

# **Current Health Disease Among Solid Waste Management Workers: A Case Study In Malaysia**

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## **Abstract**

The objective is to identify occupational disease among solid waste management workers in context of health disease. Health disease that occur among solid waste management workers such as respiratory disease, skin disease, hepatitis and needle puncture, cardiovascular problems, coronary heart disease, gastrointestinal disease and experience symptoms of poisoning. Method of collecting data is using questionnaire that were distribute among solid waste management in State A (kept confidential due to privacy). Total of respondent only 233 individuals from two main district in State A. The data is analysis by using SPSS to get the frequency and percentage for each question under the element of Health Disease. Data showing that majority of respondents reported that they sometimes having cough, wheezing, itching, rashes, and eyes irritates, diarrhea and nausea.

## **Keywords**

Health disease, Environment, Solid Waste Management

## **1.0 Introduction**

Health disease that occur among solid waste management workers such as respiratory disease, skin disease, hepatitis and needle puncture, cardiovascular problems, coronary heart disease, gastrointestinal disease and experience symptoms of poisoning. The solid waste industry work is physically tough and faces various risk of accident which increases the frequency of accidents (Mase et al, 2008).

Since in landfills there were all kinds of harmful gas causing the workers involved directly and indirectly in landfills and facilities centre also exposed to unknown hazards. Most common gas that existing namely bio-aerosol, greenhouse gases and volatile compounds. This statement supported by Rushton (2003) that state “increased exposure to bio-aerosols and volatile compounds may lead to elevated incidence of work-related respiratory, gastrointestinal and skin problems in waste collections compared to the general workforce”. Indirect health effects due to the contribution of greenhouse gases from waste disposal activities could be significant.

Furthermore rising temperatures (and low level ozone levels) due to climate change would affect old people with cardiovascular problems and both old and young people with respiratory problems such as asthma, lung disease et cetera (Giusti, 2009; Lehtinen et al, 2012). The solid waste management industry is considered occupationally hazardous since they are more prone of getting injuries that could lead to infection such as tetanus, hepatitis B and hepatitis A (Tooher et al, 2005).

## **2.0 Impact of Improper Management of Waste**

### **2.1 Environment**

Poor management of solid waste led to the contamination of water, soil and atmosphere. Lack of concern for the environment led to serious problem from the aspect of safety and health (Giusti, 2009; Pokhrel & Viraraghavan, 2005). Not only the poor management of solid waste lead to contamination but, the current landfill that overload with serious leachate spilling also playing a role in environmental problems and health problems (Masirin et al, 2008). Figure 1, show how waste lead to environment problem, namely air pollution, ground water pollution and surface water pollution.

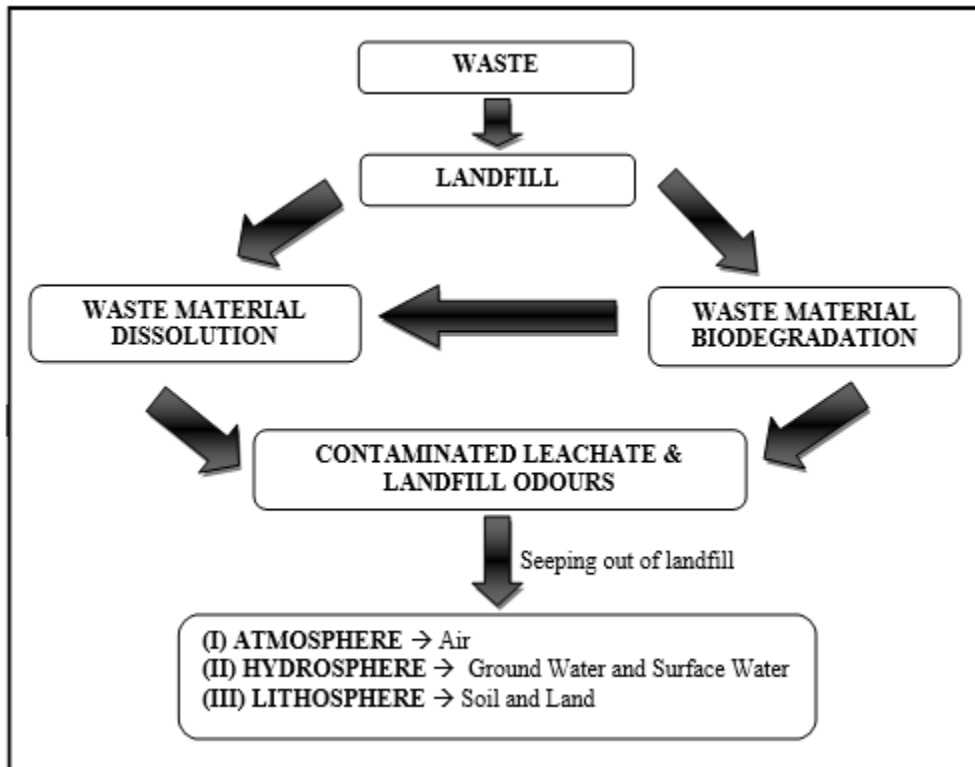


Figure 1: How waste lead to environmental problem  
Adapted from: Singh & Mittal (2009) and Butt et al (2008)

### **2.2 Health disease**

Common health disease happens to solid waste management workers namely respiratory disease, skin disease, HIV, Hepatitis, coronary heart disease, gastrointestinal disease and experience symptoms of poisoning (Sarkar, 2003; Pandey, 2005; Roopa et al, 2012).

### **2.2.1 Respiratory Disease**

Roopa et al (2012) abstract mentioning that “these workers are exposed to a lot of environmental and occupational hazards affecting the respiratory system”. According to the Pandey (2005), respiratory disease that detected and identified among solid waste workers in the study such as rhinitis/sinusitis, pharyngitis, tonsillitis, bronchitis, pneumonia, tuberculosis, chronic obstructive pulmonary disorder (COPD) and most common occur are asthma. Symptoms such as breathlessness, chest pain, cough pain, cough, fever, sneezing, headache; running nose and nasal congestion are commonly happening to solid waste management workers (Pandey, 2005; Roopa et al, 2012). These symptoms develop slowly but have long term impact that lead to tuberculosis, COPD and asthma. Roopa et al (2012) strongly suggest that the increasing duration of working and exposure contribute to the respiratory disease. Exposure to air pollutants including dust, air toxins and bio-aerosols for too long could potentially expose the workers too greater than safe level and increased of upper airway inflammation and respiratory symptoms (Wouters et al, 2002).

### **2.2.2 Skin Disease**

Studies by Pandey (2005) mention that allergies such as skin rashes, itching, irritation, swelling lips or eyelids, eye irritation, scabies, lice and fleas are few allergies that reported and difficult to control. The allergies occur due to poor protection measures, lack of enough water for proper sanitation and lack of personal hygiene. The leach from the solid waste dissolved into the water and ground which containing disease vectors and pathogens that transfer through clothes and body parts such as hand that help to develop allergies.

### **2.2.3 HIV and Hepatitis due to needle puncture**

Waste management workers exposed to needles and sharp objects during handling and separation of waste. Mainly the needles and sharp object can be found in sack of rubbish, bedding, clothing, soft furnishing, discarded litter (drink cans) and demolition materials (HSE, 2007). Transmissions of HIV/AIDS, Hepatitis A (HAV), Hepatitis B (HBV), Hepatitis C (HCV), viral haemorrhagic fevers, tuberculosis, rabies, West Nile disease, Lyme disease and tetanus viruses into human mainly thru punctures wound, eyes, inhalation, ingestion, bites, laceration and scratches that break skin. Transmissions happen due to incorrectly clinical waste that entering the general solid waste management stream. Clinical waste that entering the waste site namely syringes, needles, scalpel blades, pen and pump needle, lancets, blood lancets, vacutainer needles, scalp vein needles, stitching blades, surgical blades, cannulas, broken glass with blood, IV catheters, suction catheters, dental wires, scissors, and infusion sets (HSE<sup>b</sup>, 2014; Manyele & Mujuni, 2010; NYC Department of Education, 2013). The transmission among solid waste workers is high; HIV infection estimated to be about 0.3% compare to hepatitis A or hepatitis B estimated to be 3% or more (Cointreau, 2006).

### **2.2.4 Cardiovascular Disease**

Dangerous component and element that produced at the landfill such as cadmium, arsenic, chromium, nickel, dioxins, PAHs and furan are considered as carcinogenic. Exposures to this component lead to heart diseases depend upon level of exposure and duration of exposure. Solid waste management workers are at high risk as they are exposing to this component every day (Rushton, 2003). Stressful working environment (longer working hours or shift work) also linked to heart disease among workers (Priiss-Ustun & Corvalan, 2006).

### **2.2.5 Symptoms of poisoning**

Since the solid waste management workers expose daily to the poor air quality, challenging environmental problems and getting expose to number of pathogenic and non-pathogenic microorganisms during handling and dealing with the waste, they encounter symptoms of poisoning and several diseases. Symptoms of poisoning such as drowsiness, headache, nausea and fatigue often occur among solid waste management workers while handling rotten organic waste or waste contaminated with pathogens and/or hazardous substances. Among different poisoning problems, headache and nausea are found intense among workers thru inhalation exposure to the gases that emitted by open burning at the landfill (Pandey, 2005; Bleck & Wettberg, 2012).

## 2.2.6 Functional Gastrointestinal Disease (FGID)

In the abstract by Bleck & Wettberg (2012), mention that gastro-intestinal infections, respiratory and skin disease as well as muscular-skeletal problems and cutting injuries are commonly found among waste workers around the globe. Gastrointestinal disease involving the gastrointestinal track namely oesophagus, stomach, small intestine, large intestine and rectum. It also includes the accessory organs of digestions namely liver, gallbladder, and pancreas. Symptoms such as heartburn, abdomen pain, abdomen discomfort, diarrhoea, vomiting, bloating and constipation usually happen. There are six major gastrointestinal diseases such as oesophageal disease, gastro-duodenal disorder, bowel disorders, abdominal pain syndrome, gallbladder disorders and anorectal disorders. There are several causes for this gastrointestinal disease such as abnormal sensation, abnormal motility, brain-gut interactions, genetic factors, infection and intestinal inflammation and altered bacterial flora (IFFGD, 2010; World Gastrointestinal Organization, 2013; Sered & Prucha, 2012).

## 3.0 Discussion of current health diseases scenario in Malaysia

**Table A: Health disease scenario in Malaysia**

No	Health disease	Never	Seldom	Sometimes	Quite often	Very often
1	I have symptoms of cough	2 (0.9)	61 (26.2)	92 (39.5)	47 (20.2)	31 (13.3)
2	I have symptoms of wheezing	3 (1.3)	60 (25.8)	89 (38.2)	36 (15.5)	45 (19.3)
3	I have symptoms of itching	3 (1.3)	31 (13.3)	107 (45.9)	59 (25.3)	33 (14.2)
4	I have symptoms of rashes	3 (1.3)	30 (12.9)	96 (41.2)	54 (23.2)	50 (21.5)
5	I have symptoms of eyes irritation	3 (1.3)	20 (8.6)	93 (39.9)	65 (27.9)	52 (22.3)
6	I have suffered from respiratory tract infections at different times	1 (0.4)	17 (7.3)	55 (23.6)	75 (32.2)	85 (36.5)
7	I have sustained injury from sharp objects during packing refuse with bare hands	2 (0.9)	24 (10.3)	67 (28.8)	95 (40.8)	45 (19.3)
8	I have sustained injury due to clinical waste	0	23 (9.9)	50 (21.5)	85 (36.5)	75 (32.2)
9	I have come across any poisonous/dangerous animals while working	3 (1.3)	28 (12.0)	76 (32.6)	77 (33.0)	49 (21.0)
10	I have symptoms of diarrhoea	0	23 (9.9)	91 (39.1)	70 (30.0)	49 (21.0)
11	I have symptoms of nausea	4 (1.7)	57 (24.5)	79 (33.9)	51 (21.9)	42 (18.0)
12	I have suffered from cardiovascular disease	0	7 (3.0)	28 (12.0)	59 (25.3)	139 (59.7)
13	I have symptoms of drowsiness while handling rotten organic waste	5 (2.1)	81 (34.8)	71 (30.5)	32 (13.7)	44 (18.9)
14	I have symptoms of headache while handling rotten organic waste	40 (17.2)	89 (38.2)	43 (18.5)	26 (11.2)	35 (15.0)
15	I have symptoms of nausea while handling rotten organic waste	42 (18.0)	86 (36.9)	44 (18.9)	29 (12.4)	32 (13.7)
16	I have symptoms of fatigue while handling rotten organic waste	37 (15.9)	90 (38.6)	40 (17.2)	34 (14.6)	32 (13.7)
17	I have suffered from gastrointestinal tract infections at different times	1 (0.4)	12 (5.2)	48 (20.6)	109 (46.8)	63 (27.0)

From Table A, 92 (39.5%) individuals complaining that they sometimes experiencing symptoms of cough, 61 (26.2%) individuals complaining that they seldom experiencing symptoms of cough, 47 (20.2%) individuals complaining that they quite often experiencing symptoms of cough, 31 (13.3%) individuals complaining that they very often experiencing symptoms of cough, and 2 (0.9%) individuals mention that they never experiencing symptoms of cough.

It also show that, 89 (38.2%) individuals complaining that they sometimes experiencing symptoms of wheezing, 60 (25.8%) individuals complaining that they seldom experiencing symptoms of wheezing, 45 (19.3%) individuals complaining that they very often experiencing symptoms of wheezing, 36 (15.5%) individuals complaining that they quite often experiencing symptoms of wheezing, and 3 (1.3%) individuals mention that they never experiencing symptoms of wheezing

Solid waste management workers also experiencing itchy due to uncondusive working condition. 107 (45.9%) individuals reported that they sometimes experiencing itching, 59 (25.3%) individuals reported that they quite often experiencing itching, 33 (14.2%) individuals reported that they very often experiencing itching, 31 (13.3%) individuals reported that they seldom experiencing itching, and 3 (1.3%) individuals reported that they never experiencing itching.

Due to itchiness, later it develop to rashes and cause irritation to the skin, 96 (41.2%) individuals reported that they sometimes experiencing rashes, 54 (23.2%) individuals reported that they quite often experiencing rashes, 50 (21.5%) individuals reported that they very often experiencing rashes, 30 (12.9%) individuals reported that they seldom experiencing rashes, and 3 (1.3%) individuals reported that they never experiencing rashes.

Beside, solid waste management workers also experiencing eyes irritation due to unhealthy working condition, 93 (39.9%) individuals reported that they sometimes experiencing symptom of eyes irritation, 65 (27.9%) individuals reported that they quite often experiencing symptom of eyes irritation, 52 (22.3%) individuals reported that they very often experiencing symptom of eyes irritation, 20 (8.6%) individuals reported that they seldom experiencing symptom of eyes irritation, and 30 (1.3%) individuals reported that they never experiencing symptom of eyes irritation.

Apart from cough, wheezing, itchy, rashes and eyes irritation, solid waste management workers also suffered from respiratory tract infections. 85 (36.5%) individuals reported that they very often suffered from respiratory tract infections at different times, 75 (32.2%) individuals reported that they quite often suffered from respiratory tract infections at different times, 55 (23.6%) individuals reported that they sometimes suffered from respiratory tract infections at different times, 17 (7.3%) individuals reported that they seldom suffered from respiratory tract infections at different times and one (0.4%) individuals reported that they never suffered from respiratory tract infections.

Solid waste management workers also sustained injuries from sharp object during packing refuse with bare hands. 95 (40.8%) individuals reported that they quite often sustained injuries from sharp object during packing refuse with bare hands, 67 (28.8%) individuals reported that they sometimes sustained injuries from sharp object during packing refuse with bare hands, 45 (19.3%) individuals reported that they very often sustained injuries from sharp object during packing refuse with bare hands, 24 (10.3%) individuals reported that they seldom sustained injuries from sharp object during packing refuse with bare hands, and 2 (0.9%) individuals reported that they never sustained injuries from sharp object during packing refuse with bare hands.

Besides sustained injuries from sharp object, solid waste management also sustained injury due to clinical waste. 85 (36.5%) individuals reported that they quite often sustained injuries due to clinical waste, 75 (32.2%) individuals reported that they very often sustained injuries due to clinical waste, 50 (21.5%) individuals reported that they sometimes sustained injuries due to clinical waste, and 23 (9.9%) individuals reported that they seldom sustained injuries due to clinical waste.

Working as solid waste management workers also risking dealing with dangerous animals and poisonous insect. 77 (33.3%) individuals reported that they quite often dealing and come across dangerous animals and poisonous insect while working, 76 (32.6%) individuals reported that they sometimes dealing and come across dangerous animals and poisonous insect while working, 49 (21.0%) individuals reported that they very often dealing and come across dangerous animals and poisonous insect while working, 28 (12.0%) individuals reported that they seldom dealing and come across dangerous animals and poisonous insect while working, and 3 (1.3%) individuals reported that they never dealing and come across dangerous animals and poisonous insect while working.

Besides that, solid waste management workers also experiencing diarrhoea during working hours. 91 (39.1%) individuals reported that they sometimes experiencing diarrhoea during working hours, 70 (30.0%) individuals reported that they quite often experiencing diarrhoea during working hours, 49 (21.0%) individuals reported that they

very often experiencing diarrhoea during working hours, and 23 (9.9%) individuals reported that they seldom experiencing diarrhoea during working hours.

Apart from experiencing diarrhoea, solid waste management workers also experiencing nausea due to dealing with waste during working hours. 79 (33.9%) individuals reported that they sometimes experiencing nausea due to dealing with waste during working hours, 57 (24.5%) individuals reported that they seldom experiencing nausea due to dealing with waste during working hours, 51 (21.9%) individuals reported that they quite often experiencing nausea due to dealing with waste during working hours, 42 (18.0%) individuals reported that they very often experiencing nausea due to dealing with waste during working hours, and 4 (1.7%) individuals reported that they never experiencing nausea due to dealing with waste during working hours.

Solid waste management workers also experiencing and suffered from cardiovascular disease during their service. 139 (59.7%) individuals reported that they very often experiencing and suffered from cardiovascular disease during their service, 59 (25.3%) individuals reported that they quite often experiencing and suffered from cardiovascular disease during their service, 28 (12.0%) individuals reported that they sometimes experiencing and suffered from cardiovascular disease during their service, and 7 (3.0%) individuals reported that they seldom experiencing and suffered from cardiovascular disease during their service.

They also experiencing many health disease due to handling rotten organic waste such as drowsiness, headache, nausea and fatigue. From the aspect of drowsiness, 81 (34.8%) individuals reported that they seldom experiencing drowsiness while handling rotten organic waste, 71 (30.5%) individuals reported that they sometimes experiencing drowsiness while handling rotten organic waste, 44 (18.9%) individuals reported that they very often experiencing drowsiness while handling rotten organic waste, 32 (13.7%) individuals reported that they quite often experiencing drowsiness while handling rotten organic waste, and 5 (2.1%) individuals reported that they never experiencing drowsiness while handling rotten organic waste.

From the aspect of headache, 89 (38.2%) individuals reported that they seldom experiencing headache while handling rotten organic waste, 43 (18.5%) individuals reported that they sometimes experiencing headache while handling rotten organic waste, 40 (17.2%) individuals reported that they never experiencing headache while handling rotten organic waste, 35 (15.0%) individuals reported that they very often experiencing headache while handling rotten organic waste, and 26 (11.2%) individuals reported that they quite often experiencing headache while handling rotten organic waste.

From the aspect of nausea, 86 (36.9%) individuals reported that they seldom experiencing nausea while handling rotten organic waste, 44 (18.9%) individuals reported that they sometimes experiencing nausea while handling rotten organic waste, 42 (18.0%) individuals reported that they never experiencing nausea while handling rotten organic waste, 32 (13.7%) individuals reported that they very often experiencing nausea while handling rotten organic waste and 29 (12.4%) individuals reported that they quite often experiencing nausea while handling rotten organic waste.

From the aspect of fatigue, 90 (38.6%) individuals reported that they seldom experiencing fatigue while handling rotten organic waste, 40 (17.2%) individuals reported that they sometimes experiencing fatigue while handling rotten organic waste, 37 (15.9%) individuals reported that they never experiencing fatigue while handling rotten organic waste, 34 (14.6%) individuals reported that they quite often experiencing fatigue while handling rotten organic waste, and 32 (13.7%) individuals reported that they very often experiencing fatigue while handling rotten organic waste.

Lastly, solid waste management workers also suffering from gastrointestinal tract infection during their service period. 109 (46.8%) individuals reported that they quite often suffering from gastrointestinal tract infection during their service period, 63 (27.0%) individuals reported that they very often suffering from gastrointestinal tract infection during their service period, 48 (20.6%) individuals reported that they sometimes suffering from gastrointestinal tract infection during their service period, 12 (5.2%) individuals reported that they seldom suffering from gastrointestinal tract infection during their service period and one (0.4%) individuals reported that they never suffering from gastrointestinal tract infection during their service period.

## **4.0 Strategic Approaches**

### **4.1 Knowledge**

The first element that will be discussed is occupational safety and health knowledge. It consists of five sub-elements namely facilities, motivation, and familiarity, training programme and safety knowledge. Lack of facilities, technical, financial resource, unskilled personnel, lack of institutional capacity are the main reason for non-compliance with safety and health practice among employer and employees (Zhu et al, 2008). As suggested by Shan & Tawee (2014),

government should provide and giving incentives, subsidies or loan to improve and upgrading the technologies, equipment and facilities used in our countries. Cointreau (2006) and EPA (1999) also supported that by using mechanized machinery (fully automated waste collection vehicle and dual collection of waste) will minimizing occupational health and injury risk in solid waste management industries plus it will cut management cost even though the price for new technologies are expensive. Cointreau (2006) also mention that by upgrading the disposal system in countries from landfill to sanitary landfill, incineration facilities and MRF also influence the chances of getting occupational health and injuries among solid waste management workers. Furthermore, Phelps et al (1996) mention that workers' familiarity with areas of waste collection, familiarity with the equipment and machineries will reduce injuries risk since they as their awareness are high.

In order to increase motivation for both employers and employees to compliance with safety and health practice, Ally et al (2014), Coad (2007) and Battaglia et al (2015) state that thru national policy, implementing occupational safety and health system, laws enforcement, guideline enforcement, standard and regulations enforcement, penalties and giving financial instruments can increase motivation toward safety and health practice. Not only that, by giving proper training programme, safety education courses, and constantly informing worker regarding safety and health also reduce occupational injuries and risk (Gunsilius et al, 2011; Ally et al, 2014; Sharif, 2014).

## **4.2 Personal Protective Equipment**

Personal Protection Equipment (PPE) is used by the workers to protect against hazards in the working areas (Office of Radiation, Chemical and Biological Safety and Department of Police and Public Safety, 2003). The using of proper PPE also limits the chances of coming into contact with infectious agents (Tooher et al, 2005). Most common personal protection equipment that given by the employer to the waste management workers namely helmets, face masks, eyes protectors, coverall, safety boots, glove and safety vest. In their findings, the workers' knowledge regarding their work condition and risk and practice on proper personal protection equipment will prevent accident or incident from occur during working hours. (Aminuddin & Rahman, 2015). Study by Bleck & Wettberg (2012) reported that the interviewed workers do not have any PPE or does not have sufficient PPE and some of the PPE are torn or too old to use. This statement also supported by Odewabi et al (2013) in their observation state that the solid waste management workers seldom use PPE during handling waste. Studies conducted by Khodayari (2012) mention that accident happen due to workers did not use the personal protective equipment properly and unsafe practices. On the other hand, lack of training of how to use proper personal protective equipment and physical restraints (weather, habits, behaviours, overconfidence and complacency) among workers and personnel also contribute to the accidents. Lu et al (2015) in their finding also found out that workers rarely use proper personal protection equipment such as face mask and gloves during working hours due to perceived benefits, barriers, self-efficacy, slow down work efficiency, and organizational factors.

## **4.3 Concessionaires and Top Management**

The third element that will be discussed is the awareness of stakeholder namely local government, employee and local communities (Afrizal & Embong, 2013). It consists of three sub-elements namely self-awareness toward safety and health, employer's awareness and social and institutional awareness. Ahmadi et al (2013) mention that, the lack participant from the parties (government, employer, employees, non-government) and lack of commitment from each parties lead to the unsuccessful planning, unsuccessful implementation in managing municipal solid waste management problem.

According to Department of Labor- Te Tari Mahi (2007), it is employer's duty to inform the employees regarding hazard which they are exposed, how to minimize the hazards, managing hazard and providing necessary PPE. It also employer's duty to giving adequate training, supervise the workers during working hours, providing opportunities for the workers to get involve with the process related with the safety and health in work place and established safety and health system. This also supported by Sharif (2014) that mention safety education courses must be provided by the employer to increase awareness of employees.

## **5.0 Conclusion**

This study is carried out for municipal solid waste management workers in two district located at State Q. The questionnaire revealed that majority of the workers in this study have health disease either it occurs sometimes, very

often or quite often. The absence of using personal protective equipment are linked with the health disease that occur among solid waste management workers. Protective equipment is provided by the concessionaires company but during special visit by the safety department from municipal council or occasions.

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