

HOUSEHOLD WASTE DISPOSAL: KNOWLEDGE, PERCEPTION, PRACTICES, AND RELATIONSHIP WITH DIARRHEA FREQUENCY IN LAPUTTA TOWNSHIP IN MYANMAR

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ABSTRACT: A cross-sectional study was carried out in Yay Twin Seik village tract, Laputta Township in Myanmar in March, 2011. The main purposes of this study were to identify the diarrhea occurrence and to identify association of diarrhea risk with demographic and household characteristics, level of knowledge and perception about household waste disposal and practices on household waste disposal in Laputta Township. This study was conducted with 389 samples by using a structured interviewer-administered questionnaire. There were 339 out of 389 households who had no history of diarrhea within last one month from self report while the rests, 12.9% had at least one case of diarrhea within last one month. Among respondents, 78.1% had high level of knowledge while 21.1% had moderate level of knowledge. For perception towards household waste disposal, 50.4% of respondents had high-level perception and 48.1% had moderate level of perception. Practice on household waste disposal differed significantly with drinking water source (<0.001), number of trash bin ($p=0.032$), trash bins with wide lids ($p=0.01$), emptying of trash bins ($p=0.008$), kitchen waste ($p=0.017$) and perception towards household waste disposal (<0.001). Indoor latrine (OR=2.38; 95% CI: 1.02-5.49) and number of children under 5 (OR=2.09; 95% CI: 1.08-4.04) are risk for diarrhea while trash bins with narrow lids (OR=0.30, 95% CI: 0.16-0.59) is protective against diarrhea. Study findings can serve to guide further research in this area, and may be of value in making policy to reduce diarrhea risk.

Keywords: household waste disposal, diarrhea, Myanmar

INTRODUCTION

As the world economy grows, its production of wastes also grows. For example, US production of hazardous and toxic waste rose from 9 million tons in 1970 to 238 million tons in 1990 [1]. The rapid growth of cities in the developing world in recent decades has resulted in increased consumption of resources to meet the growing demands of urban populations and industry, and this situation leads to the generation of large amounts of waste in cities [2]. The effects of poor waste disposal have a habit of catching up with us. Disposing of waste properly needs money and effort. Public concern can exert effective pressure in this regard. However, the best way of reducing pollution from waste disposal is to reduce – by more efficient use of resources – the amount of waste we produce. Household waste is made up of everyday items. There are two types of household waste. Nonhazardous waste is made up of food, packaging, furniture and yard clippings. Hazardous waste includes such things as electronics, compact fluorescent bulbs, paints, batteries, pesticides, oils and some cleaners [3].

Waste can block the drainage system of the house. Outdoor stockpiles of household waste will be turned into bacterial culture as it becomes food

favorable for rodents and insects, which are disease carriers and can result in public health hazard. Some of major risk factors of poor environmental conditions are unsafe water and sanitation and poor hygiene, indoor and urban air pollution, climate change and so on. There are many major environmental risk factors which cause many diseases such as diarrheal diseases, respiratory diseases, vector borne diseases, road traffic injuries, unintentional poisonings [4]. Most deaths, 80% occur in children under five who frequently die from diarrhea associated with waterborne disease. In India alone, diarrhea kills about 500,000 children a year and it is the sixth largest cause of death globally. A 2006 World Bank document reported that four billion cases of diarrhea a year and other water related diseases [5]. Diarrhea is one of the causes of the highest mortality and morbidity in children, especially in children younger than 5 years [6]. In the world, as many as 6 million children die each year from diarrhea, where most deaths occur in developing countries [7]. Many of the microbial agents associated with diarrhea are transmitted via the fecal-oral route and a wide variety of bacterial, viral, and protozoan pathogens excreted in the faeces of humans and animals are known to cause diarrhea [8].

This paper categorizes some variables that influence the household waste disposal and diarrhea

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occurrence in Laputta Township in Myanmar. This area is one of the first coastal areas in the Delta region in the Southwestern part of Myanmar which was strike by the Cyclone Nargis in 2008 so this area is struggling to face many environmental problems after the Cyclone. The paper also attempts to recommend some measures to improve waste disposal and reduce diarrhea occurrence in that area after the cyclone. The aims of this study are to describe the demographic and household characteristics of people and diarrhea occurrence; to assess the level of knowledge, perception and practices on household waste; and to assess the association between demographic and household characteristics, level of knowledge, perception with level of practices on household waste disposal associated with diarrhea occurrence in people in Laputta Township in Myanmar.

MATERIALS AND METHODS

This study was carried out in Yay Twin Seik village tract in Laputta Township in Myanmar. After the cyclone, many NGOs as well as the Government provided both financial support and programs about how to improve household waste management, though there was no research done in this area about household waste management or diarrhea. So, this study was carried out during March of 2011. The study population consisted of all households in the Township. For the selection of the study subjects, purposive sampling method was used. Yay Twin Seik village tract was purposively selected from all 35 village tracts in Laputta Township. From that village tract, all 14 villages were chosen and from each village, households were selected according to inclusion and exclusion criteria for the survey. Inclusion criteria were households who stayed at the current home place for more than three months; households who had at least one child of less than 5 years old; and households who are willing to participate. From each households, the interviewee are the mother or other female guardian.

The questionnaire included: (1) socio-demographic characteristics, (2) household characteristics, (3) knowledge, perception and practice on household waste disposal, and (4) diarrhea history in every household members within in last one month (self report). The total number of people in each household ranged from 2 to 10; the mean number was 4.25. Three hundred and eighty-nine respondents were interviewed with ethical view protocol no. 031.1/54 which was approved by the Ethical Review Committee for Research Involving Human Research Subjects, Health Sciences Group, Chulalongkorn University, Bangkok, Thailand on March, 2011. The structured interview questionnaire was validated by three experts from Chulalongkorn University for the accuracy, clarity, and appropriateness. After the questionnaire was pretested, it was administered to

the respondents. The data collection was done by face to face interview. During the interview in their houses, the household condition of the houses was also observed by the interviewers such as physical appearance of water, waste disposal at household level. The data was collected by the researcher and by the help of four trained assistant researchers who were health assistants from health center of World Concern (WC) Non-government Organization. Assistant researchers had four hours for standardized training in the structured face-to-face interview technique. Questionnaires were coded before entering the data to the computer by the researcher. Data analysis was conducted to address the specific objectives of the study. Descriptive statistics such as frequency, percentage, mean and standard deviation were used to describe the socio-economic characteristics. For relationship among the variables, Chi-square tests were used to find out the association between independent variables with categorical data (socio-demographic and household characteristics) and dependent variables with categorical data (diarrhea). For the categorical independent variables data (socio-demographic and household characteristics) and the continuous dependent variables (practice score on household waste disposal), independent t-test or ANOVA test was used depending on the numbers of the independent variables. Multivariable analysis with linear regression and binary logistic regression was also used to identify important determinants and to compare their relative importance. Analysis was conducted using SPSS software.

RESULTS

All respondents were in the age ranged from 16 to 59. More than half of the respondents were in the age group 30 years and below (55.5%). The others were in the age group 31 to 40 years (28.8%) and in the age group older than 40 years (15.7%). The great majority of the respondents were married (93.0%) while the rests were widowed (4.4%), single (2.3%) and divorced (0.3%). More than half of the participants were in the primary education level (63.1%) and 15.2% of them were illiterate. Small percentage of the respondents, 11.1% and 4.4% finished secondary and high school level education respectively while other, 6.2% only learned from the monastery. More than two-thirds of the respondents surveyed were housewives (84.6%), about one-third of them (39.8%) worked as general workers and minority of them were farmers (6.9%), laborers (5.4%) and construction workers (0.3%). Other 31.6% of them also worked in fishery and worked as traders and small shop owners. The economic status of the respondents was assessed on the basic of total monthly family income and it ranged from 10,000 Kyats to 500,000 Kyats (about 10 USD to 500 USD). 44.0% of the participants had income less than 30,000 Kyats

(about 30 USD). Only 18.3% had income more than 50,000 Kyats (about 50 USD). Almost all of them (94.4%) had their own houses while others, 5.1% and 0.5% lived in rented single-family houses and partitioned shared room provided by the employers respectively. After the Cyclone Nargis had destroyed most of the houses in Laputta Township, people got help from the Government as well as from the NGOs in building their new houses. Thus, the majority had their new houses at some times after the cyclone.

Most households (88.9%) had a latrine. Among those households who had latrine, 92.5% of them kept their latrines outside the houses while the rests (7.5%) inside the houses. For the type of latrine that they use, pour-flush ones were mostly used (88.1%). More than half of the respondents (54.4%) used pond water for both drinking and cooking. 94.9% of the participants had at least one drinking water container in their houses and from that 76.4% were closed containers whereas the rests (18.5%) opened containers. Trash bins were used in more than half of the houses (60.7%) and most of the people in those houses (53.5%) had only one trash bin. Among the households which had trash bin, 43.2% and 39.4% used trash bin with narrow lids and with wide lids respectively; 24.2% did not keep their trash bins covered with lids. The participants emptied their trash bins about once a week for 33.9%, about twice a week for 27.9% and every two days for 20.8%. Very few people, only 9.7% and 7.7%, discarded waste in the trash bins everyday and less than once a week, respectively. About one-third of them (32.9%) threw their household wastes into the outdoor stockpile. Moreover, there were stockpiles of garbage near about half of the houses (51.2%). The most common household wastes were kitchen waste (food waste) (76.1%) and plastic bags and bottles (59.4%).

The scores of knowledge, perception and practice on household waste disposal were categorized into 3 levels according to Bloom classification [9]: low, moderate, and high. The cutting point for high level was more than 80% of total scores (>26.4 for knowledge and practice; >44 for perception), moderate level was 60% - 80% of total scores (19.8-26.4 for knowledge and practice; 33-44 for perception), and low level was less than 60% of total scores (<19.8 for knowledge and practice; <33 for perception). The total possible scores ranged from 11 to 33 for knowledge and practice; and from 11 to 55 for perception. More than two-thirds of the participants (78.1%) had high level of knowledge while less than one-third of them (21.1%) had the moderate. Only 0.8% of respondents had low knowledge level about household waste disposal. About half of the respondents (50.4%) were in the high perception level while almost equal percentage (48.1%) had moderate-level perception. Only 1.5% of the participants had low perception level. More

Table 1 Number and percentage of diarrhea occurrence in each household within last one month (n=389)

Diarrhea frequency	Number	Percentage
0	339	87.1
≥1	50	12.9

than half of the respondents (57.5%) were in the moderate practice level. More than one-third of them (36.8%) had good practice and in contrast, only 5.7% of them had poor practice on household waste disposal. As shown in Table 1, 50 households (12.9%) had at least one episode of diarrhea within the last month.

In order to see the effect on practice score, t-tests and ANOVA revealed that 17 independent variables have a statistically significant difference with household waste disposal practice score ($p < 0.05$). For education, illiterate respondents had mean practice score of 24.07 while the others with primary education level had 25.29 mean practice score. For the households with latrine, the mean score of practice was 25.22 while for those without latrine, it was 23.81. In the households with outdoor latrine, the mean score was 25.32 while in those without latrine, it was 23.85. Among the households with pour-flush latrine, they had 25.21 mean practice score while those with other types of latrine and without latrine had mean score of 23.98. Opened container used households had mean score of 25.71 while households with closed container had 24.99 mean score. For those without container, they had mean practice score of 23.85. The households with trash bins had mean practice score of 26.22 while those without had 23.29 mean score. In the households without bins, the mean practice score was 23.29. Among the households with one trash bin, the mean score was 26.17 while those with 2 and more trash bins had 26.61 mean practice score. For the households which had trash bin with wide lids, the mean score was 26.66 compared to those without wide lids who had 24.57 mean score. Among the households which had trash bins with narrow lids, they had mean practice score of 26.19 while those without narrow lids had 24.67. The respondents who emptied bins every day or every two days had mean score of 26.43 while those who emptied bins about twice or once per week had 26.28 mean practice score. The participants who emptied trash bins less than once per week and below had mean practice score of 23.46. For the households who kept waste opened, they had mean score of 24.78 and those who kept waste closed at household level had 25.54 mean practice score.

Chi-square test showed that only 2 independent variables were significantly associated with diarrhea occurrence, as shown in Table 2. The percentage of having diarrhea in households which had indoor latrines (50%) was much higher than that of having diarrhea in households which did not

Table 2 Relationship between socio-demographic and household characteristics with diarrhea occurrence within last one month (p<0.05) (n=389)

Characteristics	Diarrhea n (%)		χ^2	P-value
	Yes	No		
Indoor Latrine				
Yes	13 (50.0)	13 (50.0)	6.674	0.010
No	96 (26.4)	267 (73.6)		
Narrow-lid trash bin				
Yes	14 (13.7)	88 (86.3)	14.007	<0.001
No	95 (33.1)	192 (66.9)		

Table 3 Linear regression analysis of factors for practice on household waste disposal (n=389)

Variables	B	95% CI		P-value
		Lower	Upper	
Drinking water source				<0.001
Pond	1.903	1.282	2.525	<0.001
Rain	0.044	-0.750	0.839	0.913
Others	0			
Number of trash bin	0.838	0.071	1.605	0.032
Trash bins with wide lids	1.477	0.626	2.327	0.001
Trash bins with narrow lids	0.747	-0.082	1.577	0.077
Emptying of trash bins	-0.717	-1.242	-0.192	0.008
Kitchen waste	0.737	0.132	1.341	0.017
Storage of pesticides or herbicides	1.014	-0.072	2.101	0.067
Waste disposal at household level	0.520	-0.007	1.047	0.053
Perception towards household waste disposal	0.096	0.047	0.145	<0.001

Table 4 Logistic regression analysis of factors associated with diarrhea occurrence (n=389)

Variables	B	Odds Ratio	95% CI		P-value
			Lower	Upper	
Age >40					0.029
Age ≤30	-0.502	0.605	0.316	1.161	0.131
Age 31-40	0.193	1.213	0.608	2.422	0.584
Indoor latrine	0.865	2.375	1.027	5.490	0.043
Trash bins with narrow lids	-1.194	0.303	0.156	0.587	<0.001
Kitchen waste (Food waste)	0.534	1.705	0.935	3.108	0.081
Number of children under 5	0.738	2.092	1.081	4.049	0.029
Low-level perception					0.078
High-level perception	-0.425	0.654	0.097	4.410	0.663
Moderate-level perception	-0.953	0.385	0.056	2.633	0.331

have latrines (26.4%). Among the households that used trash bins with narrow lids, 13.7% of them had at least one diarrhea episode, considerably lower than those that did not use them (33.1%).

In the Table 3, from the multivariable analysis between independent variables and practice score, drinking water source, number of trash bins, trash bins with wide lids, emptying of trash bins, kitchen waste (food waste) and perception towards household waste disposal is significant after controlling other independent variables (p<0.05).

Concerning the relationship between significant independent variables and diarrhea occurrence in multivariable analysis of binary logistic regression revealed in the Table 4, age of the respondents, indoor latrines, trash bins with narrow lids and number of children under 5 were found significant after controlling other independent variables (p<0.05). Households with indoor latrine were 2.38 times more likely to get diarrhea than those without

it. Households using trash bins with narrow lids were less likely to cause diarrhea than those that did not use by odds ratio 0.303 as the B coefficient showed negative effect of trash bins with narrow lids on diarrhea. The more children under 5 in households, the more diarrhea cases were found by 2.1 times.

Chi-square test showed that only 2 independent variables were significantly associated with diarrhea occurrence, as shown in Table 2. The percentage of having diarrhea in households which had indoor latrines (50%) was much higher than that of having diarrhea in households which did not have latrines (26.4%). Among the households that used trash bins with narrow lids, 13.7% of them had at least one diarrhea episode, considerably lower than those that did not use them (33.1%).

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bins with wide lids, emptying of trash bins, kitchen waste (food waste) and perception towards household waste disposal is significant after controlling other independent variables ($p < 0.05$).

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DISCUSSION

The study was found that high knowledge towards knowledge about household waste disposal (78.1%) was a lot higher as compared to Myanmar migrant in Thailand in which it was only 49.8% [10]. The households who used pond water have more 1.9 practice scores than other kinds of water as well as those who used rain water have more 0.04 practice score than other kinds of water. This may be due to the proper storage of pond and rain water [11]. In the households in which one number of trash bins increased, there was an increase in practice score by 1.48. In the households having trash bins with wide lids, practice score increased by 1.5. The less frequent the respondents emptied trash bins, the practice score decreased by 0.7. In households which mainly produced kitchen waste, practice score increased by 0.74. This may reflect the condition that most of the respondents managed kitchen waste properly into the bags before disposed it. Perception was found to be more important than knowledge for practicing household waste properly as when one unit increased in perception scores, there was 0.1 unit increased in practice score which was consistent with the study done in Thailand which also showed significant difference between them [9].

Indoor latrine (OR=2.38; 95% CI: 1.02-5.49) and number of children under 5 (OR=2.09; 95% CI: 1.08-4.04) were risk factors for diarrhea while trash bins with narrow lids (OR=0.30, 95% CI: 0.16-0.59) were protective against diarrhea. So people in Laputta Township should be encouraged to have outdoor latrines and trash bins with narrow lids to reduce diarrhea occurrence in that area.

This study was intended to obtain baseline information regarding household waste disposal for further studies. The present results, along with results of future related research, may also assist

policy makers to implement further planning and strategy to reduce diarrhea risk in Laputta and possibly elsewhere. Non-governmental organizations like World Concern Myanmar, health authorities, policy makers and communities should cooperate in these efforts.

Since this study was done in Yay Twin Seik village tract in Laputta Township, it cannot be generalized to the whole Myanmar people, as socio-demographic characteristics might differ from one place to another and purposive sampling technique may also be a limitation. Moreover, this study was a quantitative study. Future qualitative studies may advance understanding in this area. As seasonal effect was not included in this study which had influence on both waste disposal and diarrhea, further research assessing seasonal effects should also be conducted.

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