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Investigation of the significant role of informal waste collectors in solid waste management scheme: Case study in Nay Pyi Taw, Myanmar

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Contents

	Pages
Abstract	i
စာတမ်းအကျဉ်း	ii
1. Introduction	1
2. Objectives	1
3. Methodology	1
4. Results and Discussion	2
4.1. Demographic Characteristics of Respondents	2
4.2. Types and amount of waste collected by informal waste collectors	2
4.3. General Knowledge of respondents on health-related problems	4
4.4. Recommendation	4
5. Conclusion	4
6. Acknowledgement	5
7. References	5

**Investigation of the Significant Role of Informal Waste Collectors in Solid Waste
Management Scheme: Case study in Nay Pyi Taw, Myanmar**

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Abstract

The study investigates and estimates the type and amount of recyclable waste collected by informal waste collectors by using face to face interview for 88 informal collectors in Nay Pyi Taw. The descriptive statistics (frequency and percentage) and cross-tabulation analysis were applied. According to the results, types of waste collected by informal collectors were plastics, cardboard, papers, bottles, tins and cans. The results showed that the average amount of plastic collected by each collector per day was 3.6 viss, cardboard was 2.4 viss, paper was 3.7 viss, glass was 28 bottles and tins and cans was 33. Based on these amounts, the average daily income of each collector was about 15000 Myanmar kyats. The results show that further educational initiatives to enhance awareness and understanding of health- related problems of the informal waste sectors are necessary in Nay Pyi Taw. This study indicates ways to mainstream the informal sectors in waste management schemes.

Keywords: Nay Pyi Taw, recyclable waste, type, amount, informal waste collectors

နေပြည်တော်အတွင်းရှိ စွန့်ပစ်ပစ္စည်းစီမံခန့်ခွဲမှုအခန်းကဏ္ဍတွင် တရားမဝင် အမှိုက်ကောက်ယူသူများ၏ အရေးကြီးမှုကို လေ့လာဆန်းစစ်ခြင်း

ချစ်ဦးကို၊ ကထိက

သစ်တောနှင့်ပတ်ဝန်းကျင်ဆိုင်ရာတက္ကသိုလ်

စာတမ်းအကျဉ်း

ဤစာတမ်းတွင် နေပြည်တော်အတွင်းရှိ တရားမဝင် စွန့်ပစ်အမှိုက် ကောက်ယူသူ ၈၈ ဦး ထံမှ နေ့စဉ်ကောက်ယူလျက်ရှိသည့် စွန့်ပစ်အမှိုက်အမျိုးအစားများနှင့် ကောက်ယူရရှိမှု ပမာဏကို တွက်ချက်ထားခြင်းဖြစ်ပါသည်။ စာတမ်းတွင် descriptive statistics (frequency and percentage) and cross-tabulation analysis တို့ကို အသုံးပြုထားပါသည်။ လေ့လာမှု ရလဒ် များအရ စွန့်ပစ် အမှိုက် ကောက်ယူသူများသည် အဓိကအားဖြင့် ပလတ်စတစ်၊ ကတ်ထူ စက္ကူများ၊ စက္ကူများ၊ ပုလင်း ခွံများ၊ သံဗူးခွံများကို အဓိကထား ကောက်ယူစုဆောင်းကြပါသည်။ ပျဉ်းမျှ အားဖြင့် ၎င်းတို့ တစ်ဦး ချင်းစီ၏ တစ်နေ့ ဝင်ငွေ သည် မြန်မာကျပ်ငွေ ၁၅၀၀၀ ကျပ်ခန့် ရရှိပါသည်။ သုတေသန ရလဒ်များအရ စွန့်ပစ် အမှိုက်ကောက်ယူသူများ၏ ကျန်းမာရေးဆိုင်ရာ အသိပညာ အားနည်းလျက် ရှိကြောင်း တွေ့ရှိရပါသည်။ သို့ဖြစ်ပါ၍ နေပြည်တော်အတွင်းရှိ စွန့်ပစ်အမှိုက် ကောက်ယူသူများ အတွက် ကျန်းမာရေးဆိုင်ရာ အသိပညာပေး လုပ်ငန်းစဉ်များ တိုးမြှင့် ဆောင်ရွက် သင့်ပါသည်။ ဤစာတမ်း ၏ သုတေသနရလဒ်များကို စွန့်ပစ်ပစ္စည်း စီမံခန့်ခွဲမှု လုပ်ငန်းစဉ် များတွင် တရားမဝင်အမှိုက် ကောက်ယူသူများ၏ အရေးပါမှုကို အလေးထား ၍ ၎င်းတို့၏ အခန်းကဏ္ဍကို ထည့်သွင်းစဉ်းစား သင့်ကြောင်း မီးမောင်းထိုးပြထားပါသည်။

Investigation of the significant role of informal waste collectors in solid waste management scheme: Case study in Nay Pyi Taw, Myanmar

1. Introduction

Limitation of providing basic infrastructure and waste collection are challenging to municipalities because of increasing population and waste generation (Kyessi et al., 2017; Omar, 2019). More than 50% of the waste is beyond of the ability especially in developing countries (Omar, 2019). In Myanmar, especially in three largest cities (Yangon, Mandalay and nay Pyi Taw), increasing the number negative impact on public health and environment are resulted from the increasing of daily waste generation (ECD, 2020).

In solid waste management, the informal sector plays a significant role of waste collection activity especially in low- and middle-income countries. Informal waste pickers, shops and recyclers are very important players to establish the strong official waste management system although they are still illegal according to the present legislations, rules and regulation (Magdeburg et al., 2017). They also contribute effectively in waste management and resource efficiency by collecting, sorting, trading, etc. (Wahab and Ola, 2017). Moreover, they are also crucial to develop clean and healthy cities and communities. Therefore, estimating the amount of recyclable waste collected by informal waste collectors would create more understanding of their role in waste management sector to the relevant authorities.

Although Nay Pyi Taw is the capital city of Myanmar, there is still lacking the data relating with the informal waste collectors. Therefore, not only the result of this study can lead to the better understanding of the role of informal waste pickers and collectors, it can also be used to support the decision-making processes especially in relating with how to mainstream them in waste management scheme, and how to establish short- and long-term development plans.

2. Objectives

The objectives of this study are:

- (1) To estimate the recyclable waste amount collected by informal waste collectors
- (2) To examine the basic health risk knowledge of informal waste collectors

3. Methodology

This study was conducted in Nay Pyi Taw, Myanmar. A total of 1,160,242 residents are living in Nay Pyi Taw which consists of two districts and 8 townships (Department of population, 2015). In this study, snowball sampling method was used. According to the initial investigation, there are around 800 informal waste collectors in Nay Pyi Taw. Based on this estimation, 88 informal waste collectors in Nay Pyi Taw were selected with $\pm 10\%$ margin of error and 95% confidence level as shown in Table 1 (Conroy, 2006). The informal waste collectors were selected in three townships namely Lewe, Tatkon and Pinyinmana. The first respondent in each township was selected by asking people. The next respondents were also selected based on the first respondent. The questionnaire was composed of both open-ended and close-ended questions, and it was completed with face to face interviews. The data resulting from the field survey was analyzed with the aid of the Statistical Package for Social Sciences (SPSS) software (Version 24), and presented using descriptive statistics in the form of frequency distribution. Moreover, cross-tabulation analysis (contingency table

analysis) was also analyzed. During the interview, the interviewers were requested to each respondent to answer the questions to test the basic health-related knowledge. In this study, descriptive statistics (percentage) and cross-tabulation analysis.

Table 1: Sample sizes for prevalence studies

Acceptable margin of error	Size of population					
	Large	5000	2500	1000	500	200
±20%	24	24	24	23	23	22
±15%	43	42	42	41	39	35
±10%	96	94	93	88	81	65
±7.5%	171	165	160	146	127	92
±5%	384	357	333	278	217	132
±3%	1067	880	748	516	341	169

4. Results and Discussion

4.1. Demographic Characteristics of Respondents

Out of 88 respondents, the majority were male, accounting for 78% of the total population, while females were 22%. This indicates that the survey predominantly captured the male participants. According to the results, the majority of respondents (35 %) has secondary education level, followed by 47% who has primary education level. These findings indicate that the surveyed group was predominantly composed of secondary and primary education levels. Moreover, it can also conclude that the people who have secondary and primary education level can earn the basic income from the informal recycling although they have no chance to be a government officer or businessman. However, this also highlights that most respondents are likely to possess limited knowledge and skills to understand health related problems.

During the survey, the age of the respondents was also recorded. As the results, the largest proportion of respondents (34 %) were aged between 15 to 25 years, followed by age grouped between 41 to 50 years (33 %). Participants aged between 26 to 35 years accounted for 17 % while 10 % were aged between 46 to 55 years. A small percentage, 2 %, were between 56 to 65.

Income levels play a crucial role in understanding the socioeconomic background of respondents. As the results, the monthly income of 65 % of respondents was 100000 to 300000 Myanmar Kyats. A smaller proportion, 1 %, reported earning under 100,000. Income range 300000 to 500000 were 30 % and above 500000 were 17%. This distribution indicates that most respondents are concentrated in the mid-income range. It means that moderate level of financial providing can create from informal waste collection business to the surveyed group. It also means that the informal waste collection business is one of the income generation activities in Nay Pyi Taw. It could contribute to the livelihood of people who have only primary and secondary education levels.

4.2. Types and amount of waste collected by informal waste collectors

The results show that most of the respondents worked as only informal waste collectors for their income accounted for 53%. Some respondents relied on other activities such as livestock, agriculture, etc. During the survey, the number of years each interviewer has been working in this business was also recorded. According to the results, 69 % of respondents have been working in recycling shops for 1 to 5, and 29 % of respondents have 6 to 10 years of experience in this business. The remaining 2% have more than 10 years

experiences respectively. All the recyclable wastes were collected from households, street, dumpsites, etc. The types and amount of waste collected by informal waste collectors was summarized as shown in Table 2.

According to the results, types of wastes collected by informal collectors were plastics, cardboards, papers, bottles, tins and cans. The results shown that the average amount of plastics collected by each collector per day was 3.6 viss, cardboards was 2.4 viss, paper was 3.7 viss, glass was 28 bottles and tins and cans was 33. Based on these amounts, the average daily income of each collector was about 15000 Myanmar kyats. It is significantly high. Moreover, from environmental point of view, each collector can contribute the environmental sustainability pathways especially circular economy because they collect plastics, cardboards, glasses, etc. not only for their income but also for environmental conservation. It can be said that informal waste collectors are crucial to achieve the sustainable waste management especially in circular economy scheme.

Table 2. Types and amount of wastes collected by informal waste collectors (daily)

No.	Type of waste	Average amount of waste (Daily)	Market price	Average income in Myanmar kyats (Daily)
1	Plastics	3.6 viss (Min. 1 – Max. 15)	700	2520
2	Cardboard	2.4 viss (Min. 0 – Max. 30)	500	1200
3	Paper	3.7 viss (Min. 0 – Max. 50)	1000	3700
4	Glass	28 bottles (Min. 0 - Max. 250)	180	5040
5	Tins and Cans	33 bottles (Min. 0 – Max. 250)	85	2805
Total				15265

According to the results, 55 % of respondents have no vehicle to collect the recycling wastes. They used on foot and bicycles for waste collection. Other 45 % used vehicles like motorcycles. Types of material used at collection time have influenced on income of respondents as shown in Table 3.

Table 3: Income * Material Used Crosstabulation

		Material Used	
		On foot	Vehicles
Income	Under 100000	1	0
	100000 to 300000	38	19
	300000 to 500000	3	10
	500000 and above	6	11
Total		48	40

The results indicate that income significant proportion of respondents (38 respondents out of 48) who collected wastes with no vehicles were earned from 100000 to 300000 Myanmar kyats. By comparing the income of respondents between “on foot” and “vehicles”, the respondents who used vehicles to collect the wastes were earned more income higher than those of people who did not.

The findings highlight that using vehicles in waste collection appears to influence the income of respondents. This could be due to various factors. For example, collectors who have vehicles can travel more distance and can collect more recycling materials. It means that it can create more money while collectors who have not vehicles cannot do such kind of work.

4.3. General Knowledge of respondents on health-related problems

In this research, the respondents' knowledge of health-related problems was also assessed. The questions were only Yes or No format and only included three questions: Do you think collecting recycling waste can cause health problems? Do you ever use protective equipment (gloves, masks, boots, hats, others) when processing the recycling materials? Do you ever use disinfectants or soap after processing the recycling materials? This section provided valuable insights into the level of knowledge among the respondents. For analysis, the respondents were grouped into two categories: "Highest" and "Average". The "Highest" category was grouped the person who answered correctly for all questions while the "Average" category was grouped for respondents who answered correctly for two questions out of three.

Table 4: Health risk knowledge of respondents

Category	Marks obtained	Frequency	Percentage
Highest	3	1	1
Average	2	52	59
Minimum	1	35	40
Total		111	100

The findings revealed that only 1 out of 88 respondents achieved a perfect score. The majority 59 % has the average score. It means that 52 respondents answered correctly two questions out of three while 35 respondents answered correctly only one question out of three as shown in Table 4. Only one respondent scored highest score suggests that waste collectors have very low level of health risk knowledge. This highlights that the need for further educational initiatives to enhance awareness and understanding of health-related problems of the informal waste sectors.

4.4. Recommendation

- The amount of recyclable waste collected by informal waste collectors in Nay Pyi Taw estimated in this study can be contributed to a better understanding of the role of informal recycling shops in the waste management systems.
- The government should provide some kind of special support to informal waste collectors especially those who have no vehicles.
- Do's and don'ts during waste processing should be disseminated via television programs, magazines, newspapers, and online media (Facebook, YouTube, etc.) because employees in waste collection seem to have less awareness of health protection system.

5. Conclusion

This study calculates the amount of recyclable waste collected by informal recycling collectors in Nay Pyi Taw. Informal recycling collection business can create job opportunities and can earn money for their livelihoods for people who live in Nay Pyi Taw. Average daily income of informal waste collector is about 15000 Myanmar kyats. Each collector can

contribute the environmental sustainability pathways especially circular economy because they collect plastics, cardboards, glasses, etc. not only for their income but also for environmental conservation.

The findings of this study can also support to conclude that the people who have secondary and primary education level can earn the basic income from the informal recycling although they have no chance to be a government officer or businessman. However, this also highlights that most respondents are likely to possess limited knowledge and skills to understand health related problems. By comparing the income of respondents between “on foot” and “vehicles”, the respondents who used vehicles to collect the wastes were earned more income higher than those of people who did not.

Estimating the recycling waste amount collected by informal collectors and recommendations based on the results of this study might provide the basic background information for policymakers, especially in order to mainstream informal sectors in the solid waste management system with consideration: they are important players in waste management schemes.

6. Acknowledgement

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