

Disease and health condition of scavengers in Bangladesh

A Thesis report submitted to the Department of Pharmacy, East West University,
Bangladesh, in partial fulfillment of the requirements for the degree of M. Pharm in
Clinical Pharmacy and Molecular Pharmacology

Submitted To

Farhana Rizwan
Assistant Professor
Department of Pharmacy
East West University

Submitted By

Santa Mitra
2014-3-79-023



Date of Submission: 12/06/2016

Declaration by the Research Candidate

I, Santa Mitra, hereby declare that the dissertation entitled “Diseases and health condition of scavengers in Bangladesh”, submitted by me to the Department of Pharmacy, East West University, in the partial fulfillment of the requirement for the degree of M.Pharm in Clinical Pharmacy and Molecular Pharmacology is a genuine authentic research work carried out by me under the guidance and supervision of Farhana Rizwan, Assistant Professor, Department of Pharmacy, East West University. I also declare that the contents of this dissertation, in full or in parts have not been submitted to elsewhere for the award of any other degree.

Santa Mitra

ID: 2014-3-79-023

Department of Pharmacy

East West University

Certificate

This is to certify that the thesis paper “Diseases and health condition of scavengers in Bangladesh”, submitted to the Department of Pharmacy, East West University in partial fulfillment of the requirements for the degree of M.Pharm in Clinical Pharmacy and Molecular Pharmacology was carried out by Santa Mitra (ID-2014-3-79-023) under our supervision and guidance and the contents of this dissertation, in full or in parts have not been submitted to elsewhere for the award of any degree.

Farhana Rizwan

Assistant professor

Department of Pharmacy

East West University

Certificate

This is to certify that the thesis paper “Diseases and health condition of scavengers in Bangladesh”, submitted to the Department of Pharmacy, East West University in partial fulfillment of the requirements for the degree of M.Pharm in Clinical Pharmacy and Molecular Pharmacology was carried out by Santa Mitra (ID-2014-3-79-023) under our supervision and guidance and the contents of this dissertation, in full or in parts have not been submitted to elsewhere for the award of any other degree.

Dr. Shamsun Nahar Khan, PhD

Chairperson & Associate Professor

Department of Pharmacy

East West University

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Abstract

Background: Urban solid waste management is considered as one of the most immediate and serious environmental problems confronting municipal authorities in developing Asian Countries. Today, scavenger still carries out the basic sanitary services in cities and towns of Bangladesh. These scavengers live and work in unhygienic conditions and the nature of their occupation exposes them to potentially pathogenic bio-aerosols that may lead to the spread of various diseases. **Objectives:** To identify the occupational risks, the health problems and treatment patterns as well as the socio-demographic status of scavengers. **Methods and materials:** This was a survey based study. The paper is based on the information collected from the field survey. Questionnaires, field Observation and interview with key informants were the techniques used to obtain data and information. A total of 200 respondents were selected by purposive sampling method as subject for the present study. Data was collected from scavengers who are concentrated at the selected dump sites. The data were put on a tabular form and it was analyzed statistically like frequency counts and simple percentages for the structured segment of the questionnaire. **Results:** 75% of respondents were under age 45, while the average ranged between 20 and 49 years. 72.5% of the participants included in the study were males and 27.5% were females. 70% of respondent have no educational background. Only 12.5% take bath and wash their cloths 3 to 4 days per week. More importantly 24.5% of them reported to take a bath twice per days. 80.5 % of Scavengers change their regular dress. 23.5% don't brush their teeth regularly. 56% of those were using piped water for drinking supplied by WASA. Only 17.5 percent scavengers take their lunch properly & regularly but they take their dinner regularly. Most of the scavengers suffered with low back pain (65%), fever (44%), common colds (39%), and headache (69%). Other problems included gastric pain (34%), skin rashes (14%), asthma (15%), and diarrhea (25%) (Scavengers could have experienced more than one symptom). 10% of respondents suffering from sleeping disturbance. Small cut & nick injury is most common in scavenging work. **Conclusion:** Scavenging is an inhuman economic activity that is harmful for their health because of work in an unhygienic and unpleasant environment; but there is no other opportunity for livelihoods. The most common diseases amongst these scavengers were back pain, digestion problems and skin problems. Regarding their consultations for treatment, they cannot afford treatment by the doctors due to the reasons of lack of awareness and poverty.

Key words: Scavenger, Working environment, Occupational risk, Health status, Treatment pattern.

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CHAPTER ONE: INTRODUCTION

1.1 Introduction to scavengers

The scavenging activities are one of the common phenomena in third world countries. A scavenger is one who totally or partly engaged in the occupation of manually removing dry waste, night-soil from dry latrines, or the manual handling of the dead bodies of animals and humans. Today, scavengers and sweepers still carry out the basic sanitary services in cities and towns. (Kalaiyarasan & Suresh, 2014). Solid waste arising from human activity has become a major environmental problem causing extensive pollution, which threatens human health (Jha MK, Sondhi & Pansare, 2003). An estimated million scavengers in the country are involved in the sanitation of our surroundings. The working conditions of these sanitary workers have remained virtually unchanged for over a century (Rajnarayan, 2008). Waste picking is the informal extraction of recyclable and reusable materials obtained from mixed waste. Scavengers collect materials that have been discarded as waste and add value to them by sorting, cleaning, and altering the physical shape to facilitate transport or by combining materials to make commercially viable products. The health and safety risks associated with informal recycling include occupational health risks posed to scavengers and community health risks posed to the general public. In many cities, municipal garbage dump scavengers work illegally; however, thousands of people in developing countries depend on recycling material from waste for their livelihoods (Sebahat et al, 2006). Traditionally, scholars assumed that informal workers such as waste pickers could not collectively organize due to structural barriers such as lack of legal protection, widely dispersed worksites, porous borders to their profession, a culture of independence and individualism, lack of institutional experience, and lack of money and time to build organizations. (Hart & Kieth, 1973)

Urban solid waste management is considered as one of the most immediate and serious environmental problems confronting municipal authorities in developing Asian Countries. Dhaka City Corporation (DCC) is formally responsible for urban waste management. Usually

scavengers do this work in inhuman and hazardous conditions. Their dignity, health and mortality are in inhumanly compromised because of their conditions of work. (Moushumi, 2007)



1.1 Fig: A scavenger at Banasree

Generally low caste Hindu community named Dalit were brought in Bangladesh for scavenging the city. From 1864 to till today they are performing their hereditary profession with tooth and nails. The Dhaka City Corporation (DCC) employs about 7,156 scavengers for cleaning the city. Scavengers are performing their hereditary profession by scavenging, removing night-soil and cleaning of latrines, removal of filth, dead cattle, sweeping of houses and roads and clearing clogged sewerage lines. The whole operating system of scavenging, however, does not operate in an environmentally friendly manner. They became ill due to un-protective way of scavenging. As because of poor living conditions and nature of their work, they face tremendous health and safety risks. The shanties in their colonies are not hygienic as a result their children have been suffering from different type of diseases. (Moushumi, 2007)

On the other hand the scavengers are working and spending most of their working hours at the dump site, little attention and resources are allocated for their occupational health and safety. It is pity that no single attempt was made for these Dalit's occupational safety and health who were devoting their days and nights for the city dwellers. (Moushumi, 2007). Street sweepers play an

important role in maintaining the health and hygiene within the cities. This job exposes the street sweepers to a variety of risk factors such as dust, toxins and diesel exhaust pollution, which make them vulnerable to develop certain occupational diseases. (Rajnarayan & Tiwari, 2008)

1.2 The Life and Days of scavengers in Bangladesh:

About 3.5 million scavengers belonging to the scavengers (so called lower cast of the Hindus) community across the country including the capital have been passing an inhuman and sub-standard life amid unbearable pains, enormous sufferings, serious accommodation problem and deep uncertainty. The number of sweeper only in the capital is about half million. The scavengers or Dalits, one of the 44 scheduled cast communities, is the most neglected section of the society. No authority is there to look after the scavengers who passes their nights only to wake up in the morning to clean the dirties and city garbage. They have been working for 365 days of the year but their reserved colonies are being occupied one after another by musclemen. They have been deprived of all types of civil facilities including education and health care services. Scavengers in Bangladesh are working in health threatening environment for survival. They have been passing their days in unbearable sorrows and sufferings without electricity, pure drinking water and supply of gas. The recruitment of sweepers in government jobs has also been decreased. The shanties in their colonies are not hygienic so that their children have been suffering from different type of diseases. The female sweepers are being raped and oppressed frequently during their work in the night. (Muzibur Rahman Masud, 24.04.2006 Daily Jugantor, Bangladesh)

These scavengers live and work in unhygienic conditions and the nature of their occupation exposes them to potentially pathogenic bio-aerosols that may lead to the spread of various diseases. The abundance of fleas and offensive odors in waste disposal sites, along with the lack of proper protective devices, make their working conditions even more precarious. Scavengers collect plastics, paper, glass bottles, rubber materials, and ferrous and non-ferrous metals from dump sites, which can be risky as they are exposed to various infectious agents and toxic substances that may cause illness. In addition, they face social abuse from certain elements of society, which may lead to social problems. To overcome the hazards of the job, a greater majority has also taken to substance abuse such as smoking and alcoholism (Ebenezer, 2014)

1.3 Background of scavengers:

About 300 years ago sweepers were brought to this country by the British colonial rulers. During the British regime about 50 sweeper families sent to Pakistan from Kanpur, Nagpur and Andhra province of India when the torture and oppression on the lower cast people were alarmingly increased. They were initially appointed as sweeper to the Dhaka Samity. Later, more sweepers came to them from those provinces. The migrated lower cast people had engaged in different sectors as sweepers as there was a few people to be appointed as sweeper (Muzibur Rahman Masud, 24.04.2006 Daily Jugantor, Bangladesh)

They were the low caste peoples among the Indian Hindu communities and were generally very poor people, and came here with a hope for better life. They were given jobs which involved cleaning public places, removing human sludge from pit latrines etc. Because it is their only profession, it has become their traditional job. Someone born in a sweeper family has no other choice than becoming a sweeper (Rifa'i, 2015).

1.4.1 Factors that influence scavenging:

Social reason: Scavenging is a means of earning a livelihood among the urban poor because it requires no capital and low skills. A high number of scavengers in urban areas take to this when they do not find other sources of income.

Economic reason: Scavengers are lower income group people. It is easily learned and requires no education and little training. That's why they involve in this occupation and cannot switch to other prestigious job. Waste picking is one of the inferior economic activities in the urban informal sector, largely undertaken by children belonging to weaker sections of the society for their survival and for supplementing their family income and is the profession mostly dominated by children aging 6 to 15 years who do not have any other skill and thus by way. (Bhosale & Korishetti, 2013)

Family history: Major number of lower caste of the Hindus is involving in this occupation because their progenitor was scavenger.

1.4.2 Waste Scavenging as Informal Livelihood Activity:

Poverty and more specifically, wide income gaps within urban centre around the world have been without a doubt, one of the major challenges faced by governments in developing countries. Population growth has not only exacerbated these challenges, it has also led to insurmountable increases in unemployment figures. The result has been the growing significance of the informal sector, which is in direct response to the urban crisis. One such informal activity that is responding to this quandary is waste scavenging. In this study, waste scavenging is studied not in isolation, but as part of a broader concept of the informal economic activity common in developing countries. (Ebenezer Owusu-Sekyere, 2014)

1.5.1 Scavenger organizing:

Traditionally, scholars assumed that informal workers such as waste pickers could not collectively organize due to structural barriers such as lack of legal protection, widely dispersed worksites, porous borders to their profession, a culture of independence and individualism, lack of institutional experience, and lack of money and time to build organization. (Hart & Kieth ,1973)

Waste pickers use many organizational formats including cooperatives, associations, companies, unions, and micro-enterprises. Despite the differences in format, most of these organizations share three primary purposes. First, by pooling capital, establishing microenterprises, and forming partnerships with business and government, waste collectors increase their selling power. Second, by securing uniforms, safety equipment, and work permits, cooperatives increase workplace dignity and safety. And third, by demanding recognition and compensation from the state for their environmental and economic contributions, cooperatives increase members' political might. These three functions—political influence, workplace dignity and safety, and increased earnings—are mutually reinforcing, like legs on a stool. (Tokman & V. E., 1978)

1.5.2 Features of Waste scavengers:

Scavengers are poor relatives to the rest of the society, their incomes are low, and scavenging is an informal activity and labor intensive in nature. It can render economic and social benefits (such as; work for the unemployed youths, raw materials for industry etc), on the other hand scavenging generates cost to society such as high health risk associated with the type of labor. Scavenging supplies raw materials largely to either artisans or industries. In dumpsites located near agricultural areas, scavengers recover organic materials to be used as fertilizers as well as food for goats and pigs. Their occupation have high risk on safety work and potentially caused injure, during do their job, they often have very low consciousness and careless about their health, so make the scavenger look like do not have a good health behavior or opposite with the norms and health value. This condition forced them to do so, because socially they are usually poor, homeless (mostly they live in rent house), less educated and less knowledgeable (Rifa'I, 2015). Laws were passed in some states making it illegal not to recycle. Second, changes in the political economy including the loss of manufacturing jobs, cutbacks to government employment, and the roll back of the welfare state increased the ranks of the poor, working poor, and homeless—thus there were more people disposed to waste-pick as a full-time profession or supplemental job (Gowan, Teresa, 1997).

Waste pickers not only generate social benefits, but also potential costs as well. These include:

- Occupational hazards
- Child labor: Children commonly work as waste pickers. This may interfere with their education, or harm their physical, emotional, and social well-being.
- Litter: Waste pickers working on streets sometimes spread waste from trash bags, sullyng the sidewalk and creating more work for city street sweepers.
- Public nuisance: Many people view waste pickers as a nuisance or source of shame for their communities. Waste pickers' perceived poverty and lack of sanitation makes some people uncomfortable or fearful. In developing countries especially, many argue that modern services should replace waste pickers.(Medina & Martin,2000)

- Pilfering of public property: In some cities, waste pickers have been known to steal, meltdown, and resell public property such as telephone electrical copper wires, steel fence, or manhole coverings. (Rodríguez-Garavito & César, 2006)

1.6.1 Social condition of scavenger:

Scavengers are the most neglected person in our society. Society has always kept them at a distance, despite their ubiquity and the importance of the work they do. 'Golok Biswas (49), a sweeper from tikatuli sweeper colony said: Our children do not get white collar jobs even though they have the qualifications. We were considered untouchable, people from other castes usually didn't touch us but if we skipped work or made mistakes they beat us, and sometimes even pelted us with stones'. There is discrimination for individuals who have never done this work but are/were related to a Manual Scavengers' family. However they often face low social status, little support from local governments, depolarable living and working conditions. Sweepers have no educational or health care service centre in their colonies. The pregnant sweepers have no maternity leave, even there is no maternity or mother care facilities in the colony. Some of these colonies have few numbers of primary schools but there is no adequate language teacher. Some of non-government organizations (NGO) have been collecting huge amount of money but it is not being used for their welfare. (Muzibur Rahman Masud, 24.04.2006 Daily Jugantor, Bangladesh)

1.6.2 Social condition of Children Scavengers:

The idea of this scheme is good but problem starts with the implementation. How the teacher identifies the children belongs to scavenger family? It is important to posit this section in this article as it unravels some fundamental problems pertaining to the lived realities of scavengers. The school experience of many scavengers' child is that they are always put on the back-foot by the very structure that is supposed to include them. As an experience, the author himself has had to face teachers in school where he is usually identified as a scavenger's child when teachers loudly pronounce in class in front of thousands of students publicly asking 'Who are the scavenger's children, please raise your hands and come forward' during morning assembly. At the personal level such incidents have had a brutal impact on one's psyche as one experiences

shame at the level of self and in relation to others within the group and without. Such is the experience of pain and hurt that most children of scavengers prefer to lie and refuse to accept them and the reality that surrounds the same. (Vimal , 2014)

1.6.3 Social condition of woman scavenger:

Women scavenger face multiple discriminations, from majority communities and from within their own community. They are discriminated against because of their gender and because of their caste. Dalits are considered “untouchable” and “unclean” because of the jobs they are forced to do. They often suffer physical and sexual abuse from both “higher” caste and from the men of their own caste. In fact, poverty, low literacy and social and economic marginalization are some of the factors that contribute to the high incidence of domestic violence within their communities. The scale of the problems faced by Dalit women is enormous. In areas of health, education, housing, employment and wages, application of legal rights, political participation and rural development, Dalit women have been almost entirely excluded from development policies and programmes. Often they cannot access justice and support services to which they are entitled. According to the Bangladesh Dalit and Excluded Rights Movement, Bangladesh Dalit and Excluded Women Federation, Nagorik Uddyog and the International Dalit Solidarity Network, there are an estimated 5.5 million Dalits in Bangladesh. (Muzibur Rahman Masud, 24.04.2006 Daily Jugantor, Bangladesh)

1.6.4 Children at work:

The existence of child labor in our society is a barbarous practice. It is barbarous because it is illogical, inhuman and stands against all ethics (Bhosale and Korishetti . 2013). In 2001 waste picking was included among the hazardous occupations banned under the Child Labor (Prohibition and Regulation) Act, 1986, and affected the livelihood of children. There are 60,000 children working as waste pickers, and according to a study done by the National Labor Institute it is the fourth largest occupation of the street children. Most of these children either drop out from school, or have not been to one. Their labor hence is in direct violation of the Right to Education Act. These children are trapped in a vicious cycle of poverty, illiteracy and hopelessness as they do not have the means to acquire any other professional skills. Coming in

direct contact with the toxic waste, they suffer from many health issues, and some of them get addicted to glue and other drugs which they take to block off the stench emanating from the garbage dumps (Aparna & Hameeda, 2013). They collect garbage in search of recyclable items that can be sold to scrap merchants (paper, plastic, tin, etc.) (Bhosale & Korishetti, 2013)

The existence of child labour in our society broadly indicates social inequity and at the same time, the administrative apathy, of the times we live in. Child labour, and in particular, “child ragpicking” deprives the child of its life. It transcends the barriers of religion, gender, caste and type of family. However, education, structure of family and poverty of the total family do play an important role in the life of child ragpickers. Ragpicking when undertaken as a job, by the children, pushes them to the brink of anti-social behavior and illness. (Bhosale and Korishetti, 2013)



1.2 Fig: A child waste picker at Matuail in Dhaka, Bangladesh.

Waste picker children worked throughout the year except during extreme winters and rainy season. (Barki & Manhas, 2013) During the rainy season trash pickers are more likely to go hungry when materials are dirty and wet because it's difficult for them to collect due to the rain and mud. The basic rights of the children of taking healthy and nourished food, pure drinking water and having shelter are denied at the garbage heaps. There is also no place where they can sit and eat or keep their food safely. If they take food, it is unhealthy for them by the flies and mosquitoes at the dump sites. When these children are hungry; even have to eat shitty fruit from the garbage dumps, which shows a miserable picture of these scavengers and a remarkable question for society. In some conditions, they have to beg for food; it reflects the picture of weeklong starvation of child trash pickers. The risk of ill is very high because they consume unhealthy food and water and work in unhygienic conditions. They suffered from malnutrition, weakness, stunted growth and ill health in such impatient /pathetic situation. Trash picking activity not only exposed to the hazards and strains of their labor, but also deprived from education and training that could enable them to escape the poverty. (Oza, 2013). These children faced various physical problems such as bruises or cuts on their body and susceptible to infections and diseases because the most of the children never use any instrument for the protection of their hands and feet (Salam, 2013). The environments in which they work are hot and hazardous with a high risk of injuries and diseases; as the injuries and wounds inflicted by sharp glass or metal are common for trash picker's children. Some studies indicate that they got cuts, bruise, burns, dog-bites and allergies on their hands and feet, as they walk barefoot in garbage dumps collecting iron and glass pieces without worn gloves, and unattended infectious wounds causes septicemia and tetanus (Mari et al. 2007)

1.6.5 Harassment is a significant problem:

Treated as nuisances by authorities and with disdain by the public, waste pickers are usually ignored within public policy processes and may even be arrested or physically assaulted. They may face exploitation and intimidation by middlemen, which can affect their earnings. Trash picking is one of the most dangerous and inhumane activity where they are exposed to unpleasant weather conditions, encircled by stray animals, infectious solid waste and spoil wastage of food items that may provoke them with many diseases (Niloufer, 2013)

1.7 Economic condition of scavengers:

Scavengers are categorized in low income group. They are paid roughly 5000-8500 BDT a month. Day by day it is becoming tough for the scavengers to survive with this little amount of money². Women engaged in this occupation typically earn less than man and often face other forms of inequality. Now a day's Scavengers offer a range of economic benefits by picking reusable/ recyclable materials from the waste. By picking up recyclable materials from public spaces, they contribute to cleanliness and help beautify the city. (Ashraful et al, 2015).

1.8 Basic categories of scavengers:

In general word, scavenger is a person who cleans the waste. Although the kinds of work scavengers do differ across countries, some basic categories exist.

Manual scavenger: They are also called sweeper. They mainly clean up the latrine waste. Manual removal of human and animal excreta using brooms, small tin plates, and baskets carried on the head.

Domestic waste picker: They collect waste from door to door run by municipalities in partnership with membership-based organizations of waste picker. Cooperatives with formal or informal agreements engaged in the commercial and office buildings may have members engaged in the collection of large quantities of materials by trucks or other vehicles.

Street scavenger: Street scavengers used brooms and a dustpan for cleaning up waste on the road and footpaths. Normally they are found in the road side early in the morning.

Waste scavenger: A waste scavenger is a person who salvages reusable or recyclable materials to sell or for personal consumption. (Niloufer, 2013)

The cleaning systems can be classified as household level, solid waste disposal from house, collective disposal point of the multi-dwellings, collection and transportation by a private sector NGO, dumping to the nearest bin/point and collection by DCC to main dump yard (Moushumi, 2007)

1.9.1 Household waste management in Dhaka, Bangladesh:

In Bangladesh, the city authority, nongovernmental organizations (NGOs), community based organizations (CBOs), and private organizations are working together to manage the municipal solid waste (MSW). Over six million people live in Dhaka and each day they produce over 3,000 tons of household waste. Yet the Dhaka City Corporation collects less than half of it. The rest remains on roadsides, in open drains and in low-lying areas. This has a negative impact on the city's environment. It is estimated that the population of Dhaka will be 19.5 million by 2015. It will become very difficult to find sites to bury the waste as the city expands, and transport costs to transfer the waste will increase. The volume of waste needs to be reduced to a sustainable level (Bari et al, 2012). In Dhaka, scavengers known as Tokay search for materials which can be reused or recycled. They sell them to enterprising local people who arrange for the materials to be sorted, cleaned and then sold to recycling factories. This informal system shows that waste has value (Saha, 2013)

Waste Concern, a local NGO, has been first in Dhaka to start with community-based, decentralized composting of the organic portion of the waste. This innovation has had an encouraging response from local people as they have participated in source separation and doorstep waste collection. It is encouraging that the Community Based Organizations (CBOs), NGOs and the entrepreneurs have already come forward with innovative program to deal with the growing solid waste problem. The emergence of neighborhood waste collection or community-based recycling is not, on its own, a complete or sustainable solution (Moushumi, 2007).

1.9.2 Solid-Waste Characteristics and Quantification:

The solid-waste generated mainly consists of food waste, paper, polyethylene, cloth, rags, garden trimmings, construction debris (brick, concrete, sand, and dirt), wood, leaves and branches, ferrous and nonferrous metal, glass, shredded skins and leather, hospital waste, slag, animal waste, industrial waste, old appliances, and miscellaneous waste (Zahur, 2007)

Table: 1.1 Solid waste generations in Dhaka city

Income group	Family size	Generation rate kg/person/day
High income(BDT 25000+)	3-5	0.50
Middle income(BDT5000-25000)	4-8	0.45
Low income(BDT upto 5000)	4-9	0.3

0.3–0.50 kg per person per day of solid waste is generated in Dhaka depending on the study area. A statistic Published by The Asian Productivity Organization, Dhaka City Corporation (DCC) has about 7,156 cleaners employed for street sweeping and the collection of waste found in lakes. This does not cover dustbins, roadsides, open spaces, ditches, etc. There are 2,500 brick/concrete dustbins and 2,000 made of galvanized iron sheet (Bhuiyan, 2010)

Solid waste generation in Bangladesh

1995:10742 tons/day

2001:17000-tons/ day

2025:4.064 tons/day (estimated) (Moushumi , 2007)

The rapid urbanization greatly increased the demand for informal waste collecting services, as cities lacked the infrastructure and resources to collect the totality of wastes generated by their inhabitants. Despite spending 30–50% of operation budgets on waste management, developing world cities today collect only 50–80% of refuse generated by inhabitants. Residents and businesses often resort to burning garbage or disposing of it streets, rivers, vacant lots, and open dumps (Medina & Martin, 2000)

1.9.3 Waste collection:

Waste collection is facilitated by 3,000 hand trolleys. Street sweeping is done manually and debris is loaded from the curbside into the hand trolleys and delivered to the collection bins .Usually households bring their refuse to the nearby community bins/containers located on the sides of streets. Recently, house-to-house waste-collection service has been launched in

residential areas such as Kalabagan, Malibag, Old Dhaka, Dhanmondi, Mohammadpur, Mirpur, Banani, Nikunja, Gulshan, Baridhara, Banasree and Uttara. The households are charged on the basis of the amount collected. Rickshaw vans are used to transport the waste from the houses to municipal waste bins or containers. DCC sweepers and cleaners sweep roads and clean drains and then dump the waste into nearby dustbins or containers using hand trolleys. The whole system, however, does not operate in an environmentally friendly manner (Moushumi, 2007)

1.9.4 Waste Concern:

- Plan and design the project, collect wastes from the nearby staff quarters of DCC, provide collection vans
 - Install 1 ton capacity compost plant
 - Conduct training and awareness-raising activities on proper waste separation and management
 - Operation and monitoring of the project
 - Market development for the compost
- Documentation and information destination in relation to the project benefits and activities. (Moushumi, 2007)

1.9.5 Transport:

For secondary collection from the waste bins to dumpsites, the DCC has 128 demountable container carrier trucks to collect the accumulated waste. There are also 242 open/covered trucks. The trucks used to transport solid waste are evaluated as follows.

Open garbage trucks: these trucks create a nuisance as they pass through the street.

Sometimes efforts are made to cover them after loading the waste.

Covered garbage trucks: The one- or two-men crews who load and unload the trucks from inside the truck may feel suffocated due to the small space.

Container carriers: Usually a large space is needed for maneuvering these carriers near the containers. The waste is carried by hand trolley or rickshaw van and loaded directly into the container carrier. The container carrier simply lifts the container onto it. Loading by shovel is not required. Unloading is also done in the same way (Moushumi, 2007)



1.3 Fig: Waste picking rickshaw van at Banasree

1.9.6 Disposal:

There are a number of ways to dispose of municipal solid waste. Open dumping is the most common and the cheapest method. Therefore it is widely used in developing countries and even in some developed countries. In Dhaka waste collected from the municipal waste container or waste bins is carried to the lone dumpsite at Matuail, some 3 km from the city corporation boundary. The DCC employs crude waste dumping at the Matuail landfill site, an uncontrolled dumpsite having no sanitary landfill arrangement.



1.4 Fig: Waste dumpsite at matuail (A crow circles woman looking among the trash for something valuables)

Although this is the only officially designated site, 5–6 unofficial dumpsites are found near the embankment dam from Gabtali to Hazaribagh. It is estimated that only 50%, about 1,800 tons of waste, is dumped at the Matuail and unofficial sites. Of the remaining waste, about 900 tons are used in backyards and landfills, 400 tons are dumped on the roadside and in open space, 300 tons are recycled by the rag pickers, and the remaining 100 tons are recycled at the generation point. Because of waste dumping, foul odors and air pollution are dangerously affecting the surroundings. Rodents spread germs and pathogens in the area and workers at the landfill are regularly exposed to hazardous diseases. MSW in the presence of moisture gives off organic and inorganic contents which turn into leachate. A huge amount of leachate is generated from the uncontrolled dumping as the MSW percolates through the surface and contaminates the groundwater. Consequently, the risk of polluting the underground aquifers increases. There is no provision for the removal or treatment of leachate. The DWASA supplies about 1,500 MLD (million liters per day) of water, of which 82% is extracted from groundwater sources through 400 deep wells located at different parts of Dhaka City. More land, which is very scarce and

expensive in and around Dhaka, will be needed in the near future for use as landfill. In addition, a large area around the landfill site is rendered unsuitable for living or other activities. Therefore the present system of unsanitary landfill is unacceptable, and there is an urgent need to build sanitary landfill sites or adopt even better alternative option

(Source: Report of the APO Survey on Solid-Waste Management 2004–05)

1.10.1 Occupational health hazard:

Street sweepers play an important role in maintaining the health and hygiene in the cities. Concerning the medical history and health service accessibility, most scavengers had never been ill for long periods of time and had no annual medical checkups. When they get sick they usually self-medicate. There was no difficulty regarding access to health service facilities because of the 30 baht government health care scheme. Almost all had bad health behavior in terms of smoking and drinking alcohol. Physical ailments included common colds, headaches, skin rashes, and low back pain. A study of the population living in the vicinity of a large waste site in Poland revealed that the potential health effects of waste site-related environmental exposure might include psychological problems, digestive tract disorders, respiratory disorders, and allergic symptoms (Chandramohan, Ravichandran & Sivasankar .2009)Occupational health hazard among street sweepers can be exposed were physical health hazard, chemical health hazard, biological health hazard, psychosocial health hazard and ergonomic (Zock, 2005). Osteoarthritic changes and intervertebral disc herniation are the common spinal abnormalities reported in these workers (Rajnarayan, 2008). The prevalence rate of health hazard among street sweepers indicated 89.3% of ergonomic, 80.0 % of psychological hazard, 76% of chemical hazard, 58.7 % of biological hazard and 57.3 % of physiological hazard .The risk factors with health hazards in street sweepers showed physiological hazard was not significantly associated, chemical hazard was significantly associated with educational background and take a short break, biological hazard was significantly associated with working experience, physiological was significantly associated with age group, and ergonomic was significantly associated with gender, age, working experience, educational background, take a short break, BMI, length of broom and weight of broom (Kanjana & Siriwong, 2015). This job exposes street sweepers to a variety of risk factors such as dust, bio-aerosols, volatile organic matter and mechanical stress, which make them

susceptible to certain occupational diseases. The important morbid conditions detected in these workers include the diseases of the respiratory system and eye, accidents, injuries, cuts and wounds, skin infections, animal bites, etc. Sweepers are prone to develop chronic obstructive pulmonary disease even without tobacco smoking (Shaikh et al, 2013).

The modes of exposure for the various infections are as follows:

- The most common way is by hand-to-mouth contact during eating, drinking and smoking, or by wiping the face with contaminated hands or gloves or by licking splashes from the skin.
- By skin contact, through cuts, scratches or penetrating wounds, i.e., from discarded hypodermic needles. Certain organisms can enter the body through the surfaces of the eyes, nose and mouth.
- By breathing them in as dust, aerosol or mist.(Rajnarayan, 2008)

At present, the standards and norms for the management of municipal solid wastes in industrialized countries have substantially reduced the occupational health impacts. However, in developing countries, the health-related underpinnings of solid waste management still need to be addressed. Workers manually collect the wastes. There is little, if any, protection to workers from direct contact and injury and virtually no dust control at the workplaces. Solid waste collectors are exposed to significantly large amount of dusts, microorganisms, toxins and diesel exhaust pollution than the recommended norms. (Yogesh & Sanjoy, 2008)

Both sweepers and scavengers are experiencing numerous health problems. Municipal wastes include both organic and inorganic wastes. Mixture of inorganic wastes in municipal waste and labor-intensive waste handling practice results in many physical injuries among occupational workers. Skin and eye infections are common. Dust in the air at dumpsites can cause breathing problems. Flies breed on uncovered piles of rotting garbage and spread diseases like diarrhea, dysentery, typhoid, hepatitis, and cholera. Mosquitoes transmit many types of diseases like malaria. Dogs, cats and rats living around refuse carry a variety of diseases including plague and flea born fever. Therefore various intestinal, respiratory, parasitic and skin diseases are common in workers engaged in collecting refuse. They are exposed to certain health problems by virtue of

their occupation. These health hazards include exposure to harmful gases such as methane and hydrogen sulfide, cardiovascular degeneration, musculoskeletal disorders like osteoarthritic changes and intervertebral disc herniation, infections like hepatitis, leptospirosis and helicobacter, skin problems, respiratory system problems and altered pulmonary function parameters. This can be prevented through engineering, medical and legislative measures. While the engineering measures will help in protecting against exposures, the medical measures will help in early detection of the effects of these exposures. (Rajnarayan, 2008). They have higher chances to be exposed to numerous risk factors; Due to the manual handling process, the scavengers are often exposed to an exhaust fumes, extreme noise, toxic substances and dust particles. Frequent infections and injuries were reported commonly as they lack basic safety equipment's during works. Therefore, their occupational safety and health hazard became crucial. There is little evidence about the sweeping practices, perceptions and knowledge on their occupational safety and health hazards (Ashraful et al, 2015).

1.10.2 Life risk of scavenging:

Scavengers who mainly work as a manhole cleaner have the life risk of death. In Bangladesh, the number death is few but in India, this number is approximately 100 per year. Suffocation is not an unusual workplace accident. Often the workers use alcohol to resist the stench (Jørgen Thomsen Regional Coordinator, Asia 07.01.2013.DanChurchAid)



1.5 Fig: A scavenger became dying by exposing poisonous gases from drain (collected)

Hydrogen sulfide is a flammable gas, which burns with a blue flame, giving rise to sulphur dioxide, a highly irritating gas with a characteristic odor. Mixtures of hydrogen sulfide and air in the explosive range may explode violently. Inhalation of massive quantities of hydrogen sulfide will rapidly produce anoxia resulting in death by asphyxia. Epileptic form convulsions may occur and the individual falls apparently unconscious and may die without moving again. This is a syndrome characteristic of hydrogen sulfide poisoning in sewer workers. However, in such cases, exposure is often due to a mixture of gases including methane, nitrogen, carbon dioxide and ammonia (Rajnarayan, 2008)

1.10.3 Nature and Habit of scavengers:

Lack of attention to hygiene and health, it seems from their habitual to smoke which is difficult to left, their did not accustom to washing hand with soap (WHWS), eat pattern (nutrition) is out of balance, habitual of throwing the garbage and wastewater which is not in the right place, ignore the self hygiene and environment. The tendency of such behavior will impact to the degradation of health status. Health status is the output of interaction between four factors, such as: environment factor, behavior factor, public service factor, and descendant factor. Environment factor and behavior factor have strategic position, beside health service factor (Blum, 1974). Health care behavior or prevent illness/disease may not be the same as health

education; self-cleaning and home environment, enough rest, eat healthy foods that contain lots of vitamins and nourishing as fruits,vegetables, meat, fish, tempeh like the one in the pictures, and enough exercise. Scavengers are not carefull about their health.

In earlier days, they used to enjoy life by drinking liquor, taking ganza and country-made liquor but it became a daydream for them today. They have no money to buy liquor. They have no money for colourful function during the marriage ceremonies. Even the members of the Shawtal community arrange pleasure-festival along with liquor and ganza after the death of a Shawtal to forget the pain. They join the function cheerfully and enjoy it. They consider that the death free detached the men from all types of sufferings and made him free from all hardships and problems. On the other hand, they arrange a weeklong .mourning programme after the birth of a child considering that the newborn baby would face enormous sufferings during his lifetime (Muzibur Rahman Masud, 24.4.2006. Daily Jugantor)

Waste pickers who work in open dumps are exposed to large amounts of toxic fumes, and face other severe threats including being run over by trucks and caught in surface subsidence, trash slides, and fires. Stigma, harassment, and violence: Most waste picking activity is illegal or unpermitted, so waste pickers commonly face harassment by police and authorities (Binion & Gutberlet, 2012).

1.11 Location and environment of some scavenger colony in Bangladesh:

Ganoktuli Scavengers Colony:

Over one lakh sweepers live in the Ganoktuli Sweeper Colony located on a piece of 20 acres of land by the side of the Bangladesh Rifles (BDR) Headquarters at Pilkhana. The people are living, among them 50 percent are sweepers. Local influential persons have already forcibly captured about two acres of colony land. Life is here very difficult more than the imagination. The residents of the colony have been passing their days in inhuman condition live in their small shanties along with serious bad smell of dirt and garbage. Water supply to the colony is dirty. They bath here and collect their drinking water from the taps. There is no separate arrangement for the females. The dustbin is located in front of the slum house due. The kids and band of pigs used to play together. They wash their dishes and other kitchen instruments by the drain water. The mosquitoes and flies gathered on the dirt. There is no scope to fresh breath because of the

huge congested slum house in the colony. Terrorist and violent acts here centering the drug business are common phenomenon. The local musclemen under the direct shelter of law and order forces run the drug business, so that nobody dared to protest them. There is no health care centre in the colony. There is only a primary school but the scope of education of the sweepers children is limited. There is no teacher who has some expertise on their language. They loss their interest in the school. The availability of drugs in the colony made the juveniles and teenagers drug addict. Even they have been becoming vagabond, terrorist and musclemen. (Muzibur Rahman Masud, 24.04.2006 Daily Jugantor, Bangladesh).

Dayaganj Sweeper Colony

Dayaganj Sweeper Colony is located in the old party of the capital. About 50,000 sweepers reside with fear and uncertainty. Most of the areas of the colony have already been occupied by the miscreants and rest part is now under threat of eviction. The Dhaka City Corporation (DCC) authorities have built a market there evicting the sweepers but they were not given even a single position. Local terrorists are threatening to capture the rest portion of the colony. Fearing terrorist attacks, some of the sweepers have already left the colony. Local influential groups have set up drug selling centres showing the sweepers. Local police officials with a regular gap raid the drug spots and arrest the innocent sweepers There is no way to lead healthy life in the colony because of scarcity of electricity, supply of water and other basic facilities. The garbage and dirt is everywhere and huge congested slum houses made them helpless human being. (Muzibur Rahman Masud, 24.04.2006 Daily Jugantor, Bangladesh).

Agargaon PWD Sweeper Colony

About 1000 sweeper families have been passing their measurable days on a small land near Dhaka Orthopedic Hospital in the city's Agargaon area. The normal breathing would be hampered seriously if any body enter into the colony. There is no room for walking inside the colony. They have been living here by erecting shanties by bamboo and sacks. The government recently circulated eviction notice on them without ascertaining any reason. They are counting days for more sufferings. They have been paying Taka 2 everyday to the local police to stay here. The entire western side of the colony has already occupied by the miscreants. They have

been collecting tolls for the cleaners for their staying in their own colonies. (Muzibur Rahman Masud, 24.04.2006 Daily Jugantor, Bangladesh).

Dhalpur Sweeper Colony

The situation is comparatively better here than the other sweeper colonies in the capital but the real sweepers are now under threat here. About 2000 families of Kanpuri speaking sweepers have been living in the colony on 6.7 acres of land. At least 200 slum houses of the colony have already been captured by local influential persons. The real sweepers are now under threat. The sweepers were allocated the colony after constructing eight rows of 10/10 feet houses. A good number sweeper have been already left the colony in the face of threat by the local terrorists and influential political leaders.

Local people alleged that most of the houses of this colony and nearby City Palli are now drug-selling centre. After evening, the gathering of drug addicts and anti-social elements with liquor, heroin, ganza and Phensidyl is a regular phenomenon here. The drug syndicate used to sell huge quantity of liquor worth about Tk seven to eight lakhs everyday. Scarcity of electricity and pure drinking water is a common picture. They pass their lives in between the light and darkness of the colony. (Muzibur Rahman Masud, 24.04.2006 Daily Jugantor, Bangladesh).

Spotlight-Mohammadpu Sweeper Colony

About 1000 sweepers are living in Mohammadpur Sweeper Colony with 200 houses of different shapes but the sweepers are not allowed to stay here. These houses have already been captured by miscreants and made it as dens of drug peddlers. Drugs like alcohol, ganza, heroin and Phensidyl worth about Tk four to five lakhs are being sold here everyday. Many sweepers were evicted from their house at gunpoint for selling drugs in their houses. Dirt and garbage cover the entire colony. It is very difficult to live here like a wet place. Not only in these colonies, there are a good number of lower cast Dalit people of the Hindu community have been passing their measurable days and lives in Mirpur, Shyampur, Gulshan, Islampur and Badda areas of the capital. (Muzibur Rahman Masud, 24.04.2006 Daily Jugantor, Bangladesh).

1.12 Necessity of scavengers in Dhaka city:

Dhaka, the capital of Bangladesh is the prime city of the country as its share of national urban population was 25% in 1961, 31% in 1991 and 34% in 2001 respectively. Dhaka's dominance not only in terms of population, but also in terms of economy, trade, commerce, and administration is obvious. Solid waste management is an obligatory function of urban local Bodies in Dhaka. Solid waste generation in Dhaka city is 0.3 to 0.5 kilogram per capita per day.

Table 1.2: General distribution of solid waste in Dhaka City

Waste Composition	2000 (Dhaka, % by weight)
Food and vegetable	70%
Paper	4%
Plastics	5%
Tin-can/metals	0.13%
Textile	0.13%
Other (stone, dirt)	5%

(Source: http://www.bip.org.bd/SharingFiles/journal_book/20140427160816.pdf)

1.13 Oppressed Scavengers of Bangladesh fight for their future:

There are 300 million scavengers in South Asia. They are expected to perform only society's most unpleasant tasks. In India, scavengers have recently made considerable progress in terms of poverty reduction, access to jobs and winning power. Mayawati, the chief minister of India's largest and most politically important state, Uttar Pradesh, is a scavenger and there is even talk of her one day becoming prime minister.

But here in Bangladesh, where 90% of the population is Muslim and just 8 per cent Hindu, the scavengers have a much lower public profile and no political power. And for all the discrimination they face, Dgroups say the Bangladeshi authorities do not officially recognise that Dalits even exist. They say there is no such thing as a Dalit, They say everybody is equal.

Bangladeshi's scavengers are slowly gaining hope. Organizations have been working at a grass-roots level to educate scavengers and make them aware of their potential influence if they can work together. .Almost 75 women, who previously worked as manual scavengers in the town, have been rehabilitated and trained as beauticians or in food processing, sewing or embroidery. They have also taken courses in personality development.

CHAPTER TWO: LITERATURE REVIEW

A few publications have been published on the basis of different kinds of experiments on Scavengers. From those experiments some discussions could be taken:

2.1. Health risk reduction behaviors model for scavengers exposed to solid waste in municipal dump sites in Nakhon Ratchasima Province, Thailand.

Risk Manag Healthc Policy. Vol.: 5, PP.: 97–104, 2012

In this study Phiman et al evaluates the effect of comprehensive health risk protection behaviors, knowledge, attitudes, and practices among scavengers in open dump sites. 44 scavengers participated in this study. The analysis showed significant differences before and after the intervention program. The age of the scavengers ranged from 14–60 years old. There were no significant differences between male and female scavengers (48% males and 52% females). Among the responders, 82% were married, 9% were single, and 9% were divorced or widowed. The education level was mostly primary school in 79.5%. Most had worked as scavengers for more than ten years .68% are scavenging being the family business , recommendation from a neighbor and to increase income (61%), no requirement for initial investment (36%), and other reasons (16%). Working hours ranged from 6–18 hours/day for 4–7 days/week. As regards self-protective attire, 46% used PPE every time and 55% used PPE sometimes. 43% had been injured during work (accidents, injury caused by a sharp objective such as broken glass or needles, cuts, falls). Only 23% of scavengers had received health information from the municipality. Most responders had never suffered such illness and had never had an annual medical checkup. If sick, most self-medicate by buying drugs (41%) or go to government public health facilities (46%). Some use traditional medical practitioners and private clinics. Regulated drugs and medicine were used by 43%. One hundred percent of this group had access to health service facilities. Regarding factors reinforcing health risk behaviors 25%. More than 80% got food from the workplace and found food on the dumpsite for cooking. The main drinking water supply (70%)

was rain water from home. Regarding the physical health problems of scavengers undertaking routine work on dump sites, most suffered with low back pain and sprains (95%), common colds (89%), and skin rashes (66%). Other problems included headaches (49%), fatigue (34%), shortness of breath (23%), and impetigo (19%) (Phiman et al, 2012)

2.2 HEALTH PROBLEMS OF SCAVENGERS: THE CASE OF KATHMANDU METROPOLITN CITY, NEPAL

The Third Pole, Vol.:8-10, PP.: 57-61, 2010

Tara Prasad Avasthi concentrates on the group of people who normally carry out activities such as collection and selling waste paper, dirty plastic, iron, scrap metal and other materials of dumping site. Findings are based on the survey of 40 scavengers of Teku dumping site, Kathmandu. The study indicates that the occupation seems highly risky and most vulnerable for their health. 40% scavenger take bath only once in two week. Similarly 45% scavengers take bath once a week. Only 15% take bath and wash their cloths once 3 to 4 days. More importantly none of them reported to take a bath daily or even once in two days. Scavengers do not change their regular dress for half a month or so. Some of them wear same dress even for months. A significant proportion of scavengers reported lack of water as major cause of bad personal hygiene. Most of scavengers used stream water for bathing and washing, and sometimes even for cooking and drinking. 85% of scavengers do not use brush. Similarly, 40% of scavengers use soap only for bathing and washing their dirty clothes. About 15% scavengers used soap, surf, shampoo and brush. 40% of scavengers reported that, they were suffering from multiple illnesses. Nearly 90% of scavengers reported to have been recently affected by injuries like skin scratch, getting wounds in legs and hands, and also suffering from bad smell, headache, worm and cold. 78% of scavengers reported to be affected by bad smell of waste (Tara Prasad Avasthi, 2010)

2.3 Scavenging for wealth or death? Exploring the health risk Associated with waste scavenging in Kumasi, Ghana

Ghana Journal of Geography, Vol.: 6, PP.: 63 –80, 2014

Ebenezer Owusu-Sekyere conclude the research based on data collected through 10 key informant interviews with stakeholders in waste management and 30 personal interviews with waste scavengers drawn equally from the three largest solid waste dumpsites in the metropolis. The mean age of the research participants was 34. Approximately 20% of respondents were under age 18, while the rest ranged between 20 and 49 years. This age statistics shows that the enterprise is not for the aged, who is often described as weak and fragile. Approximately 83% of the participants included in the study were males and 13% were females, none of whom was sufficiently literate or numerate to gain quality employment in the formal sector. According to GSS statistics, the poverty rate is the highest. Respondents reported spending 5.5 hours each day sifting through the deposits of refuse for their stock. Overall, joblessness and economic considerations dominated the discussions on why they engage in the activity. Low back pain was regarded as a major problem; only a small percentage (less than 16%) reported seeking proper medical diagnosis and treatment, while the remaining majority confessed they relied on self-medication or stopped work until their condition abated. Other major health problems are: Skin infection, Eye Irritation and Acute Respiratory Infection, Intestinal Infection. A great percentage (over 90%) reported injury as the most common health problem they face (Ebenezer, 2014)

2.4 Study on Socio-economic Conditions among Scavengers with Special Reference to Ganeshapuram, Thiruvearampur Block, Truchirappalli District.

Indian journal of applied research, Vol.:12(4), PP: 224-555, 2014

Kalaiyaran & Suresh said that the scavenging activities are one of the common phenomena in third world countries. A scavenger is one who is wholly or partly engaged in the occupation of manually removing night-soil from dry latrines, or the manual handling of the dead bodies of animals and humans. And In India today, scavengers and sweepers still carry out the basic sanitary services in cities and towns. Scavengers are treated as untouchable, even by other

untouchable castes. This discrimination also means that scavengers have extremely limited job opportunities that they live in acute poverty in segregated communities and have extremely low level of literacy and job mobility. The universe of the population was 529. Out of the 529 population the researcher selected 55 respondents. Only Self-prepared questionnaire was used to measure the socio-economic condition among scavengers. The study reveals result that only 38.2 percentage of the respondent earn income between Rs.4500 to 6500 per month. 61.8 percentage of the respondent were not having nutritional food. (44.6%) were facing the stigma and discrimination from the society. (54.5%) feel that the society had a bad opinion about their occupation. (72.73%) were getting debt form difference agencies (Kalaiyaran & Suresh, 2014)

2.5 Occupational health hazards in sewage and sanitary workers

Indian J Occupational and Environmental Medicine. Vol.:12(3), PP: 112–115, 2008

Rajnarayan estimated 1.2 million scavengers in the country are involved in the sanitation of our surroundings. The working conditions of these sanitary workers have remained virtually unchanged for over a century. Apart from the social atrocities that these workers face, they are exposed to certain health problems by virtue of their occupation. These health hazards include exposure to harmful gases such as methane and hydrogen sulfide, cardiovascular degeneration, musculoskeletal disorders like osteoarthritic changes and intervertebral disc hernia ion, infections like hepatitis, leptospirosis and helicobacter, skin problems, respiratory system problems and altered pulmonary function parameters. This can be prevented through engineering, medical and legislative measures. While the engineering measures will help in protecting against exposures, the medical measures will help in early detection of the effects of these exposures. This can be partly achieved by developing an effective Occupational health service for this group of workers. Also, regular awareness programs should be conducted to impart education regarding safer work procedures and use of personal protective devices (Rajnarayan, 2008)

2.6 Scavenger Community at the Crossroads: Reflection on State Intervention, Welfare and Abstruse Welfarism.

Indian Journal of Dalit and Tribal Social Work. Vol.: 2(1):1, PP.: 111-112, 2014

Vimal Kumar engages this study with various intervention programmes and strategies by state pertaining to the lives of scavenger community. It identifies government regulations and unravels their implications on the lived realities of members of the community. While contextualizing the same from anemic perspective, the article attempts to critically analyze these intervention programmes hoping to shed new light into the plight and impediments faced by the scavenger's community in India (Vimal, 2014)

2.7. HEALTH PROBLEMS AMONG THE ADOLESCENT WASTE PICKERS IN DHAKA CITY.

SUB Journal of Public Health. Vol.:3-4(2-1), PP.:53-57, 2011

Nuzhat et al said that a large portion of waste pickers in Dhaka city is adolescent and exposed to high risks and impending dangers for their overlapping living and working environment. 360 adolescent waste pickers using a semi-structured questionnaire. Among the respondents, more than two-third were boys and the average age of waste pickers was 12.6 ± 2.2 years. Among all, 16.7% never attended any formal or non-formal school and rest had education within the primary level. Out of all the respondents 29.2% were found living alone, 6.7% with father, 20.8% with mother, 12.8% with relatives and 30.6% with parents. Majority (88.9%) of the respondents reported that they pick waste every day. More than half (55.8%) of the respondents were found to be involved for more than 3 years in this profession. Among all, 80% reported to be suffering in the last six months from some sorts of health problems. Among them 59.4% suffered from injury, 31.2 % had skin diseases, 21.9% had cough and cold, 20.1% fever, 19.1% diarrhea, 11.1% from itching, and 3.1% from jaundice. During the study it was found that 36.7% of the respondents got physical problem of any kind and among them 51.5% had got anemia, 19.7% had eczema, 14.4% got scabies, 15.2% had got recent wound, 11.4% caught common cold, 10.6% had goiter and 6.8% were found to have Todd skin. Those who had recent wound injury, majority 52.9% had cut injury in hand, 25% on leg and 22.1% had in others areas. The present study also revealed that among those who reported to be suffering from any kind of health

problem in the last six months, about forty percent did not sought any health care for their ailment, 74.9% from pharmacy, 18.6% from traditional healer and 6.5% from Homeopath. Among the respondents who did not sought any care reported that their problem were not so severe and they could manage by themselves especially in terms of injury. No significant difference was observed among male and female waste picker in terms of suffering from health problem, but statistically significant association was observed between years of waste picking and health problems for the last six months (Nuzhat, 2011).

2.8 A Study of Impairment of Lung Functions in Adult Sweepers

Journal of Pharmaceutical Science and Research. Vol.:6(6), PP.: 239-241, 2014

Dr Ajay et al said that Street sweepers play an important role in maintaining the health and hygiene in the cities. 50 female sweepers by profession and age matched 50 healthy females were selected for the study. A brief history was taken and clinical examination of the respiratory system and other systems were done to exclude medical problems and to prevent confounding of results. **FVC:** The Actual Value of FVC (L) in normal healthy females was 3.17 ± 0.036 (91.9 \pm 5.2% of percentage predicted). The Actual Value of FVC (L) in sweepers was 2.51 ± 0.35 (73.7 \pm 5.6% of percentage predicted). There was statistically significant decrease in the level of FVC in sweepers compared to control group. **FEV1:** The Actual Value of FEV1 (L) in healthy females was 2.89 ± 0.35 (98.3 \pm 6.6% of percentage predicted). The Actual Value of FEV1(L) in Sweepers was 1.99 ± 0.36 (68.7 \pm 6.8% of percentage predicted). There was statistically significant decrease in the level of FEV1 in sweepers compared to control group. **PEFR:** The Actual Value of PEFR (L/Sec) in healthy non Sweepers was 8.23 ± 0.90 (91.4 \pm 6.6% of percentage predicted). The Actual Value of PEFR (L/Sec) in Sweepers was 5.83 ± 0.81 (65.3 \pm 6.9% of percentage predicted) (Dr Ajay KT et al, 2014).

2.9 Chronic Exposure to dust and lung function impairment: A study on female sweepers in India

National Journal of Physiology, Pharmacy and Pharmacology, Vol.:4(1), PP.:15-19, 2014

Thirty female sweepers and thirty healthy females were included in this study. The subjects were matched for age, height and weight. The study showed a statistically significant reduction in FVC, FEV1, PEF, FEF25-75% and FEF200-1200 and this impairment was increased with duration of exposure to dust in sweepers (Johncy, Dhanyakumar & Samuel, 2014).

2.10 Sweeping practices, perceptions and knowledge about occupational safety and health hazards of street sweepers in Dhaka city, Bangladesh: a qualitative inquiry

Int J Community Med Public Health, Vol.:2(3), PP.: 237-243, 2015

In this study Ashraful et al conducted 15 IDIs, 8 KIIs and 5 FGDs with Telegu street sweepers, community and religious leaders and NGO workers in two different sweeper colonies in Dhaka City. Due to the manual handling process, the street sweepers are often exposed to a variety of risks factors – exhaust fumes, extreme noise, toxic substances and dust particles. Frequent infections and injuries were reported commonly as they lack basic safety equipment's during works. Low perceived health hazards were prevalent. Strong faith-based explanations were found to rationalize possible health hazards (Ashraful et al, 2015).

2.11 The Potential Health Hazards Associated With Waste Scavenging in Ghana: A Case Study of Three Selected Dumpsites in Tema Metropolis.

International Journal of Environmental Science and Toxicology, Vol.: 2(10), PP.: 199-209, 2014

In this study, Helena et al. estimated the isolation, characterization and identification of pathogens associated with municipal waste that may be of public health importance; samples were collected from three dumpsites in Tema, Ghana. The results obtained from the scavengers while working were compared with the results obtained from them prior to work. From the waste dumpsites, the bacteria isolated were *Enterococcus faecalis*, *Bacillus* sp., *Klebsiella pneumoniae*,

Enterobacter amnigenus, Proteus mirabilis, Escherichia coli, Citrobacter freundii, Pseudomonas aeruginosa and Salmonella sp. The most frequently encountered bacteria were Bacillus sp. Enterococcus faecalis and Klebsiella pneumoniae, while the least encountered were Proteus mirabilis, Pseudomonas aeruginosa and Salmonella sp. Eight fungal species (Aspergillus niger, Aspergillus flavus, Aspergillus fumigatus, Aspergillus clavatus, Fusarium aqaeductuum, Mucor sp., Geotrichum candidum and Rhizopus stolonifer) belonging to 5 genera (Aspergillus, Fusarium, Geotrichum, Mucor and Rhizopus) were isolated from all the 3 dump sites during the first week. Some of the microorganisms observed in the first week of November were both Gram negative including Escherichia, Klebsiella, and Gram positive Enterococcus and Bacillus. After four weeks, mostly thermophilic microbes were isolated including Bacillus subtilis. Only three of the bacterial species, (B. subtilis, E. coli and Salmonella) that were isolated in the 1st week, were also encountered in the 5th week. With the exception of Staphylococcus oxidase, all the aeromycoflora were also isolated from the 3 dump sites. Of the five genera of fungi, that were isolated in the first week, only one (Geotrichum) was not encountered in the fifth week. The highest number of microbial colony forming units (9.0 CFU/ml) at the Ashaiman and Tema Community 1 dump sites on PDA medium, whereas the least (1.0 CFU/ml) was encountered at the same dump sites on Mc and PCA media. From the results, 2 (4.26%) Staphylococcus aureus were isolated from the waste scavengers prior to the start of work (control), while 12 (16.22%) isolated after scavenging. 16 (21.62) Escherichia coli were isolated from the scavengers while scavenging and 2 (4.62%) isolated before scavenging. (Helena et al. 2014)

2.12 Occupational Hazards and Health Status of Trash Picker Children in Faisalabad City, Punjab, Pakistan

Mediterranean Journal of Social Sciences. Vol.:6, PP.:2039-2117, 2015

Zahira et al. said that trash picking is an inferior, exploitative and inhumane economic activity; considered as the most vulnerable and neglected class in the urban informal labor market. The present study has been designed to examine the occupational environment and the hazards; and its effects on the health status of trash picker children. The snowball sampling technique was used to select the final sample unit; about 250 respondents (i.e. Trash picker children) in the age

group of 7 to 18 years were selected. A well-designed interviewed schedule (structured questionnaire) was used to collect the responses from the respondents. The study found that trash picker children faced various physical problems encircled by mosquitoes, flies, sharp metal, broken glass, broach, stray animals and feces lying around the garbage heaps. Most of them never worn gloves (97.2%) and never use any instrument (87.2%) for the self-protection. The working environment is hot and hazardous with a high risk of injuries; as the most (62.8%) of children got injuries/cuts inflicted by sharp glass or mucronate metal. Also, the different type of diseases found among half percent of the children; in which most of them suffered from digestion problems (15.6%), skin problems (13.6%) and respiratory problems (9.2%). These children are marginalized, cannot afford health services; received no treatment for injuries or many illnesses and preferred self-medication; sometimes visited to the local doctors or hospitals depending upon the diseases. Hence, there is a need to take an immediate step to provide safety equipment from the hazardous environment and intensive focus for the betterment of their health (Zahira et al, 2015)

2.13 Problems of Child Rag pickers.

International Research Journal of Social Sciences. Vol.: 2(2), PP.: 6-11, 2013

Bhosale & Korishetti estimated that the existence of child labor in our society broadly indicates social inequity and at the same time, the administrative apathy, of the times we live in. Child labor, and in particular, “child rag picking” deprives the child of its life. It transcends the barriers of religion, gender, caste and type of family. However, education, structure of family and poverty of the total family do play an important role in the life of child rag pickers. Rag picking when undertaken as job, by the children, pushes them to the brink of anti-social behavior and illness. (Bhosale & Korishetti, 2013)

CHAPTER THREE: OBJECTIVES & AIMS

3. Objectives & Aim of the Study:

To identify the occupational risks faced by Scavengers.

To examine the safety measurements during scavenging.

To study the health problems and treatment patterns of scavengers.

To know the socio-demographic status of scavengers

CHAPTER FOUR: METHODS AND MATERIALS

4.1 Type of study:

This was a survey based study. The paper is based on the information collected from the field survey. Questionnaires, field Observation and interview with key informants were the techniques used to obtain data and information. The information was obtained via face-to-face interviews and the scavengers were asked about their demographic characteristics, occupational information, socioeconomic conditions, work shifts, health status, general health impairments (accidents, injuries, complaints, and diseases), and knowledge, attitudes, and practices regarding self-protective behaviors. An observation form was used to record the conditions of scavengers' work in relation to environmental health risk and self-protective behaviors. During the observation of dumping site, the researcher was surprised to see scavenger's dirty and unhygienic job. The researcher observes housing, drinking water supply and their working methods on the dumping site.

4.2 Study area:

In this study, the area has been selected are Banasree, Hajaribagh, Newmarket area, Badda, Mirpur, Segunbaghicha, Hatirjhil. All the areas are from Dhaka District

4.3 Sample:

A total of 200 respondents were selected by purposive sampling method as subject for the present study. Some of respondents were unmarried and their educational background was class 1-5. All participants came from lower middle class family and monthly income was TK.1500 - TK. 9500. Their age range was 12 to 65 years.

4.4 Inclusion:

The study collected data from scavengers who are concentrated at the selected dump sites because a reconnaissance survey had indicated that they spent more time (mostly not less than 3 hours a day) at their job place (dump sites) sifting for their stock as compared to scavengers who move from one site to another or scavengers who search for their stock from the streets and homes. This means they were more likely to be exposed to health hazards than scavengers who were always on the move. All ages scavengers are included in this study & both male and female are also included.

4.5 Measuring Instruments:

- I. Questionnaire Part 1: Socio-Demographic information
- II. Questionnaire Part 2: Basic health status
- III. Questionnaire Part 3: Medical information

4.6 Procedure:

The primary information is complemented by literature reviews and other existing sources of secondary information. Observation was employed during the fieldwork to collect primary data. For collecting data, investigator went to waste dumping site and the present living location of scavengers, before applying the questionnaire investigator introduced herself and took formal permission. Then she gave them the questionnaire and workers were asked to read the instruction printed in the first page of the questionnaire. They were instructed to complete it without wasting time. After completing their task, according to the instruction, the answer sheet was collected from them. In the way data were collected from other scavenger.

4.7 Data analysis techniques:

The data were put on a tabular form and it was analyzed statistically like frequency counts and simple percentages for the structured segment of the questionnaire, it is hoped that the survey was at least as accurate as possible.

CHAPTER FIVE: RESULT

5.1 Socio-Demographic Characteristics of Respondents:

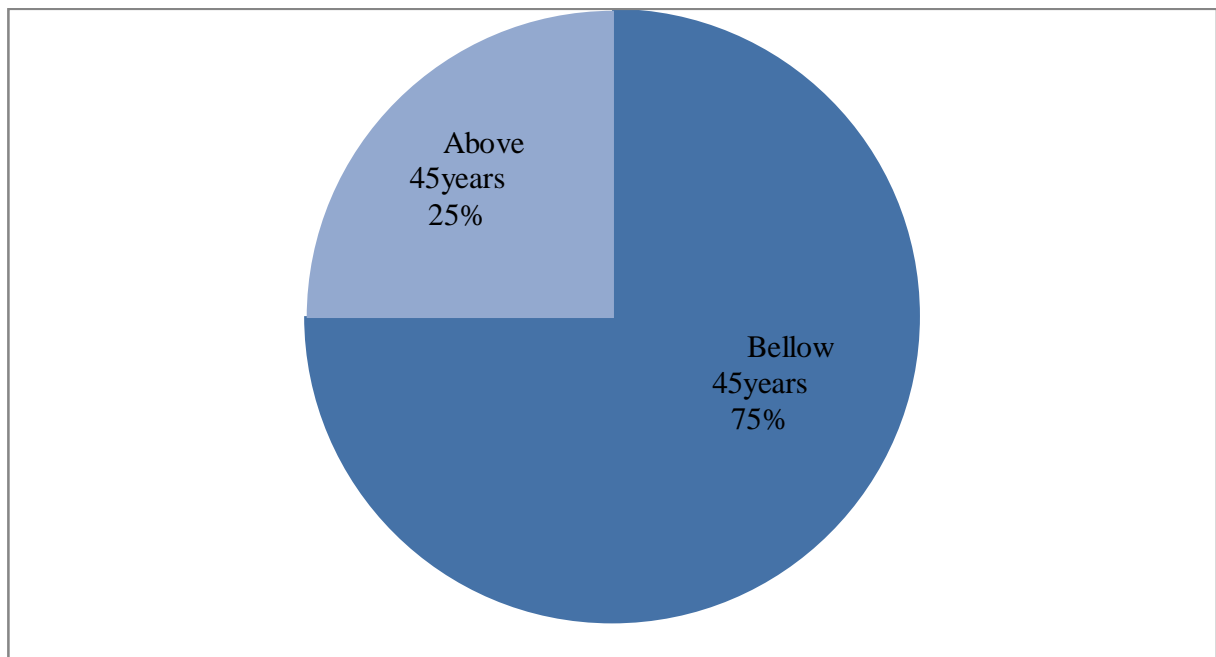


Fig 5.1: Distribution of Respondents by Age

75% of respondents were under age 45, while the average ranged between 20 and 49 years. This age statistics shows that the enterprise is not for the aged, who is often described as weak and fragile. But 25% of respondents were up 45 years old.

Table 5.1: Distribution of Respondents by Gender

Gender	No. of Respondents	Percentage (%)
Male	145	72.5
Female	55	27.5
Total	200	100

The daily exposure to health hazards and the daily loads of materials they have to carry means that they must have a certain kind of strength to endure and enjoy the trade. 72.5% of the participants included in the study were males and 27.5% were females, none of whom was sufficiently literate or numerate to gain quality employment in the formal sector. A female scavenger conceded in an interview that the male dominance in the occupation was not strange because the strain and stress associated with the job makes it unfit for women who are normally considered as the weaker sex.

Table 5.2: Distribution of Respondents by level of education

Level of Education	No. of Respondents	Percentage (%)
No education	140	70
Class 1-5	50	25
Class 6- Up	10	5
Total	200	100

Again, the study investigated their schooling profile, monthly income & their marital status. Most of scavengers are illiterate.70% of respondents have no educational background. They could not have acquired modern skills to be employed elsewhere. A greater number of respondents are married and lived in rented houses near the waste dump communities. This offered them the opportunity to catch the ‘early bird’ anytime fresh deposits were made, which normally took place early in the morning or late at night. Secondly, the home also constituted the warehouse and therefore carting their ‘catch’ to the warehouse was convenient in terms of distance and cost

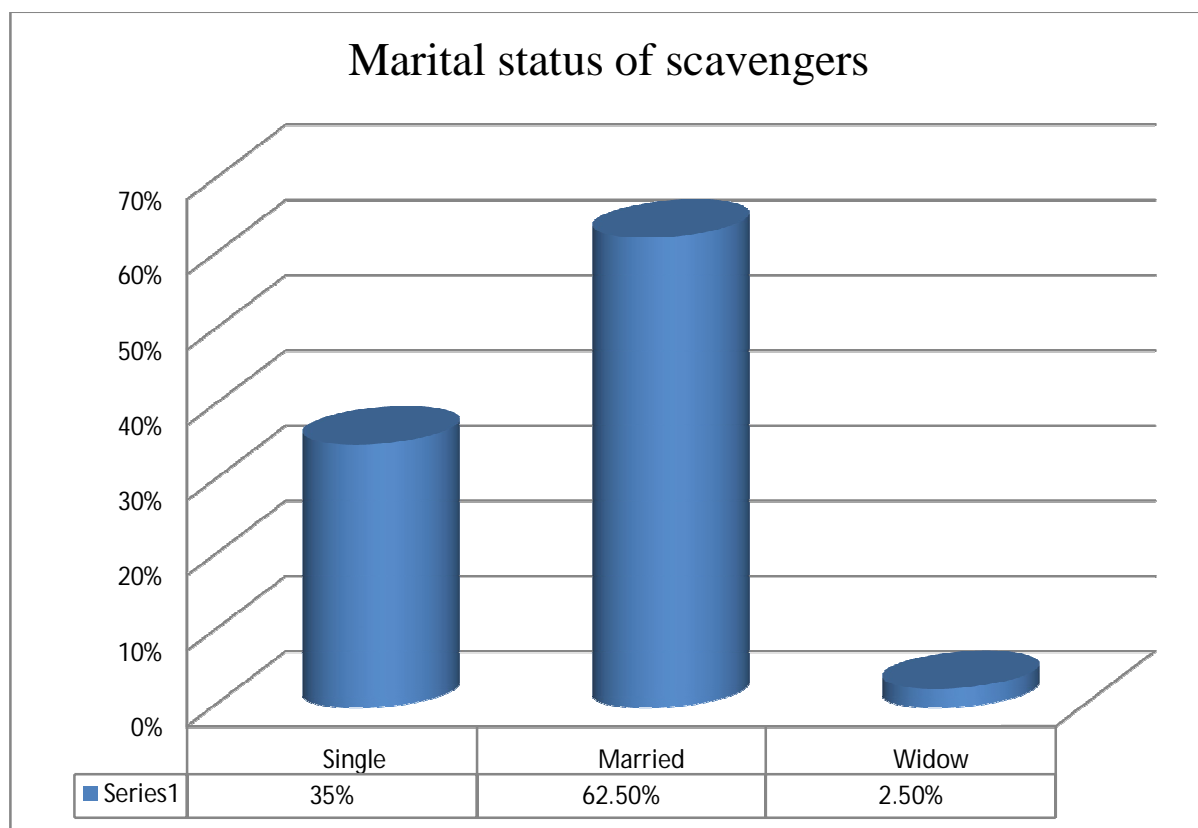


Fig 5.2: Distribution of Respondents by Marital status

The above figure shows that a significant portion of respondents (62.5%) were married, 35% were single & 2.5% were widow.

Table 5.3: Range of monthly average income of scavengers

Range of income in TK	Frequency	Percentage (%)
1500-5000	110	55
6000-UP	90	45
Total	200	100

It is clear from the above table that, most of the scavenger's monthly income is 1500-5000 tk (55%) as most of them belong to average monthly income. Majority of the scavengers are found as lower middle class people with lower standard of living. Though they work hard, their income is not sufficient to lead their life smoothly. A very few of them earn at a satisfactory level.

Basic Health Status:

Health is a state of complete physical mental and social wellbeing. Health determines physical and mental fitness and enables functioning effectively for the good of the society.

Table 5.4: Distribution of scavengers by their frequency of Bathing

Frequency	No. of respondents	Percentage (%)
Daily	175	87.5
Twice in a day	49	24.5
3-4 days per week	24	12.5
Total	200	100

Table 5.5: Distribution of scavengers by their frequency of Cloth washing

Frequency	No. of respondents	Percentage (%)
Daily	161	80.5
3-4 days per week	39	19.5
Total	200	100

Table 5.6: Distribution of scavengers by their frequency of Nail cutting practice

Frequency	No. of respondents	Percentage (%)
7days interval	47	23.5
15 days interval	153	76.5
Total	200	100

Scavengers take bath every day in a week. Only 12.5 percent take bath and wash their cloths 3 to 4 days per week. More importantly 24.5 percent of them reported to take a bath twice per days. 80.5 percent of Scavengers change their regular dress. Some of them wear same dress even for week. A significant proportion of scavengers reported lack of water as major cause of bad personal practice. Around 22.5% of scavengers do not use soap to clean their body as well as their cloth. 23.5% don't brush their teeth regularly.

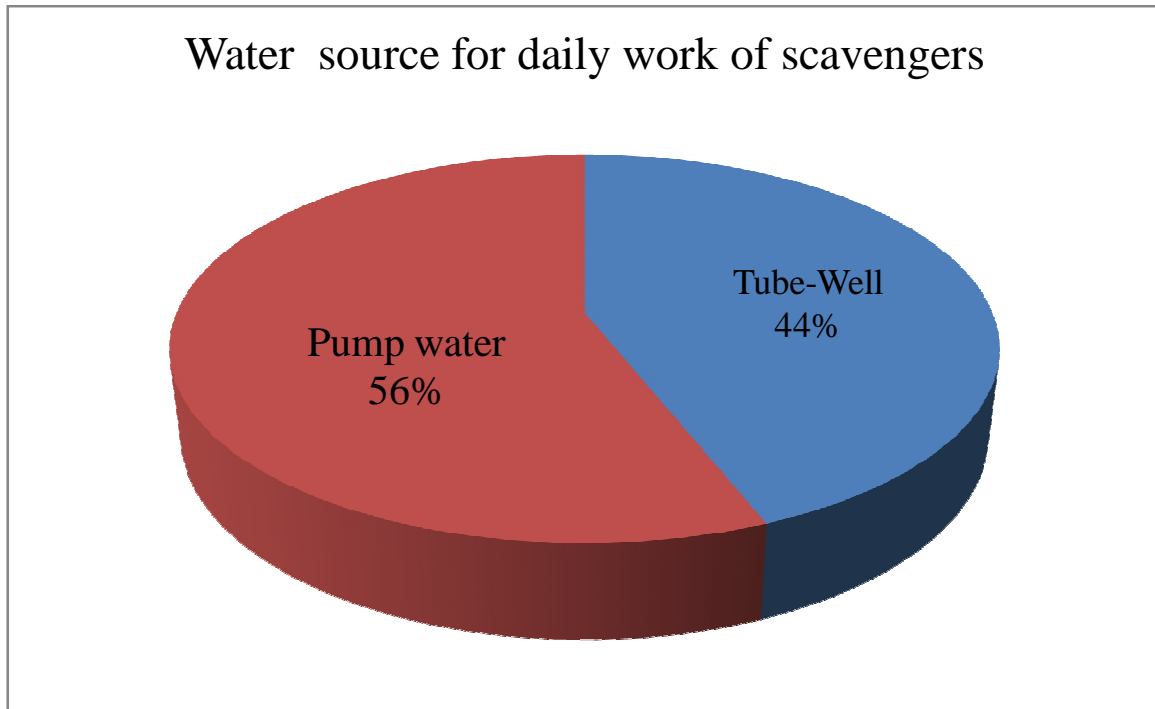


Fig 5.3: Source of water for daily work of scavengers

Some of scavengers reported that they use tube well water for their daily consumption. 56 percent of those were using piped water supplied by WASA for drinking. Limited availability of water directly affects washing, bathing, washing foods, cooking and washing dishes and utensils used in cooking. However water scarcity is a serious problem of Dhaka, not only for scavengers but all urbanities

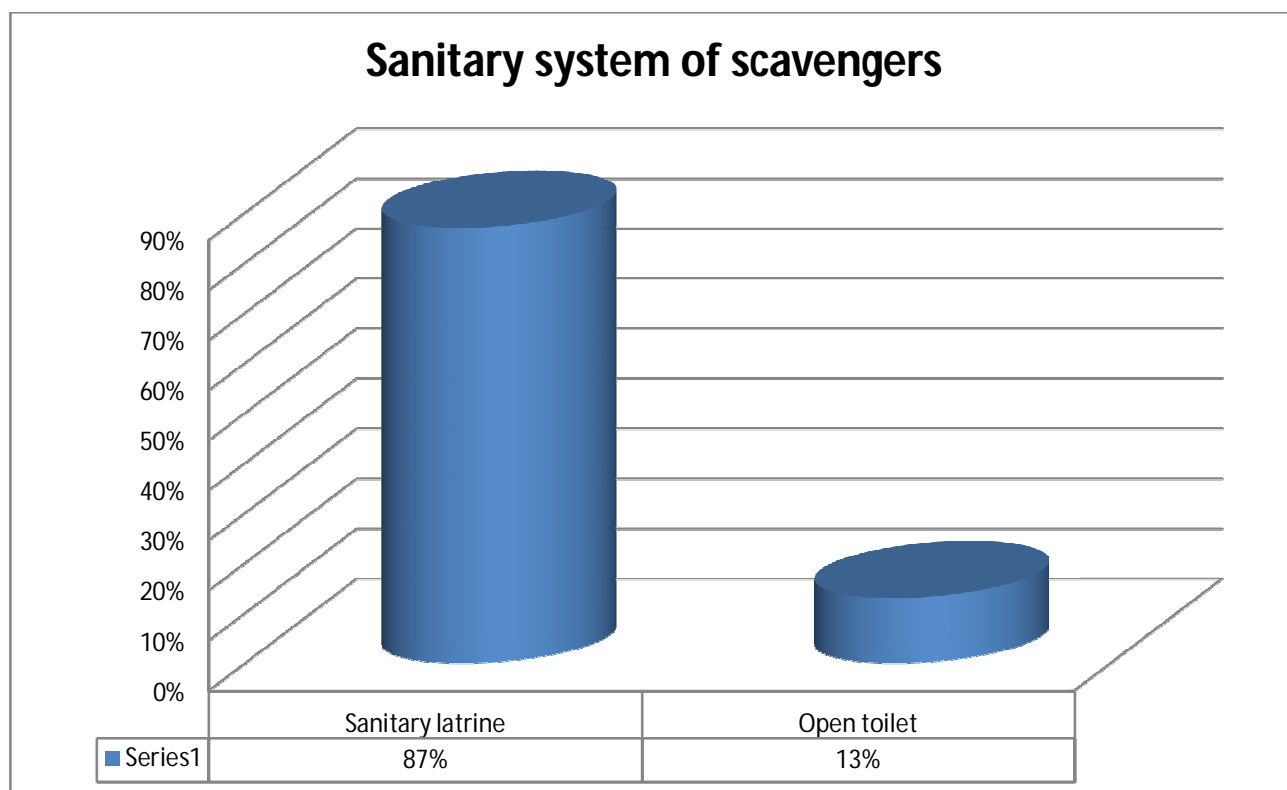


Fig 5.4: Use of sanitary system of scavengers

The study indicates that the scavengers mostly lived in slums and some of them slept on the open place that was full of dirty and smells. This happened because many of them did not have rented room to spend the night. Their sanitation system is not enough good. 13 percent of scavengers uses open toilet.

Table 5.7: Food taking behavior of scavengers

Food taking time	No. of respondents	Percentage (%)
Breakfast	Regularly: 64	32
	Irregularly:136	68
Lunch	Regularly:35	17.5
	Irregularly:165	82.5
Total	200	100

A significant number of scavengers do not take their food regularly that's why they are suffering from gastric pain. Only 32% take their breakfast regularly & only 17.5% scavengers take their lunch properly & regularly but they take their dinner regularly.

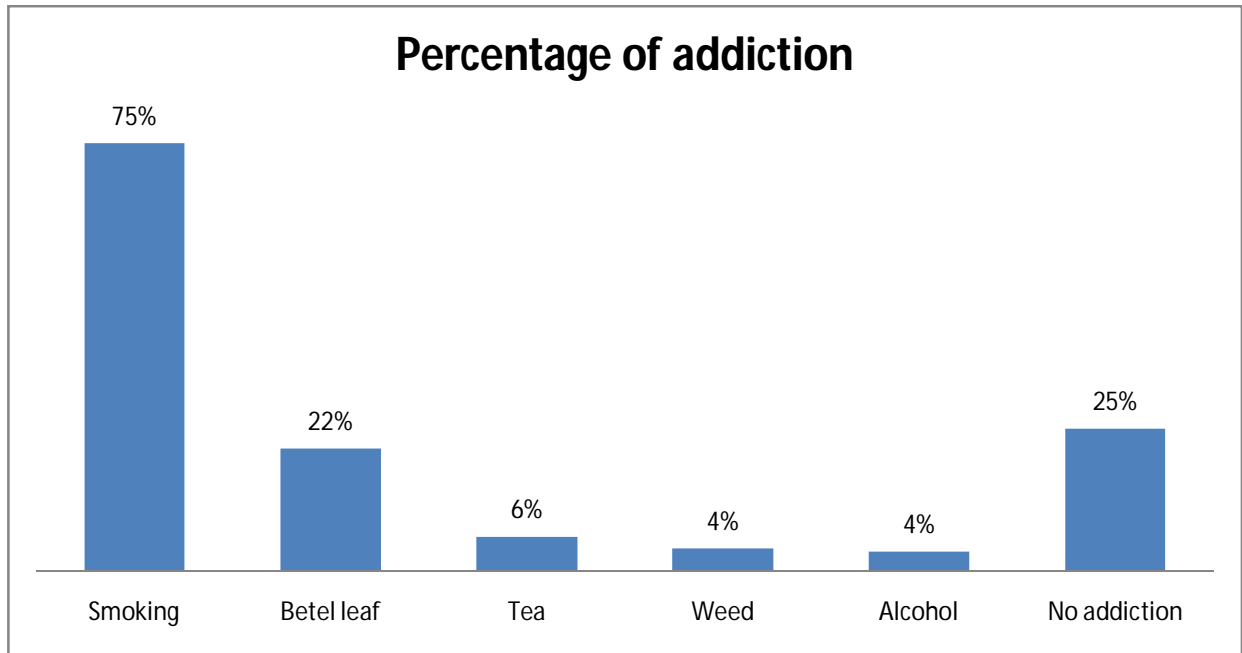


Fig 5.5: Percentage of Addiction

Most of the scavengers 75% are smoker, 21.5% are addicted by betel leaf, 45 % take weed, 3.5 % are alcoholic & 25 % take tea.

Physical health problems of scavengers:

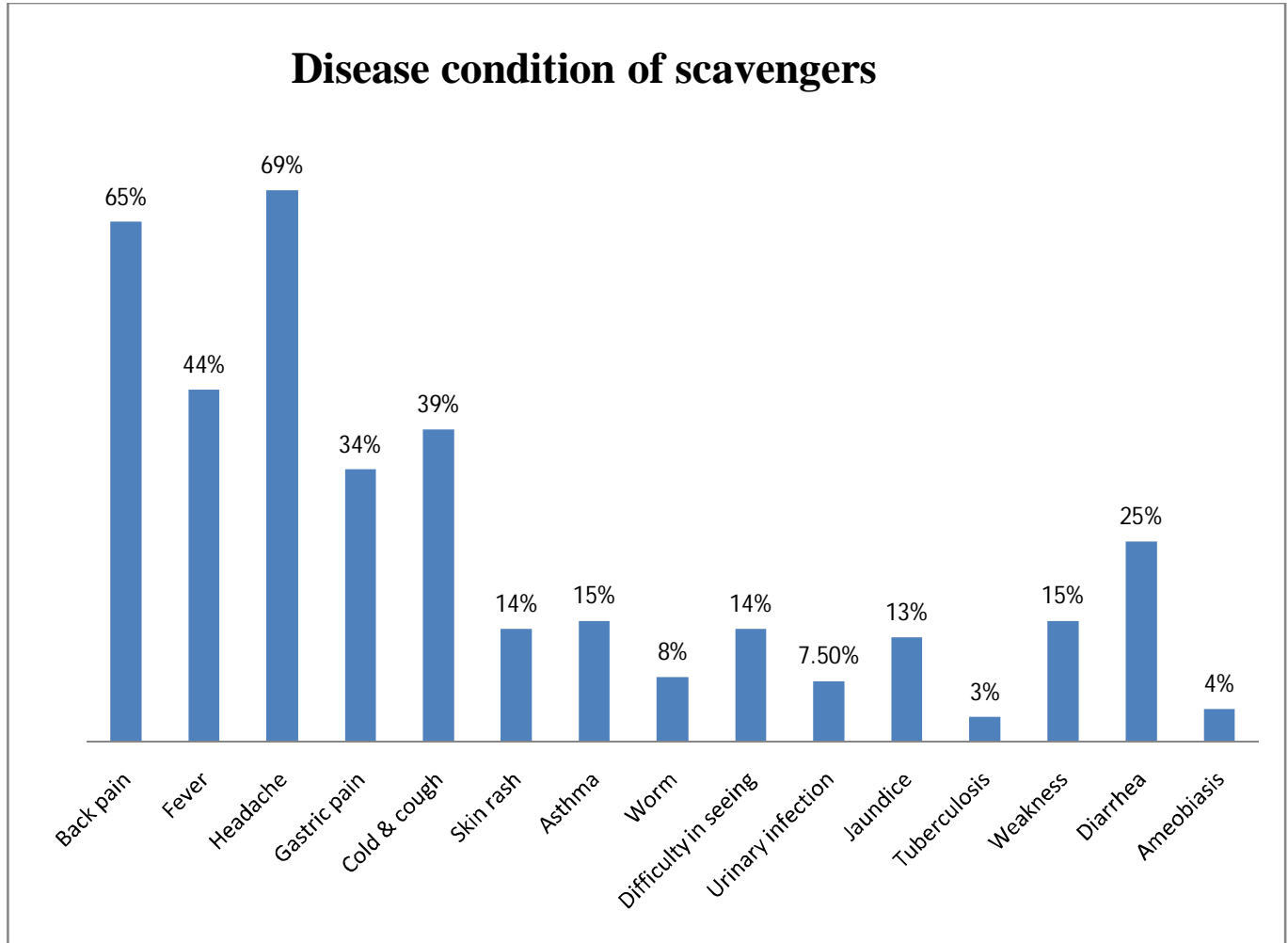


Fig 5.6: Distribution of the Respondent's Health problems

Regarding the physical health problems of scavengers undertaking routine work on dump sites, most suffered with low back pain (65%), fever (44%), common colds (39%), and headache (69%). Other problems included gastric pain (34%), skin rashes (14%), asthma (15%), and diarrhea (25%) (Scavengers could have experienced more than one symptom).10% of respondents suffering from sleeping disturbance.

Table 5.8: Distribution of the Respondent face any type of injury during work

Type of injury	No. of respondents	Percentage (%)
Small cut	Yes: 94	47
	No: 106	53
Nick injury	14	7
Road accident	8	4

Significant number (47%) respondents were injured at work place. Their bare hands and feet may injure with sharp glass pieces lying hidden in the garbage heaps and develop into rankle wounds. The data about the different types of injuries reveals that among the all injured children, the majority 33.5 % of them got cuts during the trash picking. A number of cuts are viewed on their hands, arms and foot during the study. They roam around the garbage heaps without shoes, gloves and tools (stick, wood); despite, many sharp metals caused the cuts. 7% of respondents were suffering from nick injury which was very much dangerous and pain full injury and 4% were face road accident during working. Only 15% of scavengers seek medical treatment. Rest was remained untreated because of their economic problem and ignorance.

Only for Female

Table 5.9: Method of child birth

Method of child birth	Frequency	Percentage (%)
Vaginal delivery	24	88.89
Caesarean delivery	3	11.11
Total	27	100

From the above table it is clear that maximum amount of female scavengers (88.89%) give birth to children's through vaginal delivery.

Table 5.10: Types of health facility used during child birth

Health Care Provider	Frequency	Percentage (%)
Government hospital	15	55.56
Private hospital	0	0
NGO	0	0
Traditional birth attendant	12	44.44
Total	27	100

The above table shows that 55.56% of scavengers take health care facility from Government hospital & 44.44 % take traditional birth facility.

CHAPTER SIX: DISCUSSION

The major objective of this study was to investigate diseases and health condition of scavengers in Bangladesh. To measure physical health of the respondents the health measuring questionnaire, which was developed by the present investigator was used. A total of 200 participants were selected by purposive sampling method as subject for the present study. There were significant differences between male & female scavengers (72.5% male & 27.5 % female). Some of participants were unmarried, married, widowed and their educational background was no schooling (70%) to class X. All participants came from lower middle class family and their monthly income was 1500-10000 TK. Their age range was 12-70 years old. 32.5% of respondents are come in this profession by referencing their relatives. But Phiman et al evaluates that there were no significant differences between male & female and the education level was mostly primary school in 79.5% (Phiman et al, 2012).

87.5% of scavengers take bath regularly; noticeable number (24.5%) takes both twice in a day and 12.5% respondents take bath 3-4 times per week. 80.5% respondents wash their cloth daily and 19.5 % wash their cloth 3-4 times per week. 76.5% of respondents cut their nail approximately 15 days interval. Tara Prasad Avasthi found that 40% scavengers take bath only once in two weeks. Similarly 45% scavengers take bath once a week. Only 15% take bath and wash their cloths once 3-4 days. More importantly none of the scavengers take a bath daily & 85% of scavengers do not use brush regularly, which he found in his study. (Tara Prasad Avasthi, 2010). In this study we found that most of the respondents are smoker (75%), 21.5% take battle leaf, 6% take tea, 4 % take weed & 3.5% are alcoholic.

Most of the scavengers (68% & 82.5%) don't take their breakfast and lunch regularly. That's why they suffer from various types of gastrointestinal problems. Significant number (47%) respondents were injured at work place. Their bare hands and feet may injure with sharp glass pieces lying hidden in the garbage heaps and develop into rankle wounds. The data about the different types of injuries reveals that among the all injured scavengers, the majority 33.5 % of them got cuts during the trash picking. A number of cuts are viewed on their hands, arms and foot during the study. They roam around the garbage heaps without shoes, gloves and tools

(stick, wood); despite, many sharp metals caused the cuts. 7% of respondents were suffering from nick injury which was very much dangerous and pain full injury and 4% were face road accident during working. Only 15% of scavengers seek medical treatment. Rest was remained untreated because of their economic problem and ignorance. It also agrees with the view of some researchers. Other study estimated that 52.9% had cut injury in hand, 25% on leg and 22.1% had in others areas. Among these, 40% did not seek any health care for their ailment, 74.9% from pharmacy, 18.6% from traditional healer and 6.5% from homeopath (Nuzhat, 2011).

Regarding the physical health problems of scavengers undertaking routine work on dump sites, most suffered with low back pain (65%), fever (44%), common colds (39%), and headache (69%). Other problems included gastric pain (34%), skin rashes (14%), asthma (15%), and diarrhea (25%) (Scavengers could have experienced more than one symptom).10% of respondents suffering from sleeping disturbance. It also agrees with the view of some researchers (Nuzhat, 2011 & Phiman et al, 2012)

Scavengers working at the dumpsites selected for the study were exposed to various health risks (infections, injury, disability) while working, albeit, at different magnitudes. The health risks were associated with the manual handling and lack of protective clothing/equipment, resulting in direct contact with waste. Risks from manual handling of mixed waste originated from direct contact with broken glass; human/animal fecal matter and paper that have become saturated with toxic materials; containers with residues of chemicals; pesticides or solvents from needles and bandages from hospitals. Inhalation of bio-aerosols, smoke and fumes produced by open burning of waste also caused health problems. Although there are insufficient data on the long-term effect of exposure to airborne bacteria as well as infectious or toxic materials present in solid waste, studies have shown that respiratory and dermatological problems, eye infections and low life expectancy are common(Ebenezer, 2014).

CHAPTER SEVEN: CONCLUSION

Scavenging is one of the worst fields of work, where people are involved at work to kill their hunger. Commonly known, it is the most unhygienic and dangerous for their physical growth and development or risk of health. In the whole cycle of SWMP from waste generation to collection - transport, dump to recycling or composting, both occupational groups and urban dwellers were suffering from varieties of health risk in Bangladesh. These poor waste pickers have high health risk while collecting recyclable materials but are paid low. On the contrary, wholesale buyers and recycle companies are making large profits with less risk but are neglecting the health of the scavengers completely. Scavengers are homeless, jobless as well as landless urban poor, living in urban slums near dumping sites. Their work is risky and marginal. Scavenging is struggle for the survival of urban poor groups. Significant proportions of scavengers are experiencing health problems.

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