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DOMESTIC REFUSE HANDLING PRACTICES AMONG ADULT FEMALES IN A NIGERIAN METROPOLITAN CITY: ARE THERE CHALLENGES?

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ABSTRACT

Domestic refuse are solid household wastes that are predominantly handled by adult females. This study determines the domestic refuse-handling practices/associated factors in a Nigerian metropolitan city. It was an interventional/community-based study involving a total of 436 adult females selected by the multi-stage sampling method. They were subdivided into two groups: control group (n=218) and intervention group (n=218). Using a semi-structured, interviewer-administered questionnaire, a baseline assessment was made in both groups. Health education was given on domestic refuse handling and reinforcement by trained community-based health educators. Three months later, the same respondents were re-assessed using the same questionnaire. Data was analysed using EPI info software. Post-intervention results showed that 137 (62.8%) of the females in the intervention group had good domestic refuse-handling practices compared to 55 (25.2%) of the females in the control group, while 163 (74.8%) had bad practices. Majority of females suggested collective efforts as a solution to the various challenges faced by them particularly the absence of community sanitation members. Also, community-based health education was found to be effective in enhancing good domestic refuse-handling practices, though there is a need for more community effort as regards the proper handling for enhanced sustainability.

Key words: Solid waste, practices, female adults, obstacles.

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INTRODUCTION

Refuse or solid wastes are substances produced daily from homes and industries, as well as agricultural and livestock activities (Obionu, 2007). Domestic wastes consist of ash, rubbish and garbage. Wastes must be produced as long as human beings live and its disposal has remained public health concern.

It has been recognized that waste disposal must take place in a closed environment, comprising only of soil, air and water (WAHEB, 1991). As such waste handling must include the collection, keeping, treatment and disposal of wastes in such a way as to render it harmless to human and animal life as well as the environment (FME, 2005).

Effective and efficient solid waste handling is based on a number of management options. These follow a particular hierarchy and include waste reduction, reuse where possible, recycling, composting, energy recovery and final disposal (Bassis, 2012). One should think of using the appropriate materials, tools and technology wherever possible to achieve this.

Domestic waste handling has always been a universal problem (Chimezie, 1999). The handling of wastes in Nigeria is generally far from being satisfactory. There is no benefit from any organized waste management service, therefore wastes are unattended to, haphazardly buried, burnt or disposed of. Eighty seven percent of Nigerians use insanitary methods to dispose their refuse (FMHE, 2006).

Wastes when left unattended to for a long time constitute serious health hazards. These include visual blight and odor nuisance, decreased environmental aesthetics and quality, pollution of underground water sources and the breeding of rodents, mosquitoes and other pests of public health importance with their attendant disease outbreaks. Some of these problems are related to their major constituents, which include carbon, nitrogen, phosphorus and sulphur (Sridhar, 2008). Despite large investments that have gone into meeting the challenges of effective waste handling in urban

Nigeria, there is little evidence that such efforts are having their expected impacts (Bassis, 2012).

Domestic refuse handling is largely a responsibility of females, especially the adults. Educating them and reinforcing such by the use of community-based health educators, has the potential to improve their handling practices. These facilitators can as well determine the challenges faced by them and then proffer suggestions on curtailing them.

It is rather unfortunate that there is paucity of data in community-based health education as regards domestic refuse-handling. This study therefore, evaluates the domestic refuse-handling practices among adult females in a metropolitan city and the factors that pose challenges to such practices; hoping that the findings would form the baseline for future studies.

MATERIALS AND METHODS

Study Area: The study was carried out in Jos-North and Jos-South Local Government Areas (LGAs) of Plateau State, which is located in the North Central region of Nigeria, with Jos as the State capital.

Jos constitutes a large part of Jos-North LGA. It has a population of approximately 429, 000 (Plateau State Government of Nigeria, 2008). It is an urban area with the University of Jos located in it (Wikipedia, 2008; WHO, 2008; Plateau State Government of Nigeria, 2008). Both LGAs currently have arrangements for communal refuse collection that involves private refuse collectors.

Study Population: A total of 436 female adults resident in the areas of study formed the study population.

Inclusion and Exclusion Criteria: Only female adults were enrolled for this study while males and children were excluded.

Study Design: This was a community-based/ interventional study.

Ethical Consideration: Ethical clearance was obtained from the Jos University Teaching Hospital Ethical Committee. The Plateau State Commissioner of Health, Jos-North and South LGAs Chairmen and the Village Heads of Ungwan Miango and Kugiya- the intervention and control communities respectively, gave their permission after the aims and objectives of the study were explained to them. Also, informed consent was sought and obtained from the respondents before enrollment into the study. At the end of the study the control group was also given the same intervention, for ethical reasons.

Duration of the study: This study spanned a period of 5 months; from the period of advocacy to completion.

Determination of Sample Size: The formula for minimum sample size calculation for an interventional study as described by Jekel et al. (2001) was used for comparison of proportions between two groups. This was to estimate the minimum number of subjects required per group i.e.:

$$N=2\frac{(Z_{\alpha}+Z_{\beta})^{2}\times p(1-p)}{d^{2}}$$

where: N = Minimum sample size per group; Z_{α}= Standard normal deviate at alpha probability (1.96), corresponding to 95% confidence interval at 0.05 level of significance; Z_{β}=Standard normal deviate at beta probability (0.84); p=Mean proportion =0.40 (i.e. mean of proportion of those who had improved handling of domestic refuse after being health educated, observed at baseline in a previous study) (Ministry of Environment and Forest, 2007) and the projected proportion post-intervention of 20% increase; d^2=Difference between the proportions (0.20)

$$\therefore n = \frac{2(1.96+0.84)^{2}(0.40)(0.53)}{(0.2)^{2}} = 83$$

To take care of attrition, this was multiplied by two = 83 x 2 = 166. A response rate of 90% was anticipated, then the sample size to be selected (n_s) was calculated by dividing the originally calculated size by the anticipated response rate as follows (Kirkwood and Sterne, 2003).

n_s = 166/0.9 = 184.44 ≅ 184, which was the calculated minimum sample size. The actual sample size was then 184 subjects per group.

Method of Data Collection: Using multi-stage sampling technique, 218 women per group (intervention and control groups) were recruited into the intervention and control groups. There was a baseline assessment with the use of a semi-structured, interviewer-administered questionnaire that was adopted and adapted from one for solid waste management survey by the World Bank (Alam et al., 2007). The questionnaire consisted of questions on the knowledge, attitude, and practices of proper

domestic refuse handling in both intervention and control groups.

After one week of baseline data collection, health education on the definition, composition, methods of collection and disposal of domestic refuse, factors determining good refuse handling, consequences of insanitary disposal of refuse and the importance of community participation was given. Trained community-based health educators reinforced the intervention by weekly house to house visits. Three months later, another assessment of the study populations was carried out using the same instrument.

To assess practice, respondents' answers were graded based on whether or not they engaged in practices that improved domestic refuse handling. In this regard, there were eight questions which were scored and graded in such a way that 0-3 correct answers out of 8 represented bad practice, while 4-8 represented good practice.

Data Analysis: All data generated at baseline and post-intervention were processed and analyzed using EPI info version 3.5.1 software. Chi square (X^2) test was used to test for statistical relationship between proper refuse handling and acceptance of good practices with certain associations at base line and post intervention. At 95% confidence interval, a P-value of equal to or less than 0.05 was considered statistically significant.

Table 1: Sociodemographic characteristics of the adult females

	Intervention Group (N=218)		Control group(N=218)		P value
Age (Years)	Frequency	Percentages	Frequency	Percentages	
<20	40	18.3	48	22.0	
20-29	50	22.9	46	21.1	0.701
30-39	28	12.8	30	13.7	
40-49	85	39.1	88	40.4	
50-59	15	6.9	6	2.8	
Occupation					0.913
Civil Servants	8	8.3	15	6.9	
Housewives	32	14.7	28	12.8	
Teachers	28	12.8	19	8.7	
Traders	119	54.6	128	58.7	
Tailors	11	5.0	13	6	
Others	10	4.6	15	6.9	
Educational level					0.910
None	15	6.9	12	5.5	
Primary	160	73.4	163	74.8	
Secondary	31	14.2	25	11.5	
Tertiary	12	5.5	18	8.2	

RESULTS

The age range of the respondents in both groups was similar. The intervention group was 15-59 years with a mean age of 38.8 ±12.8 years and 15-58 years with a mean age of 37.6 ±12.6 years in the control group. More than half; 119 (54.6%) of them in the intervention and 128(58.7%) in the control group were traders, while minority; eleven (5.0%) of them in the intervention and 13(6.0%) in the control group were tailors. One hundred and sixty (73.4%) of the respondents had primary education in the intervention group and 163 (74.8%) in the control group, while few in both groups had tertiary education; twelve (5.5%) in the intervention and 18 (8.2%) in the control group. (Table 1)

aOne hundred and ninety nine (91.3%) of the respondents in the intervention group at pre-intervention did not own refuse bins at home, while 19 (8.7%) of them did. In the control group, 200 (91.7%) did not own bins at home. After the intervention, 178 (81.7%) in the intervention group owned bins at home.

Pre-intervention, 196 (89.9%) of the females in the intervention group emptied their bins in the backyard, while 178 (81.7%) of them in the control group also did so. Post- intervention, 197 (90.3%) of the females emptied their bins in a hole and 20 (9.2%) of them did so in the backyard, while l (0.5%) of them did so at the final disposal site.

Pre-intervention, 68 (31.2%) of respondents in the intervention group had good practices and 151 (69.3) of them had bad practices. Post-intervention, 137 (62.8%) of them had good practices of domestic refuse handling. Pre-intervention, 55 (25.2%) of the respondents in the control group had good practices regarding domestic refuse handling and 163 (74.8%) of them had bad practices. Post-intervention, 92 (42.2%) of the females had good practices of domestic refuse handling. (Table 2)

Pre-intervention in the intervention group, 5 (2.3%) of the respondents acknowledged the presence of community members responsible for sanitation, while 213 (97.7%) did not . In the control group 10 (4.6%) of the respondents acknowledged their presence, while 208 (95.4%) did not. Post-intervention in the intervention group, 157 (72.0%) of the females in the intervention group mentioned the presence of community members responsible for sanitation. (Table 3).

Table 2: Practices of Domestic Refuse Handling

	INTERVENTION GROUP				**CONTROL GROUP**			
	Pre-Intervention		**Post-intervention**		**Pre- Intervention**		**Post-intervention**	
Practice	**Freq**	**%**	**Freq**	**%**	**Freq**	**%**	**Freq**	**%**
Good	67	30.7	137	62.8	55	25.2	92	42.2
Bad	151	69.3	81	37.2	163	74.8	126	57.8
Total	**218**	**100**	**218**	**100**	**218**	**100**	**218**	**100**

χ^2=20.55;df=2;P=0.000… **χ^2 = 6.49; df=3; P =0.0875**

Table 3: Precence of community members responsible for sanitation

	PRE-INTERVENTION				**POST-INTERVENTION**			
	Intervention Group		**Control Group**		**Intervention Group**		**Control Group**	
Presence	**Freq**	**%**	**Freq**	**%**	**Freq**	**%**	**Freq**	**%**
Yes	5	2.3	10	4.6	157	72.0	90	41.3
No	213	97.7	208	95.4	61	28.0	128	58.7
Total	**218**	**100**	**218**	**100**	**218**	**100**	**218**	**100**

Fischers exactχ^2 =1.33;df=1;P=0.4447540 **χ^2 = 19.55.; df=1; P =0.000…….**

DISCUSSION

The studied populations had bad practices regarding domestic refuse handling before the intervention. Only 8.7% of them in the intervention group owned refuse bins at home, then. This was very similar to a study carried out in Habibganj municipality, Bangladesh, where 12% of the respondents owned bins at home (Alam et al., 2007). These observations can be attributed to the similar characteristics shared by Bangladesh and areas under study. Both are developing urban municipalities, with peculiar characteristics such as ignorance and inability to afford the bins.

Our finding however, is contrary to that reported for Ranong Provinces, Thailand, where 90% of them had access to refuse bins (Naing, 2012). This could be attributed to the fact that they were migrant workers and had public bins very close to their houses. The index study was not in keeping with the observations made in a study conducted on the dustbin: 'A study of domestic waste, household practices and utility services', which suggested adopting a bin-centered approach to help researchers and planners reconceptualize waste 'problems' and so reconsider waste management strategies (Chappells and Shove, 1999).

The observation that none of the respondents in both groups emptied their refuse at the collection center, but openly in their backyards (89.9%, intervention group and 81.7%, control group), was similar to the findings from a Bangladeshian study (Alam et al., 2007), as well as that conducted in municipal India, where the wastes were also openly dumped in streams or burnt in empty spaces (Chatterjee and Mesra, 2010).

Although our finding was similar to reported for a rural Iranian study where 25% of the respondents openly dumped their wastes (Abduli et al., 2008), it was obvious however, that it was lower than that observed in the index study. This can be explained by the possibility of the absence of organized waste handling process in the rural area, which is most likely expected in urban municipalities, though not in keeping with the index study.

Following the intervention, the overall good practices of the respondents improved to 62.8% from 30.7%. In the control group, there was no staistically significant change in the practice of handling domestic refuse in the control group, P= 0.0875. Though this finding was similar to that conducted in Imo State, Nigeria where there was no statistically significant change, P=0.10 in the control group (Izeze, 2010), it was however, different from one conducted in Sokoto, Nigeria. In this case, there was a statistically significant difference; $p<0.0001$ regarding practices between both groups at post-intervention (Abiola et al., 2010).

Prior to the intervention, 2.3 % of them in the intervention group acknowledged the presence of community members responsible for sanitation, which increased to 72% post-intervention. In the control group, this remained at 41.3%, though there was a statistically significant difference; p=0.000…between the groups at post-intervention. This could be attributed to the community-based health education, which necessitated a behavioural change in the respondents; thus positively influencing them to establish a community-based team responsible for sanitation issues among them.

This study therefore, demonstrates that though community-based health education improved practices regarding domestic refuse handling among the respondents, baseline data revealed challenges such as appropriate domestic refuse collection, storage and disposal and the need for enhanced community participation for sustainability. For the continuity of the temporary changes the study brought, there is need for collective effort amongst individuals within the community and the government to sustain this positive change.

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AUTHOR'S CONTRIBUTION

The corresponding author, Lar LA, was the initiator of the study and was responsible for the conceptualization and baseline design, study protocol, collection, collation and analysis of the data. All the other authors provided technical advice as they read through the final work and made useful suggestions and corrections as the study was conducted and on the completed draft. In addition, Ogbonna C, closely supervised the study.