

Assessment of Household Solid Waste Management and Hygienic Practice in Yebu Town, Jimma Zone, South Western Ethiopia

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ABSTRACT

Background: Increasing amount of solid waste is being generated as a result of rapid rate of urbanization and economic growth. This in turn presents greater difficulties for waste disposal. The problem is more acute in developing countries where the pace of urbanization is faster. Urbanization introduces society to a new, modern way of life, an improved level of awareness, new skills, a learning process, and so on.

Objective: The main objective of this study is to assess the household solid waste management and hygienic practice in Yebu town, Jimma Zone, Oromia Region, south west Ethiopia from Feb to April, 2018.

Methodology: A community based cross-sectional study will be conducted in Yebu town, from February to April 2018 to assess the household solid waste management and hygiene practice in Yebu town. Data will be collected using questionnaires and observations. Data will be collected through interview and observation.

Result: The majority of the households, (36%) disposed solid wastes through municipality and 95.7% of the households had temporary storage means for solid waste. About 94.3% of the respondents revealed that the responsibility of waste management is left for women and girls. 83.7% of households had latrines and almost majority were simple traditional pits latrine. From those households with latrine the habit of hand-washing after defecation was reported to be about 64.3%. The habit of hand washing after defecation is significantly associated with the educational status of the respondents.

Conclusion: This study revealed that household management of waste in the community of Yebu town is poor in terms of their liquid waste management. More than seventy five percent of the households flush away their waste water indiscriminately. But it is moderately good in terms of their solid waste management. This study also revealed that households' management of solid waste in the community is moderately good. The habit of hand washing after defecation is significantly associated with the educational status of the respondents.

Keywords: Solid waste; Solid waste management; Waste; Waste disposal

ABBREVIATION

AACG-SPBA: Addis Ababa City Government Sanitation; Beautification and Parking Development Agency; **CBE:** Community Based Education; **EPA:** Environmental Protection Authority; **HH:** House Hold; **MDG:** Millennium Development Goals; **MSWM:** Municipal Solid Waste Management; **SNNPR:** Southern Nation Nationalities and Peoples Region; **SWM:** Solid Waste Management; **UN:** United Nations

INTRODUCTION

Oromia region is one of the nine ethnically based regional states

of Ethiopia, covering 284,538 square kilometers. Jimma town is the largest city in south-western Ethiopia. It is a special zone of the Oromia Region and is surrounded by Jimma Zone. It has a latitude and longitude of 7°40'N36°50'E. The town was the capital of Kaffa Province until the province was dissolved. Prior to the 2007 census, Jimma was reorganized administratively as a special Zone.

Almost any substance that is discarded is designated as waste, but it may also be considered as a potential resource. Virtually everything in the "waste stream" has residual value for someone or some business in the community. Waste represents valuable resources as ground cover to reduce erosion, fertilizer to nourish the crops, the source of energy etc [1].

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Received: August 13, 2021; Accepted: August 28, 2021; Published: September 04, 2021

Citation: Abraham T (2021) Assessment of Household Solid Waste Management and Hygienic Practice in Yebu Town, Jimma Zone, South Western Ethiopia. Int J Waste Resour 11: 424.

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Increasing amount of solid waste is being generated as a result of rapid rate of urbanization and economic growth. This in turn presents greater difficulties for waste disposal. The problem is more acute in developing countries where the pace of urbanization is faster. Urbanization introduces society to a new, modern way of life, an improved level of awareness, new skills, a learning process, and so on. However, when the rate of urbanization gets out of control, it poses a big challenge to governance-optimizing forces become weakened, institutional capabilities become inadequate and ineffective, and, with these, the problems of urbanization are compounded [2].

Waste management is the process of collecting, transporting, processing or disposing, managing and monitoring of waste materials. The term usually relates to materials produced by human activity and the process is generally undertaken to reduce their effect on health, the environment or aesthetics. The major focus of this research is on waste management practices as obtains in the urban developing nations. Waste includes all items that people no longer have any use for, which they either intend to get rid of or have already discarded and these include: packing items garden waste, old paints containers, vegetables, metals etc [3].

Poor waste management has been a major problem to human health and existence, affecting both rural and urban areas. A clean environment influences good health and good health further affects the productivity of man. Therefore, it can be said that a good and clean environment invariably affects the wealth and economic status of the nation [4].

Globally, 2.6 billion people or 39 percent of the world population do not use improved sanitation. Some 1.1 billion people still defecate in the open air. Ten countries, including Ethiopia are home to 81 per cent of them.

Open defecation is largely a rural phenomenon, most widely practiced in Southern Asian and Sub-Saharan Africa. At current rates of progress the world will miss the MDG sanitation target by almost 1 billion people. The magnitude of the hygiene challenge also remains overwhelming [5].

According to Environmental Protection Authority (EPA) and World Bank study conducted in 2004, per capita amount of waste generated in Ethiopia ranged from 0.17 to 0.48 kg/person/day for urban areas to about 0.11 to 0.35 kg/capita/day for rural areas. The range depends on several factors such as income and season. The total generation of municipal solid waste in Ethiopia in 2003 is estimated to be 2.8 to 8.8 million tones. This can be split to approximately 0.6 to 1.8 million tons from rural areas and 2.2 to 7 million tons from urban areas [6].

There are various methods of waste disposal including: land filling: which involves burying the waste in abandoned or unused quarries, mining voids or burrow pits and covering it with layers of soil; incineration: involves subjection of solid organic wastes to combustion at a very high temperature of about 10,000 so as to convert them into residue or gaseous products; open dumping: whereby dumping can be done on open land or sea; composting: this is an aerobic, biological process of degradation of biodegradable organic matter; hog feeding: this involves feeding animals like pigs with left over materials of waste; mechanical destructor: this involves the use of machines to destroy waste materials [7].

The management of waste should focus on how to find the value and redirect it back to the community. Unfortunately, our

collecting and dumping process mix and crush everything together; and make separation an expensive and sometimes impossible task to properly manage wastes [8].

Practical aspects associated with solid waste management systems are financing, operations, equipment management, personnel, reporting, cost accounting and budgeting, contract administration, guide lines and public communications are basic for proper solid waste management [9].

Solid waste management (SWM) is one of the critical concerns facing developing countries because of the social, economic and environmental implications once not properly managed. Studies show that only 30-50% of the waste generated in developing countries is collected and managed properly. The rest is either burned or left to decompose in open spaced or dumped in unregulated landfills, which is damaging the environmental Quality [10].

The problem in our country is that we generation too much waste and yet we have no program of recycling or reuse, more over we have no developed the behavior to continue waste in everywhere such as one road, backyards and water ways is a common practice, and the most common adapted or recognized final disposal of solid waste are dumping on land [11].

In many town of Ethiopia; there are many sanitation problems of which the most intractable is solid waste. There appear piles of rotting vegetables and other organic waste around the streets, river banks, and market places. These generated wastes will have contact with human being directly at several stages in the waste cycle. The groups at risk are numerous and include the population of UN served areas, preschool children; waste workers; people living close to waste disposal facilities [12].

In Ethiopia alike developing countries, the increase of solid waste generation is resulted from rapid urbanization and population booming. According to research which is done in Addis Ababa, the amount of solid waste in Addis Ababa and other fast growing areas in the country has been increasing over time, largely attributed to rapid population growth rate.

The same authors indicated that from the total solid waste released by the population in the city, about 50-60% was collected and the rest was unattended. Recently the municipality has increased its coverage to about 85% [13].

Inadequate solid waste management has resulted in the accumulation of waste on open lands, in drains and in the residential areas, causing a nuisance and foul-smelling pools, environmental pollution through leach ate from piles (water and soil pollution) and burning of waste (air pollution), clogging of drains. This situation is believed to result in poor environmental conditions, which in turn present a formidable threat to health. There is thus a need for improved waste management system the town [14].

The preparation and management of a good solid waste management system requires the intact participation and management of all stake holders. Households' behavior, lack of households' knowledge, and less focus of the management system on solid waste management are among the main factors that contributed to lack of good solid waste management system. Willingness of households to participate in collection and recycling of solid waste also depends on the perceived benefits and costs of the system [15].

The study of household waste management and hygienic practice will partially fill the gap between what is happened in the community and what it intends to be by assessing waste management practice, hygienic practice which is done in community, by identifying factors affecting proper waste management and hygienic practice which protect the community from different health and health related problems and finally by disseminating proper information for responsible body which is found in the town to ensure proper waste management and hygienic practice in the community.

MATERIALS AND METHODS

The study area is in Yebu town Which is found in Jimma Zone Mana woreda, Oromia regional state and its 22km away from Jimma University Main campus on the way to Agaro. Yebu town is about 1200 to 1500m above sea level and its Woinadega.

Based on The information that I got from the kebele total population of yebu town is 8077.

- Male=3977
- Female=4120

The town has municipality offices, which is concerned working on solid waste and liquid waste management and also slaughter service for the kebele respondents. Solid waste generated from different sources of the town. Solid waste on average about 150 kg/day is generated (interview with municipality). Humans and animals have used the resources of the Earth to support life and to dispose of waste. Waste is a consequence of everyday life of all creatures. The problems associated with the management of solid waste in today's society are complex The reasons includes: Quantity and diverse nature of the wastes, Development of sprawling urban areas, Funding limitation for public services in many large cities, The impacts of technology, Humans have been producing solid waste forever as part of life

Study Design and Period

A cross sectional study was conducted from May 15 to 30, 2018 to assess the household solid waste management and hygienic practice among Yebu, Jimma town southwest, Ethiopia.

Source Population

All residents of households found in Yebu town was considered as source population

Study Population

The residents of residential households that are found during the study in Yebu were my study population.

Data Collection Technique

Data was collected from May 15 to 30, 2018 period using structured questionnaire specifically developed for this purpose. I was also assess the practice of the study community towards solid waste management through observation. The data was collected by structured questioners with my friends selected for this data collection purpose. The questionnaire was prepared based on statement of the problem and objectives of the study.

Data Process, Presentation and Analysis

All the collected data was checked and analyzed using software

known as SPSS version 16. Tables and figures will be used for the presentation of the study result and the interpretation of the study was carried out by relating the finding in the town with the other conducted researches in related subjects.

Data Quality Assurance

The data was collected carefully using structured questionnaire. The HH questionnaire will be translated in to Afan Oromo and the data collectors was trained. Pre testing of the questionnaire and other data collection tools was conducted in other similar village in the woreda in order to test the content of the questionnaire as well as to assess the skill of data collectors. Based on the result of the pretest, corrections was made on the data collection tools and feedbacks was given to data collectors.

Intensive supervision was made during the HH data collection. Unclear question will be clarified for respondents. The collected data was checked daily for completeness and accuracy before data entry and analysis.

Ethical Consideration

Before starting the data collection legal permission with a letter support was granted from Jimma University, CBE office by principal investigator to concerned bodies. The willingness of the respondent was respected and if someone in the selected sample number is not interested to answer the question data collectors must not obligate them to do so. Norm, belief, value and confidentiality of data is fully respected.

RESULTS

Socio- Demographic Characteristics

Data was collected from 387 households. Only residents who were household heads were invited to participate in the study. Out of the 300 respondents, 110(36.7%) of them were males, and 190 (63.3%) of them were females. Out of which 213(71%) were married, 43(14.3%) were single, 23(7.7%) were widowed and 21(7%) were divorced. High proportion of the participants were government employees and merchants, 89 (29.7%) and 88(29.3%), respectively. The majority of my respondents earn monthly income of both between 501-1000(29.7%) and 1001-2000(29.7%) Ethiopian Birr. Of my respondents majorities are Muslims 151(50.3%) and Orthodox 101(33.7%) religions followers. From our respondents 94(31.3%) educated up to grade 12 and above while 26(8.7%) had no formal education and cannot read and write. The detail is presented on Table 1.

Solid Waste Management Practice

The research further sought to find out which person in the family deals with household waste. Results show that other women in the family and mothers deal with household waste with frequency of 110(36.7%) and 101(33.6%), respectively. The rest is presented on the Table 2.

Methods Used to Dispose Waste

Different methods are used to dispose the waste which is released from the households. Of respondents, relatively large proportion, 107(36%) use municipality service to dispose their wastes. Significant number of respondents also used open dump outside

Table 1: Socio-demographic data of the respondents in Yebu town, Jimma zone, south west Ethiopia, 2018.

Demographic variables	Male n (%)	Female n (%)	Total n(%)
Gender	110(36.7)	190(63.3)	300(100)
Marital status			
Married	90(30)	123 (41)	213(71)
Single	7 (2.3)	36 (12)	43(14.3)
Widowed	8 (2.7)	15(5)	23(7.7)
Divorced	5 (1.7)	16(5.3)	21(7)
Educational status			
Illiterate	10 (3.3)	16 (5.4)	26(8.7)
Read and write	17 (5.7)	31 (10.3)	48(16)
1-6	10 (3.3)	18 (6)	28(9.3)
7-12	46 (15.3)	58 (19.4)	104(34.7)
grade 12 and above	41 (13.7)	53 (17.6)	94(31.3)
Religion			
Orthodox	47(15.7)	54(18)	101(33.7)
Protestant	13(4.3)	10(3.4)	23(7.7)
Muslim	68(22.7)	83(27.6)	151(50.3)
Catholic	7(2.3)	6 (2)	13(4.3)
Other	5(1.7)	7(2.3)	12(4)
Occupation			
government employee	55(18.3)	40(11.4)	89(29.7)
Merchant	29(9.6)	59(19.7)	88(29.3)
Student	20(6.7)	11(3.6)	31(10.3)
house wife		26(8.7)	26(8.7)
Solider	8(2.7)		8(2.7)
Carpenter	1(0.3)		1(0.3)
Farmer	43(14.3)	14(4.6)	57(19)
Monthly income			
<500	35 (11.7)	19(6.3)	54 (18)
501-1000	61(20.4)	28(9.3)	89 (29.7)
1001-2000	56(18.7)	33(11)	89 (29.7)
>2000	37(12.4)	31(10.3)	68 (22.7)

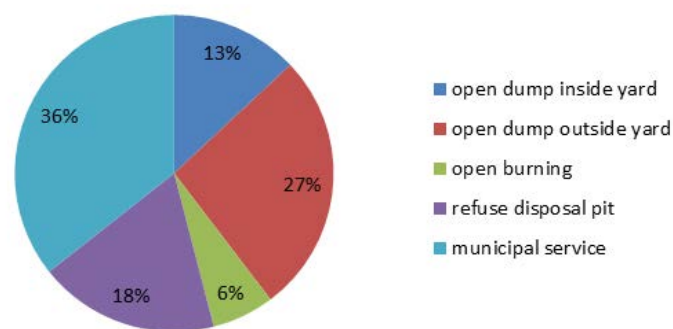
yard, i.e. 80(27%). Other significant proportion also practiced refuse disposal pit 55(18%). The detail is shown on the Figure 1.

From those respondents who responded that they use open dump outside yard method of disposal 41(13.7%) dispose their wastes early in the morning, 26(8.7%) dispose during the night time while 8(2.7%) of respondents dispose at day time. The detail is shown on the Table 3.

The research also assessed that whether the respondents burn their solid waste or not. Significant number of respondents 182(61%) answered yes but the remaining 118(39%) answered no. From those who burn solid waste 134(44.7%) burn inorganic plastics, while the remaining 48(16%) burn organic dry wastes. From those who burn solid waste high proportion 139(46.3%) have no properly arranged place for waste burning, while only 43(14.3%) have arranged place for waste burning. Also see the Tables 4 and 5.

Of respondents a very high proportion, 284(94.7%) clean their houses every day. But only a small proportion 16(5.3%) of respondents clean their houses often.

The larger proportion of the respondents have temporary storage at home 287(95.7%), the remaining 13(4.3%) do not have designated

**Figure 1:** Show methods used by households to dispose their waste in in Yebu town, Jimma Zone, south western Ethiopia, 2018.**Table 2:** Shows the responsibility for solid waste management at household level in Yebu town, Jimma Zone, south western Ethiopia, 2018.

	Frequency	Percent
Mother	101	33.6
Other women in the family	110	36.7
Children female	72	24.0
Children male	10	3.3
Father	7	2.3
Total	300	100.0

Table 3: Show the time taken by households for open disposal outside the yard by the households in Yebu town, Jimma Zone, south western Ethiopia, 2018.

Time taken for open disposal outside yard of waste	Frequency	Percent
Early in the morning	41	13.7
At day time	8	2.7
During night time	25	8.3
At any time	6	2
Total	80	27

Table 4: Shows whether the households arranged a place for waste burning or not in Yebu town, Jimma Zone, south western Ethiopia, 2018.

Presence of place for burning of waste	Frequency	Percent
Yes	43	14.3
No	139	46.3
Total	182	61

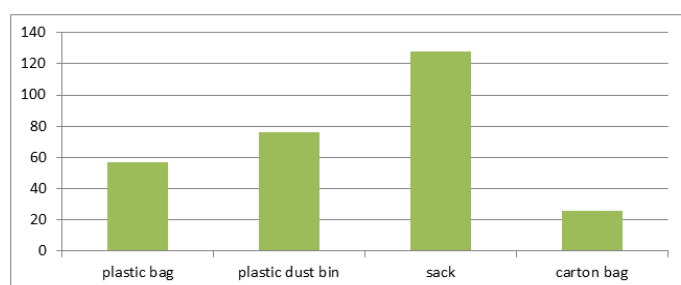
temporary storage. Out of those who have temporary storage at home, the research also sought out from what materials those containers made of. With this respect, respondents who use sack as temporary storage have the largest proportion, 128(42.7%), significant proportion of the respondents also use plastic dust bins as temporary waste storage 76(25.3%) and the largest proportion of waste storage used by households do not have cover 205(68.3%) and the rest 95(31.7%) have cover. The detail is presented on the Figure 2.

Again of the respondent 72(24%) of households apply onsite separation of waste before storage and 228(76%) of households do not apply onsite separation of waste before storage.

Majority of the respondents 284(94.7%) have the habit of hand washing after collection/disposal of solid waste and some households 16(5.3%) do not have the habit of hand washing after

Table 5: Show solid waste management of household in Yebu town, Jimma Zone, south western Ethiopia, 2018.

Variable	Frequency		Percentage
	Yes	No	
Cleaning of household compound	Yes	284	94.7
	No	16	5.3
	Total	300	100
Presence of temporary waste storage means	Yes	287	95.7
	No	13	4.3
	Total	300	100
Cover of waste storage means	Yes	95	31.7
	No	205	68.3
	Total	300	100
Onsite separation of waste before storage	Yes	72	24
	No	228	76
	Total	300	100
Washing of hands after collection/disposal of solid waste	Yes	284	94.7
	No	16	5.3
	Total	300	100

**Figure 2:** Type of container used by households for temporary storage of waste in Yebu town, Jimma Zone, south western Ethiopia, 2018.

collection/disposal of solid waste (Table 6).

From the total respondents 249(83%) do not have any personal protective equipment during collection/disposal of waste and small number of respondents 51(17%) have personal protective equipment during the collection/disposal of waste and finally wash hand with soap and other cleaning agent which is shown in the Table 7.

From a total of 300 households assessed for presence of excreta disposal systems, 283 (94.3%) reported that they have latrine; while 17 (5.7%) were without latrine. From those households who had latrine, 251 (83.7%) were traditional pit latrines, and 268(89.3%) were owned privately. Again from those households who had latrine, 49(16.3%) were VIP latrine, and 32(10.7%) were owned share. Presence of flies was observed in 136(45.3%) of the households. The finding of this study also revealed that 227 (75.7%) households did not have appropriate wastewater disposal systems and; hence they simply flushed the waste water in or around their compounds (Table 8). Out of the total respondents 283(94.3%) who indicated the availability of latrine; 196(69.3%) had hand washing facilities near the latrine and the remaining 87(30.7%) had no hand washing facility near the latrine. However, it was 182(64.3%) of the respondents from households with latrines reported washing their hands after defecation and the rest 101 (35.7%) had no habit of washing hand after defecation. From these that wash hands after defecation, 133(73.1%) expressed to use soap and water and 49(26.9%) reported that they use water only to wash their hands.

Table 6: Show the type of cleaning agent used by respondents to wash their hands after collection/disposal of waste in Yebu town, Jimma Zone, south western Ethiopia, 2018.

Type of cleaning agent used to wash hands	Frequency	Percentage
Water only	87	29
Water and soap/ash	187	62.3
Water and other cleaning agent	26	8.7
Total	300	100

Table 7: Shows respondents that can use personal protective equipment during collection/disposal of waste in Yebu town, Jimma Zone, south western Ethiopia, 2018.

Respondents that use personal protective equipment	Frequency	Percentage
Yes	51	17
No	249	83
Total	300	100

Table 8: Show liquid waste management at household level in Yebu town, Jimma Zone, south western Ethiopia, 2018.

Variable	Frequency	Percentage
Presence of appropriate waste water disposal system	Yes	73
	No	227
	Total	300
Availability of latrine	Yes	283
	No	17
	Total	300
Type of latrine	Traditional pit latrine	251
	VIP latrine	49
	Total	300
Owner ship of latrine	Private	268
	Shared	32
	Total	300
Presence of flies in and around the latrine	Yes	136
	No	164
	Total	300
Households with washing facility near to the latrine	Yes	196
	No	87
	Total	283
Households that wash hands after defecation	Yes	182
	No	101
	Total	300

The research also assessed whether the respondents store solid waste separate or mixed. The larger proportion of the participants responded that they don't care for waste separation, 217(72.3%). But only a little proportion of the respondents practiced to separate their solid waste, 83(27.7%) (Table 9).

To the question asked for how long they store their waste, significant proportion of respondents store their waste for <3 days and 3-6 days in the temporary storage before hauling to the final disposal, 109(36.3%) and 77(25.7%), respectively. The detail is shown on the Figure 3.

The research also assessed to find the major constituents of the

Table 9: Shows whether households separate or mix waste before storage in Yebu town, Jimma Zone, south western Ethiopia, 2018.

Households that store mixed waste	Frequency	Percentage
Yes	217	72.3
No	83	27.7
Total	300	100

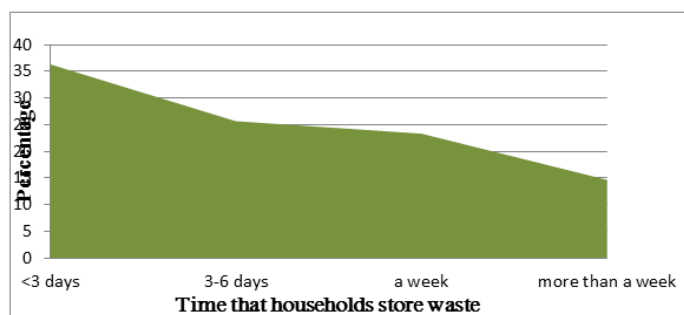


Figure 3: Show the time that waste is stored at household level in Yebu town, Jimma Zone, south western Ethiopia, 2018.

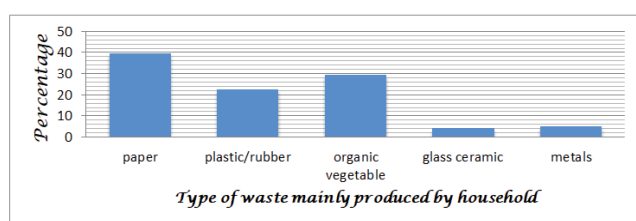


Figure 4: Show the main type of waste produced by households in Yebu town, Jimma Zone, south western Ethiopia, 2018.

household wastes. The major proportion of the wastes produced from the households is dominated by paper 118(39.3%) and followed by organic vegetables food remains which 88(29.3%) of participants responded. Plastic/rubber materials, metals and glass ceramic are also the other components; 67(22.3%), 15(5%) and 12(4%), respectively. The detail is shown in the Figure 4.

The research assessed whether the households use solid waste for other purpose or not. To this regard high proportion of the respondents, 166(55.3%) do not use solid waste for other purpose, but 134 (44.7%) use solid waste for other purpose. Out of those who use solid waste for other purpose, significant number of respondents uses it for fuel, 61(20.3%) and cattle feeding 55(18.3%). The detail is shown on the Figure 5.

The respondents were asked whether they sell wastes or not; 203(67.7%) are found to sell waste while the remaining 97(32.3%) don't sell wastes. From those who sell wastes 69(23%) sell shoes, 63(21%) sell plastics, 41(13.7%) sell metals and glasses and 30(10%) sell cloths. The research also assessed to whom they sell wastes; out of those who sell wastes, 156(52%) sell to 'Koralios', 48(16%) sell to 'Liwach', while the remaining 4(1.3%) sell to others like to those who locally reuse and recycle wastes.

The research also assessed whether they reuse household wastes or not. The majority of the respondents 260(86.7%) responded that they don't reuse household wastes. only 40(13.3%) reuse their wastes. From those who reuse household waste, the majority reuse plastics and glasses, 39(12.1%) and 38(11.8%) respectively. The detail is shown on the Figure 6.

The respondents also asked what means they use to transport waste. High proportion of the respondents 125(41.7%) use donkey

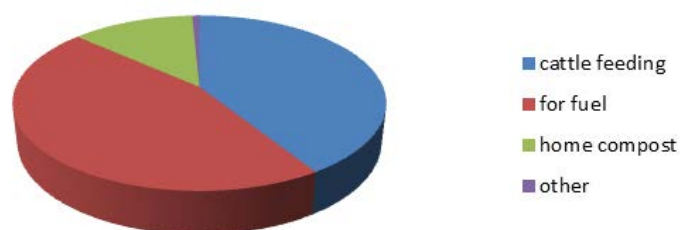


Figure 5: Households that can use waste for other purpose in Yebu town, Jimma Zone, south western Ethiopia, 2018.

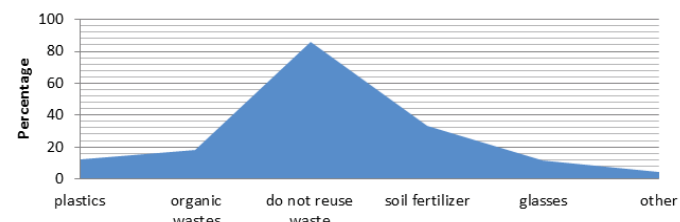


Figure 6: Shows whether households reuse waste or not in Yebu town, Jimma Zone, south western Ethiopia, 2018.

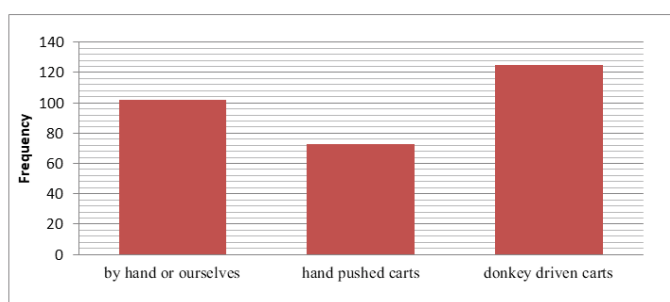


Figure 7: Shows means of waste transportation used by households in Yebu town, Jimma Zone, south western Ethiopia, 2018.

driven carts, significant number of respondents used by hands or themselves 102 (34%). 73 (24.3%) of the respondents dispose by using hand pushed carts. The detail is shown on the Figure 7.

The research also assessed whether the respondents know if there is anybody that monitors waste collection and disposal. The majority of them know that there is somebody who monitors waste collection and disposal, 207 (69%) but the remaining 93 (31%) do not know the presence of monitoring body. Out of those who know the presence of somebody who monitors solid waste disposal, they were asked what measures are taken on those who dispose waste improperly. 127 (42.3%) said that verbal warning is taken on them, 83(27.7%) said coercion is taken on them to clean by themselves. The remaining is shown on the Figure 8 and 9.

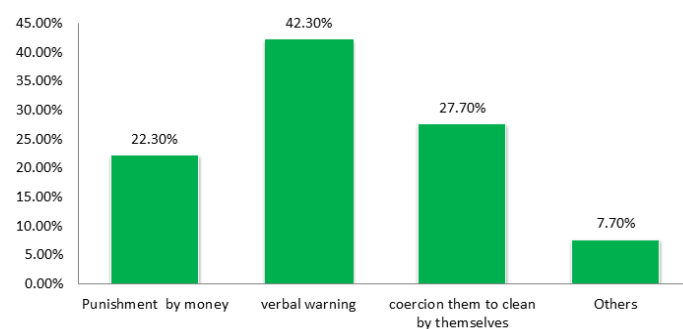


Figure 8: Shows types of action taken on those who dispose waste improperly in Yebu town, Jimma Zone, south western Ethiopia, 2018.

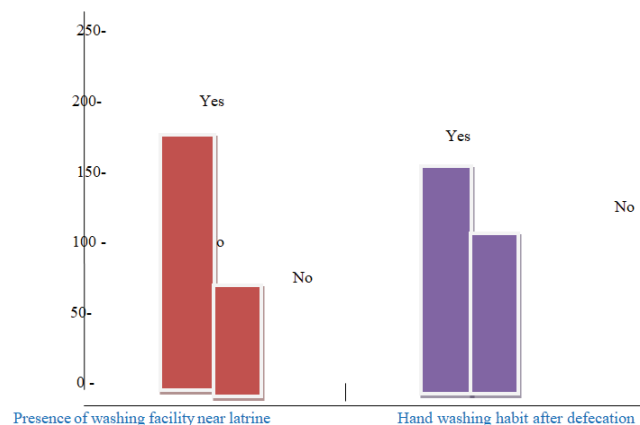


Figure 9: Hygienic practices at household level in Yebu town, Jimma Zone, south western Ethiopia, 2018.

Out of the total respondents 283(94.3%) who indicated the availability of latrine; 196(69.3%) had hand washing facilities near the latrine and the remaining 87(30.7%) had no hand washing facility near the latrine. However, it was 182(64.3%) of the respondents from households with latrines reported washing their hands after defecation and the rest 101 (35.7%) had no habit of washing hand after defecation. From these that wash hands after defecation, 133(73.1%) expressed to use soap and water and 49(26.9%) reported that they use water only to wash their hands.

DISCUSSION

The study revealed that in most of the households, 94.3% waste management was the responsibility of women (girls and mothers), which matches with the research by Bizatu and Nega in Kersa woreda, eastern Ethiopia, 2010; which was 87.9%. Men (father and boys) were reported to manage waste only in 5.7% of the households, which is again in matches with Kersa woreda, eastern Ethiopia, (Bizatu M. and Negga, 2010) which was 1.6%. The response presents evidence that there is gender imbalance in relation to family member's responsibility for waste management and so that women and girls shouldering the greatest burden.

Provision of adequate sanitation facilities is not only a socioeconomic and developmental issue but also an issue of self-respect, human dignity and public health (Legesse W, 2006). The basic functional units of solid waste management start with onsite storage and handling of wastes. This study indicated that 287(95.7%) had temporary storage for the generated solid waste. Moreover from those households which had temporary storage only 95 (31.7%) were found to have cover at the time of data collection. This indicates that the stored wastes were exposed to insects and rodents. The vast majority of the respondents, 284 (94.7%) reported that they clean their home and compound regularly. Also all of those 284 (94.7%) reported that they wash their hands after handling solid wastes. These two practices need to be encouraged and enhanced.

Many researchers have underlined the relationship between public health and improper solid waste management (World Health Organization, 1993). This study indicated that majority of the households dispose solid wastes through municipality after they collect in a temporary storage and the other major households dispose their waste in open dump outside yard, open pit or by open burning. This leads to a polluted environment. This finding is similar with a survey of SNNPR, Ethiopia (2000), where majority,

(67 %,) of the households dispose waste in open fields (Fetene G and Donald R, 2003). This finding is not different from a similar study conducted in Haramaya Woreda in 2003, where it was reported that open disposal of refuse and feces was practiced in about 93.4% of the households (Fetene G and Donald R, 2003).

From my respondents, relatively large proportion, 36% use municipality service to dispose their wastes. Which this method is not used by households of Kersa woreda as the research by Bizatu and Nega, 2010, shows. This result is also quit higher than that found in Mogadishu, Somalia (Peter M., et al, 2012) where only 15% of the respondents don't use municipal waste collection service. This is appreciable and promotable practice where the sanitation of the town will be kept safe, provided that the final disposal site is well protected. From our respondents 13% dispose waste in open disposal inside the yard, this is lower than that of the research done by Bizatu and Nega (2010) at Kersa woreda eastern Ethiopia which is 38.5%. 27% of our respondents practiced open disposal outside the yard which is also lower than the same finding from Kersa woreda, eastern Ethiopia, which was 28.1% of households practice open dump outside yard. 18% of the respondents used refuse disposal pits, which has a high gap from the finding at Kersa woreda, eastern Ethiopia, by Bizatu and Nega, 2010 in which 26.5% households used refuse disposal pit for the same disposal practice. But only 33.3% of respondents practiced using solid waste as manure, where there is gap from the finding at Kersa woreda, eastern Ethiopia, which is reported to be 85.6% of households used solid waste for manure as done by Bizatu and Nega (2010).

High proportion of respondents in this study cleans their houses regularly (94.7%) which is closer to with the research by Bizatu and Nega in Kersa woreda, eastern Ethiopia (2010) which was 88.2%. regarding temporary storage for generated refuse at home the larger proportion 95.7% of households have a temporary storage. This was much higher than and in a good condition related to the finding by Bizatu and Nega, in Kersa woreda, eastern Ethiopia (2010) which was only 6.9% of households have a temporary storage for waste. From respondents the highest proportion use sacks as temporary storage, 42.7%, which is quit comparable and higher than Mohammed in Asendabo town in 2002, which was 39.5%. Those who use plastic dust bin also hold significant number, 25.3% again which is higher than the one done in Asendabo town by Mohammed in 2002, where the respondents who use the same storage type were 15.8%. To this regard the practice of the respondents is appreciable, because related to other findings in other area higher number of respondents us temporary storage. Using temporary storage is helpful during loading in order to keep the surrounding clean.

Hand-washing with soap is a cost effective intervention not only against diarrheal diseases but also for the prevention of acute respiratory infections (Curtis, 2006). Diarrhea episodes are reduced: 36% by improving sanitation and 48% through hand washing with soap (Cairncross S and WP, 2010). The majority 284 (94.7%) of the respondents in the current study claimed that they wash their hands regularly after touching of solid wastes. But, it is only 187 (62.3%) of them reported the use of soap or ash to clean their hands. This result is higher than the finding by Bizatu and Nega, in Kersa woreda, eastern Ethiopia (2010) where 85.9% wash hands regularly and 50.9% use soap to wash hands.

In communities where the usage of latrine is low the prevalence of water borne diseases, especially diarrhea, is found to be very high (Jerry Wang, 2000). The present study revealed that 283 (94.3%)

of the surveyed households had access to latrine. From those households who had latrine; most, 251 (83.7%), use traditional pit latrines which could create conducive environment for flies to breed unless proper cover is used for the hole and kept clean. The presence of hand washing facilities near the latrines encourages the users to wash their hands after toilet use. This study showed 196 (65.3%) of the households having latrines had hand-washing facilities near the latrines. Washing of hand with soap after visiting toilet (or after defecation) has a paramount importance in decreasing of diarrheal and other parasitic diseases (Cairncross S and WP, 2010). The study revealed that 145 (48.3%) of the households with latrines wash their hands after defecation and majority of respondents 187(62.3%) use both water and soap/ash to wash their hands which is an effective means to remove the filth and pathogenic microorganisms. This is significantly associated with the educational status of the households. The rest of the households did not have any fixed place for defecation. This result is much higher than the finding by Bizatu and Nega, in Kersa woreda, eastern Ethiopia (2010) in which only 36.4% of households had access to toilet.

The research also sought to find out the main types of wastes produced in the households. Result indicated that there are different types of wastes produced by households. Paper and Organic vegetable waste is the most common type of waste which is produced from households which is 39.3% and 29.5% respectively. This result is much lower than with the result that is done in Mogadishu city which is 73% of organic vegetable waste is produced. (Peter M. et al, 2012). This indicates that the waste produced in the town can be a good raw material for reuse and other organic fertilizer production. The research also sought out whether the households reuse waste or not. In this regard high proportion of respondents (55.3%) doesn't use solid waste for other purpose. This could be one of the reasons for increased amount of solid waste hauled to disposal sites each time. However, the remaining 44.7% use solid waste for other purposes. Out of these, significant number uses it for fuel (20.3%). However, using bio fuel at home is not supportable that it is the main source of indoor air pollution. 10.3% also used it for cattle feeding and home compost which shall be promoted. Moreover respondents were asked whether they sell wastes or not. 67.7% are found to sell wastes this is highly contributive for recycling of wastes. On the other hand this practice has economical side of advantage. The research assessed out whether the respondents reuse solid waste or not. The fact is that the majority of the respondents, 86.7% don't reuse household wastes. This could be the indicator of the higher proportion of the solid waste generated from the households ends up at the municipality waste disposal sites or other unsafe ways of waste disposal mentioned earlier. With this respect an intact effort is required from all stake holders. Only 13.3% of the respondents reuse household wastes. Anyhow this result is higher than that found in Mogadishu, Somalia which was only 6.5% (Dr. Peter M. et al, 2012).

Analysis of means of waste collection in each district indicates that 41.7% use donkey driven carts, 34% of respondents dispose their waste by their hands and 24.3% use hand driven carts. This result is quit close to the result found at Mogadishu city, Somalia, where the respondents used donkey driven carts and by hand; 46% and 34.6%, respectively. This make similar with that of Mogadishu city households used carts to haul solid waste (Peter M. et al, 2012). Using those methods is not safe enough to keep the sanitation of

the town because there may be droppings of waste across the roads as it is hauled to the final disposal site

CONCLUSION

This study revealed that household management of waste in the community of Yirgalem town is poor in terms of their liquid waste management. More than seventy six percent of the households flush away their waste water indiscriminately. But it is moderately good in terms of their solid waste management because of very high proportion of the households had temporary storage for solid waste. Majority of the households had latrines, and almost 83.7% of the available latrines were traditional pits in poor sanitary conditions due to the presence of feces in the wall of latrine.

This study also revealed that households' management of solid waste in the community is moderately good. Even if majority of the households have no cover for their storage of waste and do not apply on site separation of waste before storage, majority of the households have a temporary prepared for storage of waste rather than disposing it indiscriminately. This makes the household management of waste in Yebu town is moderately good. Participation in turn is related to various factors, among which are fears for diseases associated with poor management of solid waste disposal, which respondents believe mostly affect small children. According to the information obtained from the respondents, although the highest proportion of households use municipality service for waste disposal, sometimes the absence of donkey driven carts leads households to dump solid waste outside their houses or burn it within the compound or deposit it in illegal dumping sites, most of which are located near to houses and pose major health risks.

According to the situation of the final disposal site of the municipality it is very risky to the surrounding community because there is nothing done to improve it.

RECOMMENDATION

Therefore, this study recommends the following actions in order to alleviate the problems of waste water management and sanitation in the studied community:

To Yebu Town Municipality

- As the area which was currently used by municipality for final disposal of waste collected from households was not properly located, large amount of waste was disposed before reaching to the final site and this can cause different health related problems to the community who live around that area. We recommend to the municipality in order to dispose that waste which is dumped improperly and in order to maintain the road which goes to the disposal site.
- The municipality uses donkey driven carts for hauling the wastes; However as the associated impacts of using donkey driven carts is obvious it is recommend that the municipality to employ tractor cars that are already bought to get involved in solid waste collection and transportation

To Yebu Town Health Office

- To give community based education on waste water management and hygiene by strengthening Health Extension Workers in the area.

To Yebu Town Health Office

- To encourage the use of wastes for economic benefits such as manure through composting which are better suited to organic wastes rather than burning waste.
- Further research is needed focusing on higher level integrated waste management option such as reuse, recycling and composting which contributes to economic development efforts.

ACKNOWLEDGMENTS

We would like to express our thanks to Yebu town municipality and the study participants for their cooperation and provision of valuable information.

Conflict of Interest: None.

Funding: This study did not receive specific funding.

Availability of data and materials Data will be available upon request from the corresponding authors.

AUTHORS' CONTRIBUTIONS

Abraham Teym: Conceived and developed the study, Designed the checklist, collected the data analysis, interpretation editing preparing, and writing the manuscript.

ETHICAL CONSIDERATION

Ethical clearance was obtained from the ethical review board institution of Health Science from Jimma University. The authorization letter was written from Jimma town municipality.

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