Household Solid Waste Management Practice of Women in Woldia Town, Amhara National Regional State, Ethiopia

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Abstract

Solid waste management (SWM) has become a major challenge in urban areas throughout the world. Unless people have an active involvement in SWM, it will result in environmental problems and health hazards. Hence, this study intended to assess women's practice in effective household SWM at household level in Woldia town, Ethiopia. Mixed methods research with explanatory research design was employed for the study. Questionnaires were administered to 210 women who were selected through systematic sampling technique from three urban kebeles of the town. Interview, observation and FGD were used to collect qualitative data. Descriptive statistics and inferential statistics were used to analyze the quantitative data while thematic analysis was employed to interpret the qualitative data. The binary logistic regression model was used to identify factors that determined women's participation in effective SWM at household level. The results showed that more than half (61%) of the respondents did not participate in effective household SWM, and yet, the majority (60%) of them still did not use alternative solid waste handling methods. The study also noted that lack of support from family members, inadequate support from the town municipality as well as cultural myths and beliefs were the challenges women faced to participate effectively in SWM. The study found that age, marital status, educational level and family size of respondents were the major determinants to participate in effective household SWM. From these results, it can be concluded that the young age group and the unmarried and/or divorced group of women were negligent in effective household SWM. Women's awareness of SWM was found inadequate, and they were merely involved in managing solid wastes traditionally. The study recommended that supporting women in utilizing alternative and/or sustainable solid waste handling methods should be encouraged by the local government.

Keywords: Household, Solid waste management, Women, Woldia, Ethiopia

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1. Introduction

The natural environment is the source of life on earth, and it not only directs human activities in general but also determines the existence, growth and development of humankind and all its creativities (Solomon et al., 2014). As Uchegbu (2002) explains, human activities and the environment are interrelated since all activities of human beings are accomplished in the

environment. Hence, the protection and improvement of the environment is a major issue which affects the wellbeing of people and overall development throughout the world.

Solid waste is an unavoidable by-product of human activities in everyday life. As Davies and Kudzai (2016) stipulate, household waste is a major concern since it is a source of pollution and environmental degradation when treated inappropriately. When it comes to the management of solid waste, women's multiple roles as mothers, homemakers, educators, entrepreneurs and producers place a heavy demand on them to preserve the environment (Shettima, 1996). Because of this, the need to investigate the practice of women in household SWM arises.

Reviewing the related research literature on SWM reveals that women's practice in the management process of waste has been overlooked. In addition, studies done for policy makers on gender-based SWM practice and the impact of the burden that SWM creates for women have not been studied. Previous studies solely emphasized municipal SWM. More importantly, many studies ignored the investigation of household SWM practices of women, who are especially responsible for managing solid waste.

From the point of view of sustainable SWM practice, gender is taken as one of the core issues by policy makers in Ethiopia. Hence, this study was intended to fill these gaps and would add knowledge to the existing literature. It is on the basis of this practical research gap that the researcher decided to conduct a study on the issue and a gender-based study of SWM practices is justified. Eventually, assessing status of women's participation, examining the solid waste handling methods women employed at household level, exploring the challenges women faced to participate and identifying factors that determined women participation in effective household SWM in Woldia town were objectives of the study.

2. Conceptual Framework of the Study

Based on the review of related literature, the conceptual framework for the study was developed. This particular study emphasized demographic, socio-cultural and institutional factors affecting women's participation in effective household SWM practice at the household level. Generally, the main focus and scope of this study is summarized in the following conceptual framework.

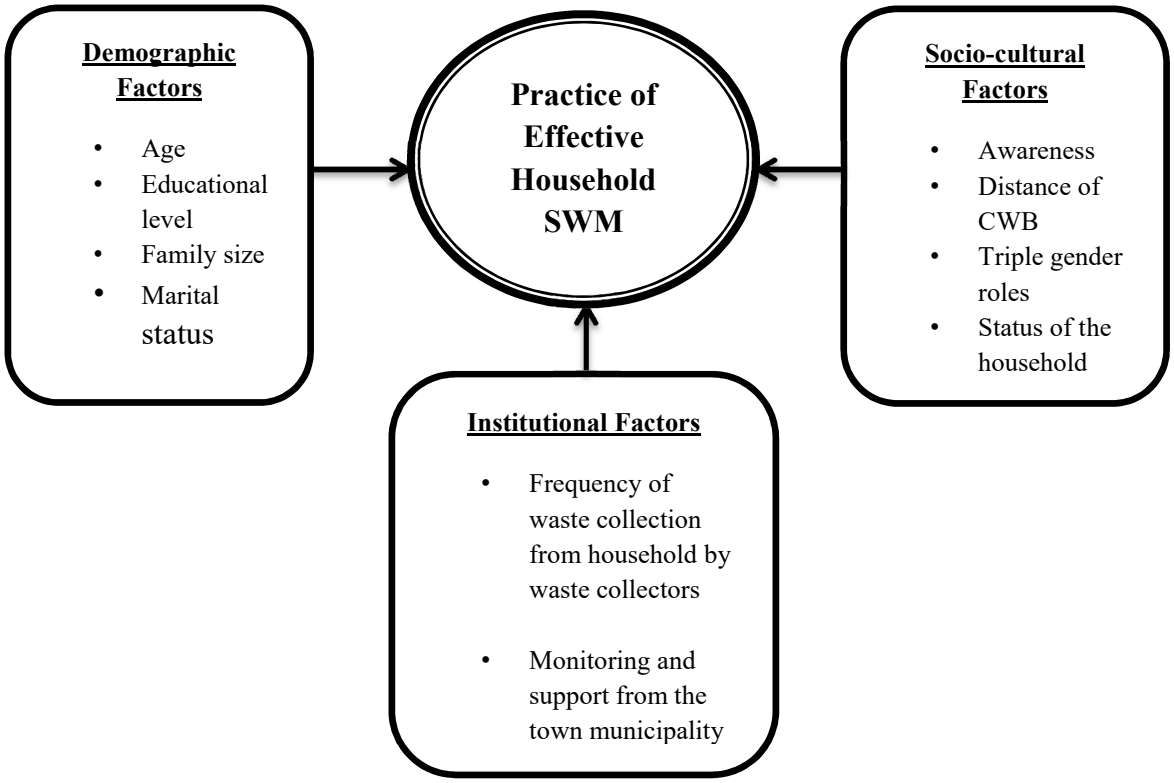

Figure 1: The relationship between the dependent variable and independent variables

3. Research Methodology

3.1. Research Methods and Design

Mixed methods research with explanatory research design was employed for this study to deal with women's diverse experiences and practices in household SWM. This design is predominantly quantitative supported by a qualitative method while the latter is used to support the former and give detailed explanation with a few cases.

3.2. Selection of Study Sites and Respondents

The rationale for the choice of Woldia town for this study was based on the 2017 report of the municipality which stated that the town had a problem with regard to household SWM. The study used the multi-stage sampling technique to select a sample of women for the questionnaire survey. In the first stage, simple random sampling was used to select three *kebeles* (Debre Gelila, Defergie Kibikalu and Yeju Genet) from the seven *kebele* administrations. Here, simple random

sampling technique was used because the town municipality confirmed that the situation of SWM problems was almost similar in all the seven *kebeles*. In the second stage, stratified random sampling technique was used to select male-headed and female-headed households from each *kebele*, considering that there were women in male-headed households. In each *kebele* administration, a list of male-headed and female-headed households were used as a sample frame with a total of 998. In determining sample size, Kothari's (2004) formula was applied as shown below:

$$n = \frac{z^2.p(1-p).N}{e^{2(N-1)+z^2.p(1-p)}}$$

Where, z= the value of standard estimates at a given confidence interval (1.96)

p= the estimated percentage or proportion of an attribute in the population (50% = 0.5)

e= the desired level of precision or acceptable error (0.06)

n= representative sample size to be drawn from the population

N= total size of population (household) (998)

By applying the formula, 210 samples were determined from the selected three *kebeles*. Finally, systematic sampling technique was applied to select a sample of women for the questionnaire survey.

For the qualitative component, on the other hand, key informant interview and focus group discussion were employed. Key informant interviewees were drawn from the town municipality and health extension office to secure relevant data; they were selected purposively. Four key informants were interviewed from the town municipality experts and health extension workers. One focus group discussion composed of eight women – two from each *kebele* administration.

3.3. Data Collection Instruments

Primary data were collected using questionnaire, key informant interview, focus group discussion and direct observation. The questionnaire had both closed-ended and open-ended items. The questionnaire was pilot-tested before the actual data collection to improve the quality of the items. Four key informants from health extension workers and the staff working at the municipality as well as two FGDs having eight women in one group were included. Solid waste

handling methods women employed, ways of solid waste burning, types of solid waste storage tool and ways of solid waste disposal were also directly observed.

3.4. Data Analysis

Both quantitative and qualitative data analyses were used for this study. Information on the status of women's participation, solid waste handling methods women employed at household level, challenges women faced to participate and factors determining women participation in effective household SWM were collected via survey questionnaire. Upon completion of the data collection, the data were coded, edited and entered into the SPSS version 20 and presented using descriptive statistics such as frequencies, percentages and tables. Chi-square test and binary logistic regression model were also used. The model goodness-of-fit was checked for adequacy of binary logistic regression model through Omnibus test and Holsmer and Lemeshow, and it was found fit. Then, the quantitative results were supported or triangulated by the qualitative results which were analyzed textually and compared with previous studies.

4. Results and Discussion

4.1. Women's Awareness of Household SWM

From the total respondents, a few (5.7%) had little awareness of SWM (see Figure 2). The result also showed that more than half of the respondents (54.8%) had no awareness. Having no awareness had a negative impact on the household SWM practice of women as the interviewees and focus group discussants reported. The participants of the study stated that women's practice of household SWM was influenced by their long traditional experiences. The key informants reported that having awareness of household SWM helped to keep the environment safe in a sustainable manner.

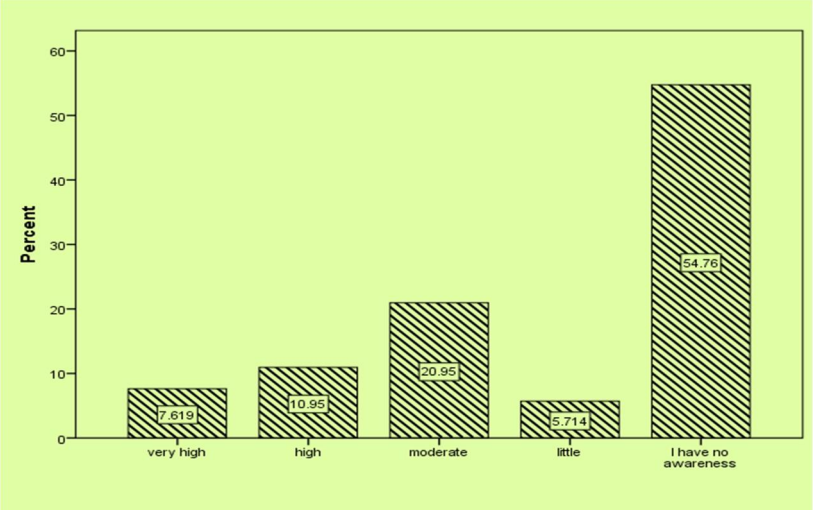

Figure 2. Women's awareness of effective household SWM

SWM is influenced by women's awareness of household solid waste prevention, separation, reuse or disposal. Based on such conditions, it can be deduced that unless women have awareness of effective household SWM, their participation could not be effective. Consistent with this finding, Zurbrugg (2003) stipulated that lack of awareness of the importance of proper SWM for health and well-being of people severely restricted usage of effective household SWM. In addition, the findings of many studies (Medina, 2004; Cointreau, 1993) have made similar conclusions. The Chi-square test also showed that there was statistically significant association between awareness level and participation of women in effective household SWM ($\chi^2 = 45.978$, *df*=4, p = 0.000).

4.2. Distance of Community Waste Bin (CWB)

FGD participants, who had no access of CWB around their house and whose house was 1.5km or more far away from CWB, had difficulty to practice household SWM effectively. The data in Table 2 shows the absence or distance of residential houses from CWB, and one of the reasons for ineffective management of solid wastes that were generated at household level. As can be seen in Table 2, 26% of the respondents reported that they had no container as a waste bin. Moreover, the lead researcher confirmed the absence of waste bins in some parts of the town through direct observation.

Table 2: Access of CWB and its distance from house (N=210)

Variables	**Options**	**Frequency**	**Percentage**
CWB and its distance from house	<0.5 km	24	11.4
	0.5-1 km	36	17.1
	1-1.5 km	40	19

	>1.5 km	55	26.2
	No CWB	55	26.2

The inaccessibility of CWBs was an obstacle for women to have an effective household SWM. In line with this result, Spies et al. (2006) also reported that the distance of a family's house from the location of a CWB had a negative impact on effective household SWM. Similarly, Ashenafi (2011) pointed out that the likelihood of disposing of solid waste in an inappropriate way by a household was affected by the length of the distance of residence from the location of CWBs. The Chi-square test also revealed that there was a statistically significant association between distance of CWB from the household and participation of women in effective household SWM (χ^2 =21.468, df=4, P = 0.000).

4.3. Access of municipality waste collectors

The majority of women who did not have the service of municipality waste collectors did not participate in effective household SWM, as confirmed by the FGD participants.

Table 3. Frequency of access of waste collectors (N=210)

Variables	**Categories**	**Frequency**	**Percentage**
How often do municipality waste collectors collect solid waste from your house?	once in a week	15	7.1
	once in two weeks	57	27.1
	once in three weeks	70	33.3
	once in more than three weeks	46	21.9

	Not at all	22	10.5

The data in Table 3 indicate the frequency with which families get the services of garbage collectors. According to Table 3, frequent access to municipal solid waste collectors had a positive impact on the management of household solid wastes by women. FGD participants also reported that there were no municipality waste collectors, or solid waste was seldom collected from houses, which was a serious problem for effective household SWM. The Chi-square test result also showed that there was a statistically significant association between frequency of waste collectors and participation of women in effective household SWM (χ^2 =59.657, df=4, = 0.000).

4.4 Solid Waste Handling Methods Women Employ

Figure 3 shows that unless municipality solid waste collectors frequently collect from each household, collection would not be an appropriate handling method by itself. As many women employ solid waste collection as a management system, solid waste needs to be frequently collected by municipality waste collectors from each household. Key informants explained that women who did not use most types of solid waste handling methods did not practice effective household SWM. Therefore, using appropriate types of solid waste handling methods was a basis for women to have an effective household SWM practice. Focus group discussants also disclosed that there were problems like lack of awareness and inadequate facilities to use control of waste at source, waste storage and separation at source, collection, transportation and disposal. So, such limitations hindered women's solid waste handling methods from being effective.

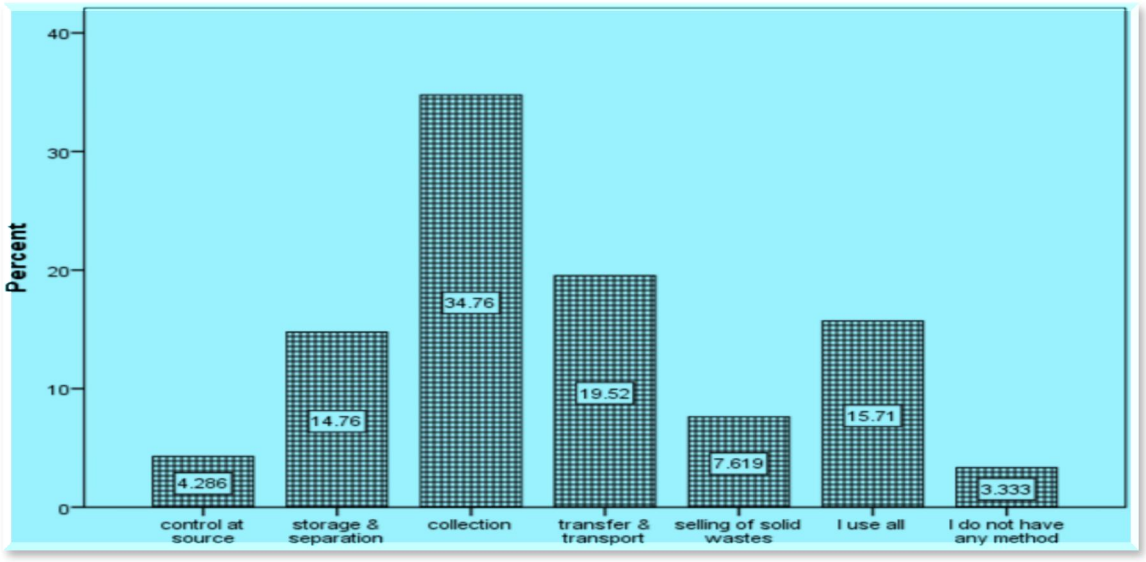

Figure 3. Household solid waste handling methods women use

This result is consistent with the work of Cunningham (2009), which found that waste should be separated at source, and which suggested that other solid waste handling methods for easy collection and transportation for final disposal should be used. However, it is only a few (4.3%) of the respondents of the study who employed control of waste at the source. A similar finding was also reported by Marden (2009), who claimed that control of waste at source greatly reduced the volume of solid waste. In order to see the association, a Chi-square test was employed and there was a statistically significant association between solid waste handling methods employed by women and their participation in effective household SWM (χ^2 =49.430, df=6, P=0.000).

4.5. Alternative Solid Waste Handling Methods

More than half (59.5%) of the respondents did not use alternative household solid waste handling methods. Table 4 showed that women participation in alternative or sustainable household solid waste handling methods was poor in the study area. This further implied that women practice was not effective in household SWM. FGD participants pointed out that it was not possible to carry out waste prevention from the source, reuse or composting due to lack of awareness and cultural myths. FGD participants also disclosed lack of support from the town municipality for women to practice alternative or sustainable type of solid waste handling methods.

Table 4. Alternative household solid waste handling methods at household level (N=210)

Variables	Categories	Frequency	Percentage
Alternative or sustainable household solid waste handling methods	Composting	6	2.9
	Reusing	57	27.1
	Waste preventing	22	10.5
	Not using any	125	59.5
	Total	210	100

In relation to this, Medina (2004) listed waste preventing, recycling, composting and reuse as essential elements of alternative or sustainable solid waste handling methods, and these were not commonly practiced in most households. Medina's study further elaborated that knowing the composition and characteristics of waste was essential in order to determine the type and way of solid waste prevention, recycling, reuse and composting. Accordingly, if waste has high proportion of organic matter, the possibility of composting and biogas regeneration as a means of handling waste is a better mechanism than reuse and recycling.

Likewise, the Chi-square test indicated that there was statistically significant association between alternative household solid waste handling methods women used and their participation in effective household SWM (χ^2 =38.536, df=3, P = 0.000).

4.6 Solid Waste Storage, Types and Tools

Most women, who had no solid waste bins, did not practice effective household SWM since the probability of throwing away solid waste here and there in an appropriate place increased as the participants of FGD verified. On the other hand, key informants illustrated that women, who used temporary solid waste containers, did not practice household SWM in an effective way.

Regarding solid waste containers, women stored solid waste mostly (73.8%) in sacks. The researcher also observed that most women used sacks as temporary solid waste bins and put the sacks near their houses. On the other hand, most of the participants of the study (81%) stored all types of solid waste in one container. The researcher also observed that in most of the households women stored all types of solid wastes in a single container. While focus group

discussants argued that lack of awareness and inadequate storage materials forced most women to keep all types of waste together.

Table 5: Solid waste storage, tools and ways of solid waste storing at household level (N=210)

Variables	**Categories**	**Frequency**	**Percentage**
Have you solid waste container?	Yes	197	93.8
	No	13	6.2
Type of storage	Temporary	188	89.5
	Permanent	9	4.3
	None use	13	6.2
Solid waste container	Plastic bag	42	20
	Sack	155	73.8
	None use	13	6.2
Ways of storing solid waste	All together	170	81
	Separately	27	12.8
	None use	13	6.2

Table 5 shows that having solid waste container is necessary to have effective type of SWM. Temporary solid waste bins do not guarantee sustainable and alternative managing of solid waste. Since permanent solid waste containers were not used by women in the study, this made their practice of SWM be ineffective.

Abiyot (2014) similarly stated that the type of waste storage used by households had a great impact on SWM and the majority of households used sacks. When women stored waste separately, their practice in SWM was effective. Hence, storing of solid waste separately was quite significant in order to have appropriate SWM. Nevertheless, most of the respondents' stored solid waste together, and it prevented women from practicing alternative or sustainable household solid waste handling system. This finding is also in agreement with Samuel (2006), who indicated that households which stored all types of solid waste in a single container exhibited inappropriate SWM practice.

4.7. Determinant Variables of Women's Practice in SWM

The binary logistic regression model was employed to establish the relationship between participation in effective household SWM and a set of explanatory variables. Hulsizer and Woolf (2009) noted that binary logistic regression has become the preferred tool for predicting dichotomous outcomes in the social sciences because it is more flexible than any other model. Hence, binary logistic regression model was employed to establish the relationship between dependent (participation of women in SWM) and independent variables (demographic, institutional and socio-cultural factors) affecting women's SWM practices in the study area.

For that reason, 10 explanatory variables were selected to explain the dependent variable. However, six independent variables (women's age category of 25-45 years old, being married, having a degree, having 4-6 and 7-9 family size, a high level of awareness and a frequency of waste collection twice and more than twice a week) were determinant factors influencing the dependent variable.

The Omnibus test of model coefficients had a Chi-square value of 159.468 with 27 degrees of freedom and was highly significant at $p < 0.05$, i.e. 0.000, denoting that the predictor variables selected had a combined effect in predicting the participation of women in effective household SWM. The predictive efficiency of the model displayed that from all women included in the model, 91.4% respondents were correctly predicted. The sensitivity (correctly predicted participating women) and specificity (correctly predicted women not participating) were found to be 77% and 97.3%, respectively. Therefore, the model was effective in describing the outcome variable, or it had goodness-of-fit.

The binary logistic regression result indicated that being within the age group of 25-45 increased the participation of women in effective household SWM by the odds ratio of 1.529 as compared to women under the age of twenty-five. That is, other variables being constant, women who were middle-aged were more likely to participate in SWM than younger women were. Therefore, an age group of women from 25-45 years old had active participation in effective household SWM. Previous studies provided a strong support for this finding. A study conducted by Ashenafi (2011) found that household head age and effective household SWM had a significant

relationship. However, Tewodros and Samson's (2009) study found an opposite result in which age was insignificant in improving participation in waste collection.

Table 7: Determinant variables of women's practice of effective household SWM

Variables	**Categories**	**ß**	**S.E**	**Wald**	**Sig**	**Odds ratio**
Age	< 25 years old **(RF)**					
	25-45 years old	2.864	1.063	7.257	0.007*	1.529
	46-65 years old	-0.27	1.141	0.001	0.981ns	0.974
	>65 years old	-0.068	1.895	0.001	0.971ns	0.934
Marital status	Unmarried **(RF)**					
	Married	3.442	1.642	4.396	0.036*	1.248
	Divorced	-19.333	6349.729	0.000	0.998ns	0.000
	Widowed	-14.920	14172.271	0.000	0.999ns	0.000
Family size	< 4 family size **(RF)**					
	4-6 Family size	-2.319	1.070	4.697	0.030*	0.098
	7-9 Family size	-2.868	1.216	5.567	0.018*	0.057
	>9 Family size	-3.075	1.958	2.465	0.116ns	0.046
Educational level	Illiterate **(RF)**					
	can read and write	1.487	2.015	0.545	0.460ns	4.426
	first degree	6.353	2.745	5.355	0.021*	4.086
	second degree or above	24.893	25114.174	0.000	0.999ns	4.956
Status of household	Male-headed **(RF)**					
	Female-headed	-0.045	0.870	0.003	0.959ns	0.956
Level of awareness	Very high **(RF)**					
	High	-2.779	1.803	2.376	0.123ns	0.060
	Moderate	-3.783	1.685	5.042	0.025*	0.023
	Less	-1.900	2.383	0.635	0.425ns	0.153

	No awareness	-3.110	1.656	3.526	0.060^{ns}	0.045
Distance of CWB	<0.5 km **(RF)**					
	0.5-1 km	-0.331	0.918	0.130	0.719^{ns}	0.718
	1-1.5 km	0.007	1.019	0.000	0.994^{ns}	1.007
	>1.5 km	-1.513	1.017	2.214	0.137^{ns}	0.220
	No CWB	-0.809	0.965	0.703	0.402^{ns}	0.445
Frequency of waste collectors	Once a week**(RF)**					
	Once in 2 week	-3.798	1.804	4.434	0.035*	0.022
	Once in 3 weeks	-5.652	1.848	9.356	0.002*	0.004
	Once in more than 3 weeks	-6.396	1.856	11.870	0.001*	0.002
	Not at all	-5.768	2.222	6.740	0.009*****	0.003
Monitoring and support of the municipality	Yes**(RF)**	1.064	0.822	1.673	0.196^{ns}	2.897
	No					
Triple gender roles	Yes**(RF)**	40.230	14122.931	0.000	0.998^{ns}	2.96
	No					
Constant		2.062	2.931	0.495	0.482	7.859

*Significant at 0.05; ns = not significant; RF = reference category

The analysis indicated that, other variables being constant, when women had family sizes of 4-6 and 7-9 as compared to a family size of less than 4, participation in effective household SWM decreased by the odds ratio of 0.098 and 0.057, respectively. The result was statistically significant at $p < 0.05$ in both cases. This means that households with family sizes of 4-6 and 7-9 had less probability of participating in effective household SWM than women with family size of less than 4. Hence, family size of 4-6 and 7-9 had negative relationship with participation in effective household SWM. Interviewees and FGD participants in this study highly emphasized that family size was a significant variable determining the effectiveness of women participation in effective household SWM. However, this result is contrary to previous studies (Abiyot, 2014;

Ashenafi, 2011; Tewodros & Samson, 2009), which found that family size was a statistically insignificant factor for effective SWM.

The analysis also indicated that educational level of having first degree (Adjusted Odds Ratio [AOR] =4.086[95% CI: ß=6.353]; P=0.021) was statistically significantly associated with being a participant in effective household SWM as compared to illiterate women. This means that women's educational level of having first degree increased the probability of participation four times higher than those women who were illiterate. This result is consistent with the works of Bizzatu and Negga (2010) as well as Kamara (2006), who pointed out that the educational level of the head of a household had a positive significant effect on effective SWM. In addition, low educational level of households affects their handling pattern of solid waste in the absence of practical knowledge about SWM, though that is not always the case (Mesfin, 2006; Samuel, 2006), because some educated individuals either due to negligence or dissatisfaction with the service of the office, take pessimist action againssolid waste storage and collection practice.

Women who had a moderate level of awareness of household SWM had less probability of participating in effective household SWM compared to women who had very high level of awareness. As the binary logistic regression result showed, when women had moderate level of awareness of household SWM, their participation in effective household SWM decreased by the odds ratio of 0.023. The result was statistically significant at $p < 0.05$. Hence, moderate level of awareness of women of household SWM had a negative relationship with participation in effective household SWM compared to women with very high level of awareness. In agreement with this finding, studies by Kamara (2006) and Zhu et al. (2008) indicated that when awareness increased, the probability of effective SWM would increase.

On the other hand, married women had more probability of participating in effective household SWM compared to unmarried women, other predictors being constant. The binary logistic regression result indicated that the participation of married women increased by a factor of 1.248 showing effective household SWM since the result was statistically significant at $p < 0.05$. Hence, this study showed that marital status had a significant impact on the participation of women in effective household SWM. Previous studies did not take marital status as a determinant variable since the studies were done on household participation rather than on only women's particular participation in effective household SWM.

Moreover, with respect to frequency of waste collection by the municipality from each household, it was found that frequency of once in two weeks, once in three weeks, once in more than three weeks and no waste collectors at all decreased the odds of being a participant in effective household SWM by factors of 0.022, 0.004, 0.002 and 0.003, respectively. The result was statistically significant at $p < 0.05$ in all cases. This means that women whose solid waste was collected by waste collectors from the municipality from their houses every two, three or more than three weeks had less probability of participating in effective household SWM than those women whose waste was collected by waste collectors once in a week. Therefore, frequency of waste collection by the municipality waste collectors from houses had a negative relationship with participation in effective household SWM. This result is consistent with the study of Ashenafi (2011) and Zhu et al. (2008) as both studies found that the frequency of waste collectors determine households' effectiveness of SWM.

4.8. Challenges of Women in Effective Household SWM

4.8.1. Lack of support from family members

Table 8: Responses on gaining support for effective household SWM (N=210)

Variables	Options	Frequency	Percentage
Who supports you to have effective household SWM in your family?	Male family members	3	1.4
	Female family members	93	44.3
	No support	114	54.3
	Total	210	100

To have an effective type of household SWM, the participation of all the family members is necessary. Unless there is support for the one who participate, and when the duty is left only for a single individual, it is quite difficult to practice effective household SWM. In this regard, participants of FGD replied that the support of family members especially husbands and male family members was very little or non-existent. One participant of the FGD, for instance, described the situation as follows:

> To tell you the truth, the task of household solid waste managing is left only for me in the household. Although my girls occasionally support me, my husband and my boys don't even think about helping me to your surprise. Even if my husband and boys do not participate in the task, their carelessness and indulgence is an obstacle during managing of household solid waste practice at times.

Moreover, focus group discussants elaborated that the authority of husbands to buy consumer goods is a challenge with regard to household SWM. Concerning this issue, one participant of the FGD said:

> You know my husband usually buys stuff since I have no power to buy and I do the household chores. In this situation, most of the stuff he buys is so wasteful and I usually have a problem in managing waste in a proper or effective way. I always tell him to be prudent when he buys things, but he doesn't listen. You can be surprised when I tell you this, but I am in fact tired of it.

It can be inferred from the above that the responsibility and power husbands have to buy goods are an obstacle for women to have effective household SWM. In sum, the absence of support from family members was a challenge for women towards effective household SWM. The study by Bizzatu and Negga (2010) is consistent with this study's finding, which stated that the main challenge of women in SWM is the fact that the responsibility is left for them only in most households. A Chi-square test was also employed and there was statistically significant association between gaining support from family members and participation of women in effective household SWM (χ^2 =24.828, df=2, p=0.000, p<0.05).

4.8.2 Inadequate support of municipality and health extension personals

The majority (76.67%) of the respondents did not receive support from the town municipality and health extension personnel in terms of collecting solid waste, while a few of the respondents did.

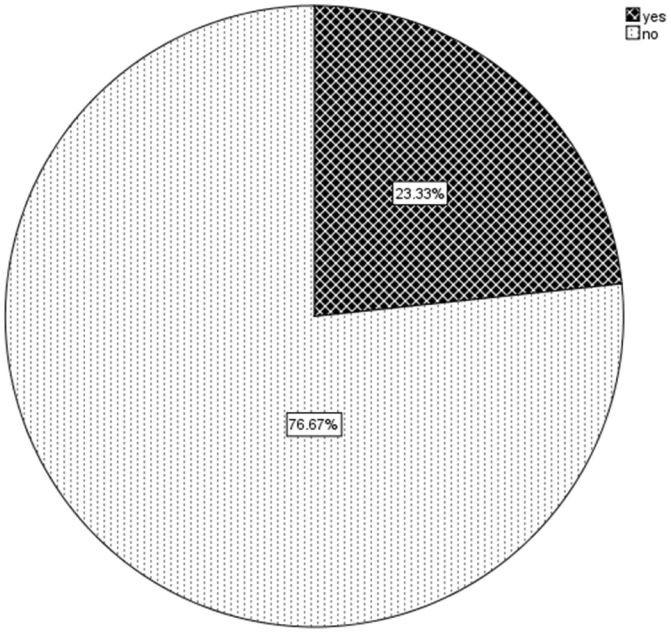

Figure 5. The municipality's monitoring and support for women in household SWM practice

As per the survey result of the study and the researcher's personal observation, due to inadequate waste collection services from the municipality, waste wwas dumped in nearby river, open space, drain and/or burned openly everywhere. Similar to the direct observation of the researcher, the focus group discussion participants of the study said that solid waste was disposed in many parts of the study area illegally or ineffectively. The participants said that this inefficiency was caused by lack of equipment as well as monitoring and support from the municipality. In such conditions, it can be inferred that the inadequate monitoring and support of the town municipality and the health extension workers was a challenge for women to have effective types of household SWM practices. Concerning this, the focus group discussants pointed out:

> The municipality by itself collects household solid waste from every household and burns it in places near residential areas. At one time they advise us to have a proper type of household solid waste management while at another time they themselves practice improper solid waste handling methods. What can we say and do here? Hence, from the beginning the support of the municipality is inadequate and such actions or failures of the municipality really negatively affect women's participation in effective household SWM.

Inadequate support from the municipality and health extension personnel is also believed by key informants that there was no organized and formal support with regard to household SWM since much attention had been given to municipal SWM.

On the other hand, focus group discussants explained that the town municipality and health extension workers created awareness of household SWM in women with the exclusion of men. Focus group discussants elaborated this issue as follows:

> Frankly speaking, it is hard to say that we have gotten enough support from the town municipality and health extension workers about household SWM. However, when they created awareness or provided training, our husbands were not invited. Because of this, we lack the support of our husbands since they did not participate in the awareness creation training or education.

Key informants from the town municipality and health extension workers also recognized the above problem and replied that it was due to the culture of the community that when training was organized it was only women who came, though men were also informed to attend. Hence, the informants emphasized that it was a challenge to women, and work needed to be done in this regard. Moreover, focus group discussants described that the town municipality and the health extension workers only ordered women what and how to do rather than helping women understand the significance of managing household solid waste. This by implication does not help women to participate in effective household SWM since they do not understand the issue from the beginning. Thus, a financially and logistically weak municipality and lack of awareness creation were big challenges for women in effective household SWM.

This finding is in line with what was reported by Zurbrugg (2003), who confirmed that inadequate service coverage and operational inefficiency of service was the main challenge in SWM in developing countries. Similarly, UNDP (1996) also pointed out that effective solid waste management depended upon appropriate monitoring and support from institutions like the municipality for households.

4.8.3 Cultural myths and beliefs

The survey data showed that around 84% of women were influenced by cultural traditions and beliefs in managing of household solid wastes in an appropriate way (Table 9). FGD participants noted that women who were influenced by cultural myths and beliefs usually employed inappropriate types of practices in managing solid waste.

Table 9: Influence of cultural myths and beliefs on effective household SWM (N=210)

Variables	Options	Frequency	Percentage

Do cultural myths and beliefs challenge you in household SWM?	Yes	177	84.3
	No	33	15.7

According to focus group discussants, the culture of the society towards solid waste and its management had a serious impact on women's practice in managing solid waste. One participant of the FGD expressed the following concerning cultural myths and beliefs:

> At times I want to tell my husband and boys to help me with our household solid waste disposal or collection. However, I worry about what my neighbors would say when they see my husband and boys collect waste, so I do it myself at that moment. Even when my husband and boys offer help I sometimes decline their offer. Moreover, when I want to use solid waste again, I am worried that it will affect the reputation or honor of the family and because of it I stop reusing solid waste.

Likewise, women's attitude or view about solid waste and its management had an effect on their participation. In this regard one participant of the FGD expressed the following:

> For me, I do not want to see my husband participating in household solid waste management. He will be despised by the society if he does household chores which the society considers as a woman's responsibility. Therefore, I try to do it myself but I may not practice effective household SWM due to the heavy burden of household chores. Even so, I am not happy if my husband is involved in such a woman's responsibility.

Based on the above statements of the participants in the FGD, it can be inferred that it is not only the culture of the community, but the attitudes or beliefs of women themselves also poses a challenge in having an effective household SWM. So, the result shows that cultural myths and beliefs were challenges women faced in having appropriate household SWM. Samuel's (2006) and Yitayal's (2005) studies are also in agreement with this study finding as their studies characterized culture of the community as a hindrance to effective SWM. The Chi-square test also showed that there was statistically significant association between influence of culture of the society and women participation in effective household SWM (χ^2 =87.640, df=1, p=0.000).

5. Conclusion and the Way Forward

SWM has become a serious agenda worldwide since it is a major cause of environmental pollution and human health risks. Based on the large body of literature on SWM, it can be concluded that household level of SWM and women's practice has been overlooked. When women's practice is ineffective when it comes to SWM, it leads to substantial negative environmental and health impacts. Hence, based on the findings of the study the following conclusions are drawn.

The poor practice of women in household SWM resulted from traditional and backward ways of waste management. In relation to this, lack of waste management facilities and absence of waste collectors from households made women's household solid waste practice inefficient. Moreover, inappropriate practice of women in storing solid waste without separating waste in accordance with its nature becomes problematic for disposal, recycling or reuse of waste.

Younger women and unmarried or divorced women were negligent in household SWM. Middle-aged and married women, educated women and women who had small family size were active participants in effective SWM. On the other hand, women who had no awareness of effective household SWM and who did not gain the service of waste collectors frequently practiced household SWM inappropriately.

The task of SWM was taken as the responsibility of women in households. For that reason, family members did not support women to practice an appropriate kind of household SWM. This was due to culturally deep-rooted myths and beliefs of the community that household chores are given to women exclusively. Furthermore, inadequate monitoring and support from the town municipality and health extension workers made women's involvement in SWM poor and inappropriate.

Based on the findings of this study, the town municipality and health extension workers have to provide adequate education and awareness of how to handle solid wastes effectively. The town municipality should also provide adequate CWBs near households since one of the basic obstacles to women in properly managing solid waste in the study area was inaccessibility of CWBs. There also have to be enough municipality waste collectors who collect solid waste from each household regularly. Women should use solid waste separation at source as a main waste

handling method. Because once solid waste is separated at source, it will not be challenging during collection and transportation for final disposal. Women should also employ alternative or sustainable solid waste handling methods like waste preventing, reuse or composting as a waste handling method because those are friendly to the environment and have a sustainable impact on human health.

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