Perception of Rubbish Collectors at the Garbage Dump Sites in Kelantan, Malaysia on the use of Personal Protective Equipments (PPE)

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\textbf{ABSTRACT:} Landfill is a traditional method for solid waste disposal used throughout Malaysia including Kelantan and the location of a landfill can be a place for the poor to earn their living, either full time or part-timely. Due to unhygienic working environment, these rubbish collectors may be exposed to various types of diseases and landfill hazards. Hence, this study aimed to investigate the perception of garbage collectors at the garbage dump sites in Kelantan on the use of Personal Protective Equipment (PPE). Interviews were carried with 50 respondents based on a structured questionnaire crafted to capture the demographic characteristics and perception on the use of PPE among waste collectors. Descriptive statistical method was used to describe demographic profile of respondents and the perception on the use of PPE by respondents. Out of 50 respondents, 17 (34\%) respondents said that it was a source of income, nine (18\%) respondents answered as self-employment, 21 (42\%) respondents said that it was for an extra income, while, three respondents said that they took over (continued) the work from their parents. There were 29 respondents (58\%) who worked around three to four hours per day, 17 respondents (34\%) worked around five to six hours per day, and four respondents (8\%) worked more than six hours per day. The study also showed that, 96\% of respondents strongly agreed and 4\% agreed that wearing rubber boot and using waste collecting tool during collecting waste is a must. At the same time, 82\% of them agreed that, they should take bath immediately after collecting waste every day. On the other hand, there was quite high percentage of garbage collectors who did not agree with the use of glove (34\%), facemask (68\%) during collecting waste and wash hand (32\%) and cloths (26\%) with antiseptic after collecting waste. It is hoped that through this study, the local authority will
recognise garbage collectors as a job for the poor to earn their livelihood and develop proper mechanism to address the issue related to safety measure at garbage dumping sites.

**Keywords**: garbage collectors, demographic profile, garbage dump site, safety measure, descriptive statistical, Kelantan

**Introduction**

Scavenging renders economic and environmental benefits such as providing income to unemployed individuals, supplying cheaper raw materials to industries, and also decreasing the demand for collection, transportation and disposal of waste. In developing countries such as Malaysia, scavenging starts with the collection of plastic bags, bottles, papers, cardboards, aluminium, iron and rubber materials, and it mostly takes place in the informal sector. Garbage collectors in Malaysia provide informal collection and recover additional materials at the open dumping sites (landfill) which not only help them in earning an income but also assist to reduce the amount of solid waste to be disposed and thus reduce environmental degradation.

Recycling of waste in the developing countries is largely dependent on garbage collectors in recovering materials. This is done by garbage collectors at the dumpsites who searched for recyclables in exchange of money. Scavenging is an occupation that provides a livelihood for the poor and it is an important survival strategy in which impoverished individuals cope with scarcity. Garbage collectors typically specialise in recovering only one or a few types of waste materials. Scavenging takes place in all stages along the waste management system that is; source separation at household or place generating waste material; where material are reused, sold or given away for instance, old newspapers are reused for packing. Batone and Okiverira (1992) observed that during collection, garbage collectors segregate recyclables for sale. On the other hand, garbage collectors also retrieve recyclables at dumps, along the roads or public places, in canals and streams, at landfill sites prior to burial and purchase source of separated recyclables from residents.

Scavenging is a prevalent occurrence throughout the developing world. World Student Community for Sustainable Development, (WSCSD, 2005) estimated that up to 2% of the population in the third world countries survive by recovering materials from waste. Garbage
collectors sort out materials to sell for recycling, as well as for their own use. The recovery of materials from dumpsites by garbage collectors in developing countries takes place in the wide variety of settings. Although the circumstances in which materials are recovered in a particular place may be unique, it is obvious as opined by Blincow (1986) that garbage collectors source their materials from two major ways; either by sorting or collecting freely from dumps and landfill, or by purchasing the already sorted materials from households.

Poverty is common in most developing countries and this has forced the poor to get incomes in most of the resources available to them. Vogler (1984) stated that given the very low income in most developing countries, scavenging provides them with reusable and saleable materials. In doing so, the poor has developed creative ways in order to satisfy their needs. This is through the recovery of items which are not necessarily part of the waste stream. In Mali, a lot of farmers search and dig artefacts produced by ancient Mali Empire in order to sell them to art collectors (Holmes, 1984). In Calcutta, garbage collectors work along the rail road tracks in order to recover the pieces of coal that fall from the train (Furedy, 1984). In Cairo, garbage collectors search ox dung for undigested kernels of corn to eat (Meyer, 1987).

Like most developing countries, solid waste landfill sites in Malaysia comprise of either open dumping or controlled dumping sites as proper sanitary landfill concepts are not fully implemented due to technological and financial constraints (Chong, et al., 2005). The list of existing landfill sites as prepared by the Ministry of Housing and Local Government (MHLG, 2002) is summarized in Table 1. Majority of the landfills in Malaysia are open dumps, thus cause natural resource polluted and various environmental problems such as health hazards, surface water and ground water pollution as well as foul smell formation. There are other treatment or disposal methods such as incineration and composting which could moderate the solid waste problems. However, these methods are not economically and socially viable at this moment. Therefore, reduction, recovery and recycling of waste play important roles in tackling the pressing solid waste problems.
<table>
<thead>
<tr>
<th>No.</th>
<th>States</th>
<th>Number of landfill</th>
<th>Average Area (ha)</th>
<th>Waste received (ton/day)</th>
<th>Landfill Level</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Level 0</td>
</tr>
<tr>
<td>1</td>
<td>Johor</td>
<td>18</td>
<td>5.6</td>
<td>1,082</td>
<td>10</td>
</tr>
<tr>
<td>2</td>
<td>Melaka</td>
<td>4</td>
<td>18.5</td>
<td>1,065</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>Negeri Sembilan</td>
<td>11</td>
<td>10.9</td>
<td>727</td>
<td>7</td>
</tr>
<tr>
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<td>Selangor</td>
<td>14</td>
<td>10.6</td>
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<td>0</td>
</tr>
<tr>
<td>5</td>
<td>Pahang</td>
<td>14</td>
<td>8.7</td>
<td>895</td>
<td>5</td>
</tr>
<tr>
<td>6</td>
<td>Terengganu</td>
<td>8</td>
<td>5.6</td>
<td>707</td>
<td>2</td>
</tr>
<tr>
<td>7</td>
<td>Kelantan</td>
<td>12</td>
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<td>424</td>
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<tr>
<td>8</td>
<td>Perak</td>
<td>19</td>
<td>10.3</td>
<td>1,450</td>
<td>9</td>
</tr>
<tr>
<td>9</td>
<td>Kedah</td>
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<td>3</td>
</tr>
<tr>
<td>10</td>
<td>Pulau Pinang</td>
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<td>1,400</td>
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<tr>
<td>11</td>
<td>Perlis</td>
<td>1</td>
<td>4.0</td>
<td>100</td>
<td>0</td>
</tr>
<tr>
<td>12</td>
<td>Sarawak</td>
<td>36</td>
<td>2.9</td>
<td>1,000</td>
<td>20</td>
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<td>13</td>
<td>Sabah</td>
<td>20</td>
<td>21.7</td>
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<td>15</td>
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<tr>
<td>14</td>
<td>Kuala Lumpur</td>
<td>1</td>
<td>12.0</td>
<td>600</td>
<td>0</td>
</tr>
<tr>
<td>15</td>
<td>Labuan</td>
<td>1</td>
<td>12.1</td>
<td>12</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>171</strong></td>
<td><strong>9.1</strong></td>
<td><strong>13,491</strong></td>
<td><strong>83</strong></td>
</tr>
</tbody>
</table>

Notes: Level 0: Open dumping
Level 1: Controlled tipping
Level 2: Controlled landfill with bund and daily cover soil
Level 3: Sanitary landfill with leachate recirculation system
Level 4: Sanitary landfill with leachate treatment system

The Government of Malaysia, through the Ministry of Housing and Government (MHLG) launched a national recycling in 1993. However, the campaign was not successful due to lack of support and participation from the public. The recycling campaign was re-launched on 2nd December 2000. At the launch, it estimated that by 2020, 22% of all waste would be recycled (Agamuthu, 2001). In tandem with government initiatives, scavenging of recyclable materials by garbage collectors in open dumping sites and along the streets is increasing. Garbage collectors commonly earn their livelihood through sorting and recycling of recyclable materials such as paper, bottles, plastics and metals in dump site. In doing this, waste collectors were exposed to all kinds of diseases and landfill hazards. In Manila for example, there are more than 35 diseases have been identified in garbage collectors communities and areas that lack refuse collection and sanitation, including diarrhea, typhoid fever, cholera, dysentery, tuberculosis, anthrax, poliomyelitis, skin disorders, pneumonia and malaria (German Agency for Technical Cooperation, 1986).

A number of health studies have been conducted in India and Nepal (German Agency for Technical Cooperation, 1986; Huisman, 1994; Direct Initiative for Social and Health Action, 1996). Tuberculosis, dysentery, asthma, pneumonia, parasites, malnutrition and bronchitis are the most common diseases among garbage collectors based on health studies of garbage collectors conducted in Bangalore, Manohar, and New Delhi (Huisman, 1994). Of the 180 garbage collectors surveyed at Calcutta's open dumps in 1995, 40% had chronic cough, and 37% jaundice; the average quarterly prevalence of diarrhea was 85%; fever, 72%; cough and cold, 63%; eye soreness or redness, 15%; and skin ulcers, 29% (Direct Initiative for Social and Health Action, 1996). A study comparing garbage collectors working at Calcutta's Dhapa dump in the 1980s with nearby farmers who use organic solid waste as fertilizer showed that garbage collectors reported a higher prevalence of respiratory diseases (71% versus 34%), diarrhea (55% versus 28%), and protozoal and helminthic infestation (32% versus 12%) (Nath, 1991). At Bombay's open dump sites, 80% of garbage collectors reported eye problems, 73% respiratory ailments, 51% gastrointestinal ailments, 40% skin problems, and 22% orthopedic ailments. Based on clinical examination, 90% had decreased visual acuity, and 27% had skin lesions, of which 30% were determined to be directly related to work (Konnoth, 1991).
Women and children often make up a majority of waste pickers at dump sites in developing countries. Besides the implications for reproductive toxicity, morbidity data from dump site waste pickers in India suggested that waste picking children have 2.5 times more risk of morbidity than non-waste picking children from the same housing areas. In 1991, 974 children below 16 years of age were working at the largest dump site of Metro Manila in the Philippines. Clinical examination of 194 children showed that 30% had skin diseases (including rashes, hypopigmentation, fungal infection, or boils) at the time of examination. They also reported multiple respiratory symptoms including chronic cough (23%), chronic phlegm production (18%), wheezing (25%), and shortness of breath (19%). Based on chest x-rays conducted following the survey, in only three percent were these symptoms attributable to residual or minimally active pulmonary tuberculosis (Adan, et al., 1982; Torres, et al., 1991).

Materials and Methods

Eight landfills in Kelantan were selected for the survey. Before selecting the study site, preliminary visit was done to assess the presence of rubbish collectors. Henceforth, survey sites were selected based on the accessibility, status of the landfills whether it is active or not and also the presence of rubbish collectors. Selected landfills are located in Tanah Merah, Machang, Bachok, Tumpat, Lubok Jong, Gua Musang, Kuala Krai and Jeli in Kelantan, Figure 1.

A set of questionnaire was designed based on Magaji et al., (2011) which consisted of four parts namely demographic profile, type of materials scavenged, quantity and volume of each material scavenged and potential health risk of garbage collectors. Garbage collectors were chosen randomly from eight selected domestic waste landfills with the total of 50 respondents. The data was collected through interview with the use of prepared questionnaire. Survey was conducted during peak hour of a day which was from 8.00 a.m. until 5.00 pm at each of the dumping sites. This was done to ensure that there was no any possibility of garbage collectors that were left behind from this survey.

A descriptive statistical method based on the Statistical Package for Social Science (SPSS) version 15 and Microsoft Office Excel 2003 was used to describe demographic profile of respondents, types and volume of waste collected by respondents and potential health risk.
Figure 1: Sampling sites of eight landfills
Results and Discussion

The demographic data of respondents such as citizenship, gender, age, number of children and level of education only involve single variable because it only has small number of categories or values.

The results showed that there were 47 Malaysians (94%), two Burmese (4%) and one Indonesian (2%) respondent. This result indicated that, not only Malaysians who saw the potential of scavenging at the landfills as one of the income source but there were also immigrants from Burma and Indonesia. This also revealed that, landfills in Malaysia especially in Kelantan have plenty of saleable waste materials to be explored and can be turned into money.

There were 33 male respondents (66%) and 17 female respondents (34%) that were involved in this study. Male respondents’ percentage was higher than female respondents due to the nature of the job. Scavenging was quite unsanitary and the garbage collectors may face molestation by others (Magaji, et al., 2011). Hence, females would not prefer to become garbage collectors due to unsanitary and un-aesthetic condition of the dumping sites. Besides that, females were not able to collect and handle heavy waste during collection and selling.

In terms of age groups, there were two respondents from the age group of below 20 (4%), 15 respondents from the age group between 20 to 29 (30%), eight respondents from the age group between 30 to 39 (16%), 11 respondents from the age group between 40 to 49 (22%), ten respondents from the age group between 50 to 59 (20%) and four respondents from the age group between 60 to 69 (8%). Majority of the respondents were in the age group of 20 to 29 years old and very few were below 20 years old. The involvement of respondents from age group of 20-29 years old was supported by Magaji et al. (2011) where they stated that, young and energetic garbage collectors were able to withstand the stress of scavenging. These garbage collectors were also attracted and motivated by the income collected and the flexibility of this job as compared with other jobs especially in the time factor. The age group of respondents had led to another relating factor i.e. the marital status. It was found that, 8 respondents (16%) were still single while 42 respondents (84%) were married. The age of married respondents was between 20 to 59 years old. Furthermore, based on the results obtained, eight respondents (16%) had no children, 12 respondents (24%) had one to two
children, 13 respondents (26%) had three to four children and 17 respondents (34%) had more than four children. From the results, it was evidently that there were only a small number of garbage collectors (16%) that had no children and the rest of the garbage collectors (84%) had at least one or more children. This showed that, rubbish collecting was one of the sources of income for them to support their families. This was parallel with the findings of Medina (2000) and Wilson et al. (2006) where they reported that, up to 2% of Asian and Latin America’s urban population were dependent on waste collecting to earn their livelihood (Medina, 2000; Wilson et al., 2006).

In terms of educational background it was shown that, 11 respondents (22%) had no formal education, 17 respondents had primary education (34%), 15 respondents had PMR (lower secondary- form three) qualification (30%), and seven respondents had SPM (secondary - form five) education (14%). Majority of the respondents were from primary education and this was believed to be the reason why they chose to be garbage collectors because they did not have adequate academic qualification to seek for better jobs. The percentage of garbage collectors decreased as the academic qualification increased. This was shown in the results obtained where respondents who had SPM education level contributed only 14% of the total respondents.

When they were asked the reasons of getting involved in scavenging, most of them said that they did that to get extra income; 38 respondents (76%), nine (18%) of them did it as a permanent job and three (6%) respondents were involved in rubbish collecting because they carried on or took the work from their parents. Majority of part timers were rubber tappers and petrol station attendants. The involvement in scavenging helped them to generate extra income to support their families. Most of the parents nowadays would send their children to schools for better jobs in the future instead of inheriting rubbish collecting job from their parents, reporting the least percentage in those who took over the work from their parents.

In terms of working hours, the results showed that 29 respondents (58%) worked around three to four hours per day, 17 respondents (34%) worked around five to six hours per day, and four respondents (8%) worked more than six hours per day. It could be suggested that, respondents who worked three to four hours per day basically is part-time garbage collectors. On the other hand, respondents who worked five to six hours could be in to two groups which were part-
time and full-time garbage collectors. Meanwhile, respondents who worked more than six hours per day can be categorised as full-time garbage collectors.

A total of 50 garbage collectors had been interviewed to gauge the perception on the need of wearing personal protective equipments (PPEs) such as glove, facemask and rubber boot. The results shows that, 96% of respondents strongly agreed and 4% agreed that wear rubber boot and using waste collecting tool during collecting waste is a must. According to some garbage collectors, although they have wear rubber boot during scavenging, the probability they got injured by broken glass and sharp object at dumping site was still high based on their previous experience. At the same time, 82% of them agreed that, they should take bath immediately after collecting waste every day. On the other hand, there was quite high percentage of garbage collectors who did not agree with the use of glove (34%), facemask (68%) during collecting waste and wash hand (32%) and cloths (26%) with antiseptic after collecting waste (Table 2). On the other hand, there were 34% (16% disagree and 18% strongly disagree) of garbage collectors thought that wearing glove was not necessary and 68% (14% disagree and 54% strongly disagree) of garbage collectors thought that wearing facemask was not necessary during scavenging. In other words, they did not wear such protective equipment during collecting the waste at dumping site. This increased the likelihood they exposed to various health risks due to manual handling of waste and lack of protective equipment (Wilson, et al., 2006). According to the respondents, wearing glove and facemask were a burden for them due to financial problem. They were not willing to spend money on such protective equipment because they had already adapted with the odour and dust at the dumping site. They can collect waste without wearing glove due to the fact that they use tools aid while collecting the waste instead of using bare hands.

There was 32% of surveyed garbage collectors disagreed with using of antiseptic for washing their hands after scavenging. They did not use any antiseptic or detergent to wash their hands after scavenging. Most of them just used the residual water in the plastic bottles collected (accumulated the residual water in the bottles collected) at dumping site to wash their hands after scavenging due to lack of water supply. Besides, some of the garbage collectors who stayed at the dumping site using dug well water which was located on site for washing their hands and bathing. The probability of skin disease and fever among garbage collectors increased due to lack access to clean water supply. The relationship between safety measure taken and perception of respondents on the use of PPE was identified. Based on calculation,
Ho was rejected because calculated chi-square (692.59) is greater than chi-square in distribution table (36.415) for alpha 0.05 with degree of freedom 24. Thus there is a relationship between safety measure taken and perception of respondents on the use of PPE.

Table 2: Perception of respondents on the use of PPE

<table>
<thead>
<tr>
<th>Safety Measure Taken</th>
<th>Strongly agree</th>
<th>Agree</th>
<th>Moderate</th>
<th>Disagree</th>
<th>Strongly disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wear glove</td>
<td>28</td>
<td>16</td>
<td>22</td>
<td>16</td>
<td>18</td>
</tr>
<tr>
<td>Wear rubber boot</td>
<td>96</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Wear facemask</td>
<td>6</td>
<td>16</td>
<td>10</td>
<td>14</td>
<td>54</td>
</tr>
<tr>
<td>Use tools while scavenging</td>
<td>96</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Wash cloth with antiseptics</td>
<td>4</td>
<td>26</td>
<td>44</td>
<td>26</td>
<td>0</td>
</tr>
<tr>
<td>Wash hands with antiseptics</td>
<td>8</td>
<td>26</td>
<td>34</td>
<td>32</td>
<td>0</td>
</tr>
<tr>
<td>Take bath immediately after work</td>
<td>50</td>
<td>32</td>
<td>12</td>
<td>6</td>
<td>0</td>
</tr>
</tbody>
</table>

Conclusion

Garbage collectors basically, voluntarily absorb all the risks that may occur at the rubbish dumping sites every day when they perform their duty. They suffered from serious occupational health risks due to manual handling of waste and lack of personal protective equipment. They were undoubtedly exposed to various health risks due to inappropriate safety measures taken during collecting waste at the waste dump site. Quite high percentage of respondents who did not see the importance of wearing glove and facemask during collecting wastes. This might due to lack of education and financial abilities to buy PPE. Based on the findings, the risk of get injured by sharp object such as broken glass decreased with the increase in educational level of garbage collectors. This was believed to be due to more educated garbage collectors were more concerned and aware of their personal health risk and therefore taken appropriate safety measures. Most of the garbage collectors from middle income level suffered from cough and fever because they were not able to buy appropriate PPE to protect them from being exposed to landfill hazards. At the same time they have limitation of getting access to the better health services due to poverty. Majority of the respondents said only boots and tools aid are needed, while, wore facemask and glove during
collecting and washing hands and cloth with antiseptic after collecting waste was given less priorities. In conclusion, garbage collectors faced tremendous health challenge while performing their duties.

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References


