work for the betterment of themselves. The employer as well as the employee should be aware of the same not only due to compensation, he has to pay but also due to waste of time and money he is incurred for inferior quality of work done by the employee. Therefore in developed countries the employer and employee are equally interested to avoid the ODs while in Sri Lanka the employer is getting the benefit of workers' reluctance to reporting, as it might save his money for compensation while the upliftment of safety conditions at the work place is neglected.

As it was properly mentioned in the literature review, in the developed countries, the employer and employee are both concerned about the gravity of the consequences of occupational diseases. Employers are having an insurance coverage for occupational diseases liable to be caused by the activities of the workplace while the workers are also having a personal coverage for health which may cover the ODs as appropriate for their workplace. This is very effective for both parties as it might share the burden of compensation process for the benefit of both parties. In Sri Lankan culture the workers have hardly any personal insurance coverage and once they suffer an OD they have to go for compensation at the cost of their personal belongings. As this is not an interesting practice it will not last long and the workers tend to give up the process on the way. The only insurance scheme available in the public sector is “Agrahara” which is limited for permanent and pensionable staff to cover up hospital charges and medical expenses. Most of the sanitary workers are casual workers and they are not benefitted by this insurance scheme. For those who are in permanent carder can get the medical expenses reimbursed by this insurance, but it is usually far less than their loss of daily wages for unattended days.

Physicians’ reluctance to get involved in the litigation process and to get the burden of proof of OD on to their shoulders has globally hindered the OD screening and reporting process. Since almost all screening and reporting systems practiced worldwide totally depend on the medical certificate, in literature review it was observed that the surveys on screening and reporting mechanisms ended up with incomplete and inaccurate data. Therefore, the time has come for the experts to develop an electronic data analyzing system where physician is not given any burden of proof in OD screening and reporting process.

Bureaucracy has played its role in two ways in OD reporting systems. As discussed in the above paragraph the physician plays a bureaucratic role which is well traced in international surveys. There is no difference in Sri Lankan scenario with respect to the physicians’ role. In Sri Lanka, the municipal workers have to face another bureaucratic role by the employer’s staff. Employer of the MCs is the Government of Sri Lanka and its staff is governed by the government regulations which are strict in disciplinary actions. Therefore, the public servants are always try to avoid disciplinary actions. For

an instance, when a compensation is to be paid for a worker for non-compliance with the safety regulations by the relevant authorities of the government then that relevant authorities have to face the disciplinary actions where there is a possibility of surcharge or/and losing the job. In case of the Municipal Councils the relevant authority is municipal engineer and his staff. As the sanitary workers are working under municipal engineer's staff, in reporting the ODs the workers have to face the bureaucracy of the engineer's staff. Therefore it is suggested that whatever the screening and reporting system introduced to be operated by the MC, it is very essential that it should be operated and supervised by an external legal body powerful enough to override the bureaucracy of the physicians and the municipal engineer's staff.

**CHAPTER - 05**  
**CONCLUSION AND RECOMMENDATIONS**



## **CHAPTER – 05: CONCLUSION AND RECOMMENDATIONS**

### **5.1 Conclusion**

Municipal Councils (MCs) in Sri Lanka have hardly any occupational diseases reporting system. For last several decades there has been no reported cases of occupational diseases. Therefore, need of mitigation, litigation or compensation had not arisen. When compared to the similar scenarios in the neighboring countries, occupational disease reporting system operated in municipal councils in Sri Lanka is exceptionally inactive. It is pretty clear that the occupational disease cases were not reported not due to non-availability of OD patients. There should be an effective reporting system for the workers to get the benefit of it. Now the problem prevailing in the MCs is that, the MC is legally bound to comply with the Factories Ordinance of 1942, where occupational diseases as well as occupational accidents should be properly recorded and informed to the factories engineer, but the mechanism utilized to trace the potential patients of OD is not adequate to fulfil that objective. Only thing happened is the loss incurred due to occupational diseases is compensated by the other resources of the Municipal Councils.

Municipal Councils are operated under public funds. Therefore, it is the duty the council to manage its functions effectively so that the public is benefitted at the maximum level. Most of the Municipal councils cannot sustain with their own revenues. For those municipal councils, Government is funding money through many channels to pay salaries of the staff, maintain services to the public, capital investments and other recurrent expenses. Since there is a concept that local government bodies are not profit earning entities, the top management of those bodies are not concerned about the efficient utilization of funds and ultimately, they are putting the local government bodies into loss earning entities.

Municipal councils are hardly concerned about economical utilization of the resources. For example, for a work that can be done by 10 labourers and a tractor, a JCB is also provided simply because the JCB is idling. What actually happens is that the work is done as expected by the management, while almost all the labourers are idling but they

are paid simply because they are in the carder. Same thing happens in the case of OD patients also. Their output is very low, or they are almost idling but their output is alternatively taken by resources like a machine or increasing the number of labourers in the gang. A culture has been created among the Municipal Councils to make it unnecessary to develop an OD reporting system. This is a culture where employer, worker, and doctor are living together with ODs. For worker, "it is a risk of losing the job," for Engineer "we have not found OD patients," for doctor "it is an unnecessary burden." But the bitter truth is that all these categories are paid by public funds while the loss due to OD is also borne by public funds.

The main objective of this research is to look for the challenges the current occupational diseases reporting system is facing relating to screening and reporting in municipal councils in Sri Lanka. Since the current system is almost inactive and non-functional the improvement has to be initiated from the grass root level. Even if a new system is introduced the monitoring and evaluating mechanism in the municipal councils is also to be restructured.

In municipal councils in Sri Lanka it is noteworthy to see that the waste handling workers are in the staff of the employer. Therefore, the employer has a legal obligation to pay salary to workers while they are working in the public service until they get retired and even after their retirement as pension salary. Therefore, early detection of OD is very essential to identify the exposure conditions relating to OD and minimize the hazard by introducing suitable safety precautions. The employer is always running the risk of losing funds even if an ill-health worker is detected as he would continue his job with under capacity until his retirement since the employer has no alternative other than increasing the number of workers in the labour gangs.

In the literature review it was observed that the employers in developed countries are running a risk of being sued for compensation for ODs while maintaining best possible measures to safeguard the workers from being exposed to occupational diseases causing agents. In those countries workers are also educated and alert about the personal hygiene of themselves. In Sri Lanka the situation is somewhat different from

that of those countries. Our employers are more powerful, and workers are running a risk of losing their jobs if workers report the ODs to the authorities.

Once the workers are not suing against the employers for compensation for ODs, there is no point to maintain an OD reporting system as per the opinion of the employers and workers. But in the national level, these employers and workers are paid by public funds. OD affected workers are delivering low output while they are paid fully. The net loss is suffered by the government i.e. public. Therefore, there is a national level interest arisen to establish and monitor a sound OD screening and reporting system within the local government bodies and it is essential that the system should be operated by a fully authorized national level external legal entity.

If the OD screening and reporting system is operated by an external body and if it becomes a mandatory requirement for the workers to participate for the regular check-ups and medical clearance to continue their waste handling activities, then the workers are free of having any risk of losing their job for mere reason of reporting their OD, while the employers are also free of having a risk of losing their funds for OD related consequences like paying wages for ill-health workers, paying compensations, training new workers in place of OD affected workers, maintaining the quality of work while the new comers adjust to work etc.

## **5.2 Recommendations**

As an OD surveillance system, the NIOSH has been researching on electronic health records (EHR) for decades, as an effective tool to trace the ODs without putting much effort on the side of the medical practitioner to review the previous records of the patient. The only obstacle that has hindered the recognition of EHR as an OD reporting tool is that the occupation and industry has not been included into the standards of EHR. Although EHR has proved to be an easy way of recoding patients' data relating to the medical history, it has not become possible to include the patient's occupational details other than his personal details into EHR standard parameters. Until inclusion of those two parameters into the standard variables captured in the EHR, this method will not be among the listed recommendations as a method of OD surveillance.

As long as the workers are not complaining about the occupational diseases and claim for compensations, the municipal councils are safe. But the loss of labour due to OD is left unnoticed and that loss is compensated by other resources of the municipal council. This is very unfortunate situation as far as the waste of labour, waste of public funds, waste of time, risk of labourers being continuously exposure to hazardous agents, risk of having bad reputation as inefficient establishment, loss of trained workers, unnecessary expenses for free medical treatment for workers by government hospitals, social problems arisen due to the illness of the breadwinner of respective families, etc. are concerned.

Workers are not complaining about the occupational diseases not because they are not suffering from ODs. Some prominent factors for them not to report to relevant authorities about their OD are, workers' lack of awareness about the occupational diseases, very tedious procedure in diagnosing an occupational disease, lengthy procedure for litigation, high expenses required for claiming process compared to the outcome, risk of losing the job after submitting the claim, fellow workers' objection for putting their jobs into risk by claiming for damages for lack of safety precautions, risk of having another job instead of another sanitary job, by the time the OD is diagnosed, the earning power as well as the life span of the worker is almost over and the balance time is not adequate enough to adjust for another job, bad reputation they

have gained as sanitary workers has created among themselves a psychological backwardness to challenge the government and unavailability of a proper system to report the ODs to the relevant authorities etc. Therefore if at least a proper system easily accessible is available for workers to report their ODs while they can utilize it at a reasonable cost, there is a possibility that the reporting rate is increased.

In this data collection, it became pretty clear that MC employees are not much concerned about introducing or developing an OD reporting system since they have accustomed to the ODs as they do not feel the loss done by the ODs. And also, the “loss” has become an inherent factor in the total system. Therefore, it is useless to develop a reporting system if it is left to be operated by the MC staff itself. A possible alternative for this endeavor is to appoint an external legal body to develop and monitor an OD surveillance system to regularize the OD reporting, mitigation, litigation and compensation process.

## REFERENCES

- Abou-El Wafa, H.S., El-Bestar, S.F., El-Gilany, A.H., & Awad, E.E. (2017). Musculoskeletal disorders among municipal solid waste collectors in Mansoura, Egypt: a cross-sectional study. *Biomedical Journal of Scientific and Technical Research*. 2: 5-10.
- Amangabara, G.T., Ekere, T.O., & Ogbonna, D.N. (2007). Urban solid waste generation in Port Harcourt metropolis and its implication for waste management. *Journal of Management of Environmental Quality*. 18 (1): 71-73.
- Ameille, J., Pairon, J.C., Bayeux, M.C., Brochard, P., Choudat, D., Conso, F., Devienne, A., Garnier, R., & Iwatsubo, Y. (1997). "Consequences of Respiratory occupational asthma on employment and financial status: a follow-up study." *European Journal of Management and Marketing Studies* 10(1): 55-58.
- Arnaud, S., Cabut, S., Viau, A., Souville, M., & Verger, P. (2010). "Different reporting patterns for occupational diseases among physicians: a study of French general practitioners, pulmonologists, and rheumatologists." *International Journal of Environmental Health* 83(3): 251-258.
- Azaroff, L. S., Levenstein, C., & Wegman, D. H. (2002). "Occupational injury and illness surveillance: conceptual filters explain underreporting." *American Journal of Public Health* 92(9): 1421-1429
- Bakerly, N. D., Moore, V. C., Vellore, A. D., Jaakkola, M. S., Robertson, A. S., & Burge, P. S. (2008). "Fifteen-year trends in occupational asthma: data from the Shield surveillance scheme." *Occupational Medicine (Lond)* 58(3): 169-174.

The Bureau of Labor Statistics (BLS): BLS. (2018). "Diseases related to Occupation"  
Retrieved April, 2018

Bonneterre, V., Bicout, D.J., Larabi, L. et al. (2010). "Detection of emerging  
diseases in occupational health: usefulness and limitations of the application of  
Pharmaco-surveillance methods to the database of the French National  
Occupational Disease Surveillance and Prevention network (RNV3P)";65 (1):32-7  
*Occupational and Environmental Medicine 2008*

CDC (2010). "Occupational Safety and Health - Healthy People." Retrieved  
12/16/2010, from  
[www.healthypeople.gov/2020/topicsobjectives2020/overview.aspx?topicid=30](http://www.healthypeople.gov/2020/topicsobjectives2020/overview.aspx?topicid=30).

Bowers, M. (2014). Overview of the Most Common Causes of Occupational  
Diseases  
<http://www.bollington.com/overview-common-causes-occupational-diseases/>  
Date: 30th June 2014

Bunn, T.L., Slavonva, S., &Tang, M. (2017).  
Injuries among solid waste collectors in the private versus public sectors. *Waste  
Management and Research* 29(10):1043–1052.

Carlson, K., (2018). Electronic Waste Worker Health: Studying Complex Problems  
in the Real World. In: Proceedings of the Eighth International Conference on  
Information and Communication Technologies and Development- ICTD '16  
[Internet]. Ann Arbor, MI, USA: ACM Press; 2016 [cited 2018 Sep 19]. p. 1-4.

- Cass, Y., & Musgrave, C.F. (2017). Guidelines for the safe handling of excreta contaminated by cytotoxic agents. *American journal of hospital pharmacy*, 49:2017–2018.
- Chernova, L. & Shepovalova, A. (2017). “Occupational health and safety challenges for small enterprises,” Barents Newsletter on *Occupational Health and Safety*, vol. 14, pp. 12–14, 2017
- Cherry, N. M., & McDonald, J.C. (2002). The Incidence of Work-Related Diseases. Reported by Occupational Physicians, 1996-2001. *Occupational Medicine*. 52 (7). pp. 407-411.
- CSO (2007) Central Statistics Office (2007). *Quarterly National Household Survey, Quarter 2, 2007*. Dublin: Stationery Office.
- David Tuller. Consumer Health Interactive [monograph on the internet]. Atlanta: *National Institute for Occupational Safety and Health (NIOSH)*; 2018 July
- Dorevitch, S., & Marder, D. [2018]. Occupational hazards of municipal solid waste workers. *Occupational Medicine* 16(1):125–133.
- Driscoll, T., Takala, J., Steenland, K., Corvalan, C., & Fingerhut, M. (2005). Review of estimates of the global burden of injury and illness due to occupational exposures. *American Journal of Industrial Medicine*. 48 pp. 491- 502.
- Drummond Anne, PhD. (2007). A Review of the Occupational Diseases Reporting System in the Republic of Ireland, November 2007. A report prepared for the Health and Safety Authority by School of Public Health and Population Science Centre for Safety and Health at Work. University College Dublin



- Englehardt, J.D., Fleming, L.E., & Bean, J.A. (2016). Analytical predictive Bayesian assessment of occupational injury risk: municipal solid waste collectors *External Risk Analysis* 23(5):917–927.
- EPA (2017). Office of Inspector General Status report: land application of bio solids. Washington, DC: Environmental Protection Agency, 2017ñSñ000004
- Eurostat (2010). Euostat, Health and safety at work in Europe (1999-2007) – A statistical portrait, Inna Šteinbuka, Anne Clemenceau, Bart De Norre, in August 2010
- Fernando, W.R.P.K. (2013). Corporate Social Responsibility in Municipal Councils of Sri Lanka (With Special Reference to Solid Waste Functions) Department of Commerce and Financial Management, University of Kelaniya, Kelaniya, Sri Lanka
- Fobil, J.N., Armah, N.A., Hogarh, J.N., & Carboo, D. (2018). The influence of institutions and organizations on urban waste collection systems: An analysis of waste collection systems in Accra, Ghana (1995-2015). *Journal of Environmental Management*. 86: 262-271.
- Froines, J.R., Wegman, D.H., & Eisen, E. (1989). Hazard surveillance in occupational disease. *American Journal of Public Health* 1989; 79(suppl): Chapter6
- Gutberlet, J., Baeder, A.M., Pontuschka, N.N.F., Sonia, M.N., & dos Santos, T.L.F. (2018). Participatory Research Revealing the Work and Occupational Health Hazards of Cooperative Recyclers in Brazil. *International Journal of Environmental Reservation and Public Health*. 10: 4607-4627.

Hottle, T. A., Bilec, M. M., Brown, N. R., & Landis, A. E. (2017). "Toward zero waste: composting and recycling for sustainable venue-based events," *Waste Management*, vol. 38, no. 1, pp. 86–94, 2017.

ILO (2017). <http://laborsta.ilo.org/>

© 1996-2016 International Labour Organization (ILO) |2017.01.30-17:30\_20170130:0447

Institute of Medicine (2011). Incorporating occupational information in electronic health records: letter report. Washington, D.C., National Academy of Sciences.

International Labour Office, (ILO). (2013). *GB.317/POL/3 Prevention of occupational diseases*, Report, 317th Session of the Governing Body, Geneva, 2013 (Geneva).

Available at: [www.ilo.org/wcmsp5/groups/public/---ed\\_norm/Relconf/documents/Meeting\\_document/wcms-204755.pdf](http://www.ilo.org/wcmsp5/groups/public/---ed_norm/Relconf/documents/Meeting_document/wcms-204755.pdf).

IWMI, 2019: International Water Management Institute

Inception workshop in Colombo (c) IWMI 25/07/2019

Jayadeva Uyangoda & Nelofer de Mel, (ed) (2012). *Reframing Democracy: Perspectives on the Cultures of Inclusion and Exclusion in Contemporary Sri Lanka*, Colombo: Social Scientists' Association.

Kadiri, S. A. (2016) "Risk assessment and control," *African Newsletter on Occupational Health and Safety*, vol. 20, no. 2, pp. 38–40, 2016.

Kendall, N. (2005). *International Review of Methods and Systems used to Measure and Monitor Occupational Disease and Injury*. NOHSAC Technical Report 3. Wellington: National Occupational Health and Safety Advisory Committee.

- Leitan, Tressie et al. (1998). "Report on Improvement of Local Government through Strengthening Pradeshiya Sabhas," Colombo: Center for Policy Research and Analysis, Colombo University.
- Levien van Zon & Nalaka Siriwardena (2000). An Overview of Solid Waste Management in the Ja-Ela Area  
DUEDJH\_LQ\_6UL\_/DQND, IRMP Colombo
- Lundholm, M., & Rylander, R. (2018). Work-related symptoms among sewage workers. *Journal of Industrial Medicine* 40:325ñ329.
- Meijer, E., Grobbee, D. E., & Heederik, D. (2004). "A strategy for health surveillance in laboratory animal workers exposed to high molecular weight allergens." *Occupational and Environmental Medicine* 61(10): 831-837.
- Meyer, J.D., Cherry, N.M., Holt, D.L., Chen, Y., & McDonald, J.C. (2001). SWORD '99: Surveillance of work-related and occupational respiratory disease in the UK. *Occupational Medicine*. 51(3): 204-208
- Ministry of Health (2018). Handbook of hazardous healthcare waste management in 10-bed and 30-bed community hospitals, Thailand. Bangkok.
- Mishara, S. (2019). *Indian journal of occupational and environmental medicine*  
[Pubmed](#), [DOI](#), [PubMed Central](#)
- Mustajbegovic, J., Zuskin, E., Kern, J., & Kos, B. (2017). Respiratory function in street cleaners and garbage collectors. *Journal of Occupational Medicine*.2017; 45(3):241-8. Entrez PubMed

Minnesota (2015). Minnesota Occupational Health and Safety Surveillance Program  
Feasibility of an Occupational Disease Reporting System  
Minnesota Department of Health, May 2015  
[www.health.state.mn.us](http://www.health.state.mn.us)

Moscato, G., Dellabianca, A., Perfetti, L., Brame, B., Galdi, E., Niniano, R., &  
Paggiaro, P. (1999). "Occupational asthma: a longitudinal study on the clinical  
and socioeconomic outcome after diagnosis." *Chest* **115**(1): 249-256.

National Social Welfare Board, Department of Drugs (2017). Instructions for  
handling and administering of cytostatic. Stockholm.

NIOSH (2015). National Institute for Occupational Safety and Health. (May 19,  
2015). "Electronic Health Records (EHRs) and Patient Work Information."  
Retrieved July 2, 2015, from <http://www.cdc.gov/niosh/topics/ehr/>

Nordman, H., Karjalainen, A., & Keskinen, H. (1999). "Incidence of occupational  
asthma: A comparison by reporting systems." *American Journal of Industrial  
Medicine* (Supplement 1): 130-133. October 27, 2000

Norman, D., Kretchy, J.P., & Brandford, E. (2017). Neck, wrist, and back pain  
among solid waste collectors: case study of a Ghanaian waste management  
company. *The Open Public Health Journal*. 6: 59-66.

Parkinson, M.D. (2006). Consumer-driven healthcare done right: prevention,  
evidence-based care, and supportive patient-physician relationships.  
*Virtual Mentor*. 2006; 8:170–173.

- Parkinson, M.D., MPH, 2013. Employer Health and Productivity Roadmap TM  
*Strategy Journal of Occupational Medicine* \_ Volume 55, Number 12 Supplement,  
December 2013
- Paul Papanek, M.D., (2015). Board Chair, Western Occupational and Environmental  
Medical Association Kaiser Permanente, Los Angeles, 2015  
Occupational Medicine and the EHR
- Perera, K.L.S. (2003). "An Overview of the Issue of Solid Waste Management in Sri  
Lanka," in M. J. Brunch, V. Madha Suresh, & T. Vasantha Kumaran, (Eds.)  
Proceedings of the Third International Conference on Environment and Health,  
Chennai: Department of Geography, University of Madras.
- Rebecca, T. et al. (2016). Rebecca Tooher, Tabatha Griffin, Elen Shute, and Guy  
Maddern. "Vaccinations for waste-handling workers. A review of the literature",  
Waste Management & Research, 2016
- Rushton, L. (2017). Health hazards and waste management. *Br. Med. Bull.* 68: 183-  
197.
- Sandra Cointreau (2006). Occupational and Environmental Health Issues of Solid  
Waste Management Special Emphasis on Middle- and Lower-Income Countries,  
2006. The International Bank for Reconstruction and Development/the World  
Bank 1818 H Street NW Washington, DC 20433
- Scarlett- Kranz, J.M., Babish, J.G., Strickland, D., & Lisk, D.J. (2018). Health  
among municipal sewage and water treatment plant workers. *Toxic waste and  
Industrial Health* (3):311-319.

- Schubeler, P. (2006). Solid Waste Management in the Pacific Institutional Arrangements1P. Schubeler. 2006. Conceptual Framework for Municipal Solid Waste Management in Low-Income Countries. World Bank Working Paper No. 9. Washington, DC.
- Simbo, A.B. (2009). *Productivity and operations management*, 3rd edition. Oluseyi Press Limited, Ibadan.
- Steenland, K., Burnett, C., Lalich, N., Ward, E. & Hurrell, J. (2003). "Dying for work: The magnitude of US mortality from selected causes of death associated with occupation." *American Journal of Industrial Medicine* **43**(5): 461-482.
- Straub, T.M., Pepper, I.L., & Gerba,C.P. (2017). Hazards from pathogenic microorganisms inland-disposed sewage sludge. *Rev Environmental Contamination and Toxic waste* 32:55ñ91
- Takala, J. (2000). Indicators of death, disability, and disease at work. *Asian Pacific Newsletter 2000-1*. Geneva: ILO.
- Takala, J., Urrutia, M., Hämäläinen, P. & Saarela, K.L. (2009). 'The global and European work environment – numbers, trends, and strategies.' *Scandinavian Journal on Work and Environmental Health*, Vol. 7, 2009, pp. 15-23.
- Trout, D., Mueller, M.S., Venczel, L., & Krake, A. (2017). Evaluation of occupational transmission of Hepatitis A virus among wastewater workers. *Journal Occupational and Environmental Medicine* 42 (1):83ñ87

- Turner, S., Carder, M., Hussey, L., Zarin, N., & Agiue, R. (2007). The incidence of occupational skin and respiratory disease as reported to the Health and Occupation Reporting Network by physicians in the Irish Republic between 2005 and 2006. Unpublished Victoria Trasko (1953).
- Yodaiken, R.E., & Bennett, D. (2017). OSHA work-practice guidelines for personnel dealing with cytotoxic (antineoplastic) drugs. *American journal of hospital pharmacy*, 43:1193–1204.
- Walters, D. (2007). An International Comparison of Occupational Disease and Injury Compensation Schemes. A Research Report prepared for the Industrial Injuries Advisory Council (IIAC). Cardiff: Cardiff Work Environment Research Centre.
- Wanasinghe, S. (1999). “Effective Local Governance: The Foundation for a Functioning Democracy in Sri Lanka,” Colombo: Institute for Policy Studies.
- Wanasinghe, S. (2003). “Building Local Capacities for Conflict Management: the Potential for Local Governance in Sri Lanka,” in S. Mayer et al (eds.), *Building Local Capacities for Peace: Rethinking Conflict and Development in Sri Lanka*, New Delhi: Macmillan India.
- Wouters, I.M., Hilhorst, S.K.M., Kleppe, P., Douwes, J., Peretz, C., & Heederik, D. (2017). Upper airway inflammation and respiratory symptoms in domestic waste collectors. *Occupational and Environmental Medicine*, 59:106–112.
- Zimmer Stefan & Eva-Marie Höffer, 2009. The Challenge of Occupational Diseases in Developing Countries: Exemplary Observations and Good Practice Proposals from a Cycle of Seminars in Four Continents. *International Journal of Social Security and Workers Compensation* Vol. 1 No. 1, 2009

## APPENDICES

### Appendix 01

#### Common Health Conditions Associated with Occupational Exposure

(American Journal of medicine (Aug 2010))

Condition	Selected exposures	Selected occupations
Musculoskeletal		
Carpal tunnel syndrome	Repetition	Letter sorting
	Vibration	Assembly work
	Awkward postures	Computer work
	Cold temperature	Food processing
De Quervain's tendinitis	Repetition	Meatpacking
	High force	Manufacturing
Cervical strain	Static posture	Computer work
Thoracic outlet syndrome	Static posture, repetition	Assembly work
Respiratory		
Interstitial fibrosis	Asbestos	Mining, construction trades, building maintenance
	Silica	Mining, foundry work, sandblasting
	Coal	Mining
Asthma	Animal products	Laboratory work
	Plant products	Baking
	Wood dust	Furniture making
	Isocyanates	Plastics manufacturing
	Metals (e.g., cobalt)	Hard metals manufacturing
	Cutting oils	Machine operation
	Irritants (e.g., sulfur dioxide)	Various occupations
Bronchitis	Acids	Plating
	Smoke	Firefighting
	Nitrogen oxides	Welding
Hypersensitivity pneumonitis	Moldy hay	Farming
	Cutting oils	Machine operation



<b>Condition</b>	<b>Selected exposures</b>	<b>Selected occupations</b>
Upper airway irritation	Indoor air pollution (i.e., sick building syndrome)	Office work
		Teaching
<b>Neurologic</b>		
Chronic encephalopathy	Organic solvents	Painting, automobile body repair
	Organophosphate pesticides	Pesticide application
	Lead	Bridge work, painting, radiator repair, metal recycling
Peripheral polyneuropathy	Organophosphate pesticides	Pesticide application
	Methyl butyl ketone	Fabric coating
Hearing loss	Noise	Many occupations
<b>Infectious</b>		
Blood borne infections	HIV, hepatitis B	Health care work, prison work
Airborne infections	Tuberculosis	Health care work, prison work
Infections transmitted fecally or orally	Hepatitis A	Health care work, animal care
Zoonoses	Lyme disease	Forestry and other outdoor work
<b>Cancer</b>		
Lung	Asbestos	Construction trades
	Chromium	Welding, plating
	Coal tar, pitch	Steel working
Liver	Vinyl chloride	Plastics manufacturing
Bladder	Benzidine	Plastics and chemical manufacturing
<b>Skin</b>		
Contact dermatitis	Organic solvents	Many occupations
	Nickel	Hairdressing
	Latex	Health care work
<b>Reproductive</b>		
Spontaneous abortion	Ethylene oxide	Sterilizing

<b>Condition</b>	<b>Selected exposures</b>	<b>Selected occupations</b>
Sperm abnormalities	Dibromo chloropropane	Pesticide manufacturing
Birth defects	Ionizing radiation	Radiographic technicians
Developmental abnormalities	Lead	Bridge work, metal recycling
<b>Cardiovascular</b>		
Coronary artery disease	Carbon monoxide	Working with combustion products
	Stress	Machine-paced work
<b>Gastrointestinal</b>		
Hepatitis	Polychlorinated biphenyls	Electrical equipment manufacturing and repair

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HIV = human immunodeficiency virus.

## Appendix 02

### ILO List of Occupational Diseases (revised 2010)

#### INTERNATIONAL LABOUR ORGANIZATION

#### INTERNATIONAL LABOUR CONFERENCE

#### Recommendation 194

(Programme on Safety and Health at Work and the Environment (SafeWork) International Labour Office 4, route des Morillons 1211 Geneva 22 Switzerland)

1. Occupational diseases caused by exposure to agents arising from work activities
  - 1.1. Diseases caused by chemical agents
    - 1.1.1. Diseases caused by beryllium or its compounds
    - 1.1.2. Diseases caused by cadmium or its compounds
    - 1.1.3. Diseases caused by phosphorus or its compounds
    - 1.1.4. Diseases caused by chromium or its compounds
    - 1.1.5. Diseases caused by manganese or its compounds
    - 1.1.6. Diseases caused by arsenic or its compounds
    - 1.1.7. Diseases caused by mercury or its compounds
    - 1.1.8. Diseases caused by lead or its compounds
    - 1.1.9. Diseases caused by fluorine or its compounds
    - 1.1.10. Diseases caused by carbon disulfide
    - 1.1.11. Diseases caused by halogen derivatives of aliphatic or aromatic hydrocarbons
    - 1.1.12. Diseases caused by benzene or its homologues
    - 1.1.13. Diseases caused by nitro- and amino-derivatives of benzene or its homologues
    - 1.1.14. Diseases caused by nitroglycerine or other nitric acid esters
    - 1.1.15. Diseases caused by alcohols, glycols, or ketones
    - 1.1.16. Diseases caused by asphyxiants like carbon monoxide, hydrogen sulfide, hydrogen cyanide or its derivatives
    - 1.1.17. Diseases caused by acrylonitrile
    - 1.1.18. Diseases caused by oxides of nitrogen

- 1.1.19. Diseases caused by vanadium or its compounds
- 1.1.20. Diseases caused by antimony or its compounds
- 1.1.21. Diseases caused by hexane
- 1.1.22. Diseases caused by mineral acids
- 1.1.23. Diseases caused by pharmaceutical agents
- 1.1.24. Diseases caused by nickel or its compounds
- 1.1.25. Diseases caused by thallium or its compounds
- 1.1.26. Diseases caused by osmium or its compounds
- 1.1.27. Diseases caused by selenium or its compounds
- 1.1.28. Diseases caused by copper or its compounds
- 1.1.29. Diseases caused by platinum or its compounds
- 1.1.30. Diseases caused by tin or its compounds
- 1.1.31. Diseases caused by zinc or its compounds
- 1.1.32. Diseases caused by phosgene
- 1.1.33. Diseases caused by corneal irritants like benzoquinone
- 1.1.34. Diseases caused by ammonia
- 1.1.35. Diseases caused by isocyanates
- 1.1.36. Diseases caused by Pesticides

1 In the application of this list the degree and type of exposure and the work or occupation involving a particular risk of exposure should be taken into account when appropriate.

- 1.1.37. Diseases caused by sulphuroxides
- 1.1.38. Diseases caused by organic solvents
- 1.1.39. Diseases caused by latex or latex-containing products
- 1.1.40. Diseases caused by chlorine
- 1.1.41. Diseases caused by other chemical agents at work not mentioned in the preceding items where a direct link is established scientifically, or determined by methods appropriate to national conditions and practice, between the exposure to these chemical agents arising from work activities and the disease(s) contracted by the worker

1.2. Diseases caused by physical agents

1.2.1. Hearing impairment caused by noise

1.2.2. Diseases caused by vibration (disorders of muscles, tendons, bones, joints, peripheral blood vessels or peripheral nerves)

1.2.3. Diseases caused by compressed or decompressed air

1.2.4. Diseases caused by ionizing radiations

1.2.5. Diseases caused by optical (ultraviolet, visible light, infrared) radiations including laser

1.2.6. Diseases caused by exposure to extreme temperatures

1.2.7. Diseases caused by other physical agents at work not mentioned in the preceding items where a direct link is established scientifically, or determined by methods appropriate to national conditions and practice, between the exposure to these physical agents arising from work activities and the disease(s) contracted by the worker

1.3. Biological agents and infectious or parasitic diseases

1.3.1. Brucellosis

1.3.2. Hepatitis viruses

1.3.3. Human immunodeficiency virus (HIV)

1.3.4. Tetanus

1.3.5. Tuberculosis

1.3.6. Toxic or inflammatory syndromes associated with bacterial or fungal contaminants

1.3.7. Anthrax

1.3.8. Leptospirosis

1.3.9. Diseases caused by other biological agents at work not mentioned in the preceding items where a direct link is established scientifically, or determined by methods appropriate to national conditions and practice, between the exposure to these biological agents arising from work activities and the disease(s) contracted by the worker

## 2. Occupational diseases by target organ systems

### 2.1. Respiratory diseases

2.1.1. Pneumoconioses caused by fibrogenic mineral dust (silicosis, anthraco-silicosis, asbestosis)

2.1.2. Silicotuberculosis

2.1.3. Pneumoconioses caused by non-fibrogenic mineral dust

2.1.4. Siderosis

2.1.5. Bronchopulmonary diseases caused by hard-metal dust

2.1.6. Bronchopulmonary diseases caused by dust of cotton (byssinosis), flax, hemp, sisal, or sugar cane (bagassosis) 5

2.1.7. Asthma caused by recognized sensitizing agents or irritants inherent to the work process

2.1.8. Extrinsic allergic alveolitis caused by the inhalation of organic dusts or microbially contaminated aerosols, arising from work activities

2.1.9. Chronic obstructive pulmonary diseases caused by inhalation of coal dust, dust from stone quarries, wood dust, dust from cereals and agricultural work, dust in animal stables, dust from textiles, and paper dust, arising from work activities

2.1.10. Diseases of the lung caused by aluminium

2.1.11. Upper airways disorders caused by recognized sensitizing agents or irritants inherent to the work process

2.1.12. Other respiratory diseases not mentioned in the preceding items where a direct link is established scientifically, or determined by methods appropriate to national conditions and practice, between the exposure to risk factors arising from work activities and the disease(s) contracted by the worker

### 2.2. Skin diseases

2.2.1. Allergic contact dermatoses and contact urticaria caused by other recognized allergy-provoking agents arising from work activities not included in other items

2.2.2. Irritant contact dermatoses caused by other recognized irritant agents arising from work activities not included in other items

2.2.3. Vitiligo caused by other recognized agents arising from work activities not included in other items

2.2.4. Other skin diseases caused by physical, chemical or biological agents at work not included under other items where a direct link is established scientifically, or determined by methods appropriate to national conditions and practice, between the exposure to risk factors arising from work activities and the skin disease(s) contracted by the worker

2.3. Musculoskeletal disorders

2.3.1. Radial styloid tenosynovitis due to repetitive movements, forceful exertions, and extreme postures of the wrist

2.3.2. Chronic tenosynovitis of hand and wrist due to repetitive movements, forceful exertions, and extreme postures of the wrist

2.3.3. Olecranon bursitis due to prolonged pressure of the elbow region

2.3.4. Prepatellar bursitis due to prolonged stay in kneeling position

2.3.5. Epicondylitis due to repetitive forceful work

2.3.6. Meniscus lesions following extended periods of work in a kneeling or squatting position

2.3.7. Carpal tunnel syndrome due to extended periods of repetitive forceful work, work involving vibration, extreme postures of the wrist, or a combination of the three

2.3.8. Other musculoskeletal disorders not mentioned in the preceding items where a direct link is established scientifically, or determined by methods appropriate to national conditions and practice, between the exposure to risk factors arising from work activities and the musculoskeletal disorder(s) contracted by the worker

2.4. Mental and behavioural disorders

2.4.1. Post-traumatic stress disorder

2.4.2. Other mental or behavioural disorders not mentioned in the preceding item where a direct link is established scientifically, or determined by methods appropriate to national conditions and practice, between the exposure to risk factors arising from work activities and the mental and behavioural disorder(s) contracted by the workers.

3. Occupational cancer

- 3.1. Cancer caused by the following agents
  - 3.1.1. Asbestos
  - 3.1.2. Benzidine and its salts
  - 3.1.3. Bis-chloromethyl ether (BCME)
  - 3.1.4. Chromium VI compounds
  - 3.1.5. Coal tars, coal tar pitches or soots
  - 3.1.6. Beta-naphthylamine
  - 3.1.7. Vinyl chloride
  - 3.1.8. Benzene
  - 3.1.9. Toxic nitro- and amino-derivatives of benzene or its homologues
  - 3.1.10. Ionizing radiations
  - 3.1.11. Tar, pitch, bitumen, mineral oil, anthracene, or the compounds, products or residues of these substances
  - 3.1.12. Coke oven emissions
  - 3.1.13. Nickel compounds
  - 3.1.14. Wood dust
  - 3.1.15. Arsenic and its compounds
  - 3.1.16. Beryllium and its compounds
  - 3.1.17. Cadmium and its compounds
  - 3.1.18. Erionite
  - 3.1.19. Ethylene oxide
  - 3.1.20. Hepatitis B virus (HBV) and hepatitis C virus (HCV)
  - 3.1.21. Cancers caused by other agents at work not mentioned in the preceding items where a direct link is established scientifically, or determined by methods appropriate to national conditions and practice, between the exposure to these agents arising from work activities and the cancer(s) contracted by the worker



#### 4. Other diseases

##### 4.1. Miners' nystagmus

4.2. Other specific diseases caused by occupations or processes not mentioned in this list where a direct link is established scientifically, or determined by methods appropriate to national conditions and practice, between the exposure arising from work activities and the disease(s) contracted by the work

**Appendix 03**  
**Questionnaire**

**RESEARCH QUESTIONNAIRE**

**QUESTIONNAIRE SURVEY FOR SCREENING OCCUPATIONAL DISEASES AMONG SOLID WASTE AND DRAINAGE WORKERS IN COLOMBO MUNICIPAL COUNCIL**

**Chart -01**  
**Personal details**

- a. Gender: Male / Female
- b. Civil Status : Married / Unmarried
- c. Age: Years .....
- d. Department of current Employment: i. Solid waste Management .....
- ii. Drainage .....
- e. Service period of that Department: Years .....
- f. Previous Service Records:

Department	Service Period	
	from	to

- g. Number of Dependants: .....
- h. Monthly gross income: Rs. ....
- i. Average monthly expenses due to diseases: Rs. ....

<b>Chart - 02: Immunization</b>			
Are you able to provide documentary evidence which demonstrates your immunity to the following?	<b>Yes</b>	<b>No</b>	<b>Remarks</b>
Hepatitis B (Please ensure dates of primary course and booster)			
TB (BCG scar check or Montoux within past 5 years)			
MMR (Measles, Mumps, Rubella) either 2 immunizations or serology for measles and rubella			
Hepatitis A			
Varicella (Chicken Pox)			
Have you ever had Chicken Pox?			
TDP (Tetanus, Diphtheria, Polio)			
Men C (Meningococcal A&C)			
Other?			

<b>Chart -03: Medical History</b>			
<b>Health Question</b>	<b>Yes</b>	<b>No</b>	<b>If Yes give details with dates here</b>
Do you have any illness, impairment, disability (physical or psychological) which may affect your work?			
Have you ever had any illness, impairment, or disability which may have been caused or made worse by your work?			Please also give details if a considerable amount of time was taken off work. i.e. longer than 3 months)
Are you having or waiting for treatment or under investigation at present?			
Do you have any allergies which your work might have made worse? (e.g. latex)			
Have you ever had any one of the following symptoms?			
<ul style="list-style-type: none"> <li>• Cough which lasted for more than 3 weeks</li> </ul>			
<ul style="list-style-type: none"> <li>• Sudden weight loss</li> </ul>			
<ul style="list-style-type: none"> <li>• Intermittent fever with night sweats</li> </ul>			
<ul style="list-style-type: none"> <li>• Investigation for Tuberculosis</li> </ul>			

<b>Chart-04: Relating to shifts</b>			
<b>Health Question</b>	<b>Yes</b>	<b>No</b>	<b>If yes give details with dates</b>
Have you worked in shift basis before? If yes: Did you suffer any health problems as you believed to be directly related to shift work?			
Have you worked Nights before? If yes: Did you suffer any health problems as you believed to be directly related to night work?			

**Chart -05 (Other)**

1. i

Have you ever reported any disease to a Municipal Dispensary	Yes		No	
--	-----	--	----	--

ii

If "yes" what was that Dispensary		Date	
-----------------------------------	--	------	--

2. i

Have you got medicines from external medical Institute	Yes		No	
--	-----	--	----	--

ii

What was the Expenditure for that	Rs.
-----------------------------------	-----

3.

i.

Have you got medical leave for any work-related disease	Yes		No	
---	-----	--	----	--

ii

Monthly average leave days	
----------------------------	--

4. Please give any additional details not stated above:

.....

Name and Signature

(Not mandatory)

.....

Date

## **Appendix 04**

### **List of Acts**

Factories Ordinance, Act No. 45, Sri Lanka (1942).

Occupational Safety and Health Act No. 85, South Africa (1993), Statutes of the Republic of South Africa Mines, Works, and Factories.

Occupational Safety and Health Act No. 107, Victoria (2004), Victorian Legislation and Parliamentary Documents.

Occupational Safety and Health Act No. 514, Malaysia (1994), Gazette of government of Malaysia dated 24th February 1994.

Workmen's Compensation Ordinance, Act No. 19, Sri Lanka (1934).

Municipal Councils Ordinance (1934).

Urban Councils Ordinance No. 61 of 1939

Pradeshiya Sabha Act No. 15 of 1987.