PUBLIC AWARENESS OF EXISTING ENVIRONMENTAL HEALTH REGULATIONS AND THEIR APPLICATION IN URBAN AND PERI-URBAN AREAS OF ADDIS ABABA, ETHIOPIA

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ABSTRACT

Limited public awareness of existing environmental health regulations, failure to implement them and support their execution when violated often result in a poor environmental situation. The purpose of this study was to assess the public knowledge of existing environmental health regulations and their applications in the urban and peri-urban environment of Addis Ababa, the capital of Ethiopia. A descriptive study was conducted to assess the knowledge and practices of the study population regarding existing environmental health regulations: built environment, solid and liquid waste management, air and noise pollutions, and their implementation. A single-population proportion formula was employed to calculate

sample size and samples were selected from households in the two sub-cities of the Addis Ababa City Administration. A total of 845 households (98.9% response rate) were randomly selected and included in the study. The results revealed that of the selected regulations, 56% of the participants knew the standards on environmental protection and sanitation, and 40% reported knowing the regulations on solid waste management. Ownership of assets and education were strong determinants of public awareness of selected environmental health regulations. The public awareness on existing environmental health regulations in the study area was found to be low.

Keywords: environmental health, peri-urban, pollution, regulations, urban

INTRODUCTION AND LITERATURE REVIEW

Urban growth has a number of positive impacts on the environment and human well-being. Higher population densities help to decrease the per capita costs of providing energy, health care, infrastructure and services. Moreover, urbanisation has historically been closely related to declining birth rates, which, in turn, reduce population pressure on land and natural resources (Wheeler & Beatly, 2007). Despite all these positive results, in most major cities, especially in the developing world, the environmental health situation is negatively impacted by urbanisation, which is partly attributed to the large influx of migrant populations. It is compounded by failure to institute systems and technologies capable of maintaining a healthy environment (Federal Environmental Protection Authority, 2007; Srivastava, 2007; Wheeler & Beatly, 2007).

The population influx results in the rapid growth of urban size and leads not only to local environmental problems but also to large 'ecological footprints' (resource consumption and waste generation) beyond their immediate vicinity (César & Ekbom, 2013; Clark, 2009; Saab, 2012). In such an environment; formulation, endorsement and proper implementation of environmental regulations are required. However, low public awareness of existing environmental regulations and failure to institute and enact them when violated lead to and result in a poor environmental status (Friedman, 2006:28; Kume & Ahmed, 2005; Pandey, 2008).

Such an unhealthy environment disproportionately affects population groups, especially the marginalised poor that have direct contact with different forms of environmental waste, such as people who live in the informal settlements or poor residential areas, especially children, youth, women and the elderly, including those scavenging for metal and plastic scraps (Asfaw, 2007; Scott, 2007). Additional exposure routes for the urban poor, who are often migrants with little access to formal settlements and health services, include direct contact with solid waste and wastewater, for instance, through riverside open defecation grounds (United Nations Fund for Population Activities, 2012; Scott, 2007).

The introduction and use of modern health services and an environmental health programme in Ethiopia go back to the beginning of the 20th century. It has come a long way from the traditional medicine-based approach to the current Sector-Wide Approach Programme and evolved through four restructuring phases.

At the beginning of the 20th century, the modern health services in the country were provided by a few clinics and hospitals, which were mainly owned by the government and religious missions. But encouraging progress was made when, in 1908, the government Health Department was established within the Ministry of the Interior. For the first time in Ethiopia there was a department responsible for the health of the people and this phase extended to 1936 when it was interrupted by the second Italian invasion (Kitaw, Teka, Meche, Hailemariam & Fantahun, 2012). The Italian invasion period (1936–1940) reintroduced western health care after the destruction of all that had been developed by the country. However, the efforts which the colonial regime made benefited only the occupying and settling Italians and almost none of the Ethiopians (Hailemariam & Kloos, 2006:230).

- **First phase – reconstruction (1941–1953)**: In 1942, the Directorate of Medicine was established to undertake medical and public health services. The issue of sanitation was considered a domestic affair during that time (Kitaw et al., 2012; Kume & Ahmed, 2005).

- **Second phase – the basic health service period (1953–1974)**: This phase started in 1947 with new organisation and tasks, and the period ended in 1974. During this period health service activities were carried out through four consecutive five-year plans. During this phase the *Public Health Proclamation No 91/1947* opened the way for the development of environmental health services in Ethiopia (Hailemariam & Kloos, 2006; Kitaw et al., 2012).

- **Third phase – the primary health care (1974–1991)**: From the late 1970s to the end of 1989 the socialist regime took power and adopted Primary Health Care (PHC) to suit its Health Policy statements. Drinking water and sanitation became formal components of PHC. Ethiopia, during this time, adopted a ten-year perspective plan which the PHC activities implemented (Hailemariam & Kloos, 2006; Kitaw et al., 2012; Kume & Ahmed, 2005).

- **Fourth phase – the sector-wide approach (1991–2002)**: The fourth phase entailed restructuring the health policy and shifting into new strategies (1990 to date) (Health Policy 1993). This phase occurred after the socialist regime was overthrown by the Ethiopian Peoples' Revolutionary Democratic Front (EPRDF). A new economic and political system was established with the decentralisation of powers down to the grassroots level: the expansion of the private sector, democratisation of the social and economic systems, and encouraging of investments from the background against which environmental health services are managed (Kitaw et al 2012; WHO 2009).

Furthermore, the Federal Democratic Republic of Ethiopia government issued a proclamation, *Proclamation No 661/2009*, which is applicable to regulatory activities in respect of food, medicine, environmental health, health professionals, health and controllable health-related institutions in the country. Article 2 (section 3) Article 2 (section 29) and Article 30 (section 3) are specific to environmental health issues such as occupational health, and environmental sanitation focused on institutes and liquid waste management (Federal Negarit Gazeta, 2010).

As described above, to preserve and improve the urban environmental health situation, the Ethiopian governments at national and local levels promulgated regulations related to environmental health and steps to be followed to prevent pollution while intervening with developmental activities. These regulations have been promulgated for wider use through print media, radio and television programmes. Further, the public sector, partners and population groups of women and youth associations, and the health extension programme in Ethiopia have exerted efforts to address the environmental health issues. These activities include women and youth who are organised to participate in solid waste collection and management, health extension workers promoting latrine construction and use among rural households, and their engagement in health education activities (FMOH 2011). These efforts were reported to be effective particularly in creating awareness, protecting the self and environment from pollutions/contaminants in rural communities and in some urban areas. However, a low level of public participation in environmental health policy (61%) and a failure to implement existing regulations are affecting the public, particularly in the poor urban areas of Addis Ababa (FMOH 2011).

THE RESEARCH OBJECTIVE

The objective of the study was to assess the knowledge and practices of the existing environmental health policies, regulations and guidelines among urban and peri-urban community members.

Definition of keywords

Environment: Environment in this paper refers to an overall surrounding context during a given time period. (It refers to four environments: social, political, economic, and ecological.)

Peri-urban area: This refers to a zone that surrounds the city/town and an area that experiences the immediate impact of land demands from urban growth (Srivastva, 2007).

Regulations: Laws, rules, or other orders prescribed by the authorities, especially to regulate the individual and public conduct and deeds (Dictionary).

Urban: The Federal Democratic Republic of Ethiopia Central Statistics Authority defines 'urban' as a locality with 2 000 or more inhabitants (Central Statistical Agency, 2012).

METHODS

A descriptive cross-sectional quantitative study method was employed. The study was conducted in Addis Ababa, the capital city of Ethiopia. Two of the ten sub-cities of Addis Ababa were purposively selected based on their proximity/continuum to the urban centre of the city. It was assumed that the environment-related health problems, and interventions to a greater extent, are similar in districts/sub-districts of major urban settings in Ethiopia.

The study population and sampling

The study population included in this study are residents of the two sub-cities, Nefasilk Lafto and Akaki Kality, in Addis Ababa. A single-population proportion formula was employed to calculate sample size, and samples were selected from households in the two sub-cities of the Addis Ababa City Administration. Thirty-six enumeration areas (EAs) were selected. Household listing was conducted in each EA by the trained enumerators (36 enumerators) and a total of 856 households were randomly selected and included in the study. This study was conducted in April to May 2013 and data was collected from household members (household head, or spouse or any adult resident of the household) who were available at home during the data collection time.

In addition to the socio-demographic variables of the many regulations endorsed by the Federal Government of Ethiopia, proclamations related to building construction, solid waste and different pollution were purposively selected, and organised in a simple form to facilitate understanding. Trained data collectors probed the household on whether they knew and applied these regulations in their environment. These proclamations are as follows:

Proclamation no. 299/2002. Environmental impact assessment proclamation (Federal Negarit Gazette No. 11; 3rd December 2002:1950). Deals with safety for, flora, fauna, soil, *air,* water, climate, and natural resources.

Proclamation no. 513/2007. Solid waste management proclamation (Federal Negarit Gazette No. 13; 12th February, 2007:3524). Deals with solid waste handling/ management.

Proclamation no. 624/2009. Ethiopian building proclamation (Federal Negarit Gazeta No. 31; 6th May, 2009:4673). Deals with many aspects of the building starting from planning to permission to occupy the building.

Proclamation no. 661/2009. A proclamation to provide for food, medicine and health care administration and control (Federal Negarit Gazeta No. 9; 13th February,

2010:5157). The list includes the production of food, medicine and health care, distribution and waste management.

Data was entered and cleaned using Epi Info version 3.2 and transferred to Statistical Package for Social Sciences (SPSS) version 16. The analysis was done using SPSS version 16. The results were presented in the form of frequency tables and figures where appropriate. Study tools were adopted – part of the tools used are from the Central Statistics Agency's 2011 Ethiopia Demographic and Health Survey module, which was modified for the purpose, pre-tested in similar settings and revised before undertaking the study. The data was also analysed, using a multivariate analysis method to control for confounding variables. Gender, age, education level, income and asset ownership were the independent variables that were measured against the dependent variable: awareness of the selected environmental health regulations. The models were adjusted for socio-demographic variables after looking for interaction between the independent and dependent variables. Data collectors and supervisors were given three days training on the use of the study tools.

ETHICAL CONSIDERATIONS

The study protocol was approved by the Senior Degrees Committee at the Department of Health Studies, University of South Africa (Unisa). The researcher presented the certificate of ethical clearance from Unisa to the Addis Ababa City Administration Health Bureau and secured clearance to collect data in the study areas. At the district (called Woreda in Ethiopia) an institution level permission was requested and granted by the district administration. Informed consent was obtained prior to individual interviews; and accordingly all respondents were willing participants in the study. The investigator assured that privacy and the confidentiality of the information given by participants at every stage of the study by omitting names and by not identifying details of participating individuals and organisations/facilities.

RESULTS

A total of 845 of an expected 856 participants (98.7% response rate) were included in this study. 89% of the study populations were from urban areas and the remaining 11% were from peri-urban areas. The age of the participants ranged from 14 to 78 and their mean age was 35 years (SD$\pm$14.48 years). The proportion of female participants was higher by 58.2% than male participants. 60% of the participants were married. 26% of participants were employed by the private sector (including self-employees), 11.4% were public sector employees and 22.5% were unemployed. Only 75% of the participants were willing to provide and able to estimate their average monthly family income. Of these, 88.8% reported a monthly income of about 2 000 and less Ethiopian Birr (Table1).

Table 1: Socio demographic characteristics of the study participants, Addis Ababa, Ethiopia, April–May 2012

Variables Frequency		Participants	
		%	
Reside in (n=845)	Urban	753	89
	Rural	92	11
Gender (n= 845)	Female	492	58.2
	Male	353	41.8
Age group (n=845)	< 19	126	14.9
	20 to 29	281	33.3
	30 to 39	189	22.3
	40 to 49	127	15.0
	50 to-64	81	9.6
	>65	41	4.9
Marital status (n=843)	Single	275	32.6
	Married	508	60.3
	Widowed/widower	45	5.3
	Divorced/separated	15	1.8
Education (n= 845)	Can't read and write	119	14.1
	Read and write with no formal education	56	6.6
	Grade 1-6	115	13.6
	Grade 7-10	254	30.1
	Grade 11-12	143	16.9
	College and above	158	18.7
Economic activities (n=845)	Private sector	222	26.3
	Unemployed	190	22.5
	Housewives	145	17.2
	Public sector employee	96	11.4
	Student	83	9.8
	Farmer	53	6.3
	Pensioner	51	6.0
	Community based organization	5	0.59

Monthly Income in ETB (n=586)*	<500	181	30.9
	501-1000	206	35.2
	1001-2000	133	22.7
	2001-3000	42	7.2
	3001-5000	20	3.4
	>5000	4	0.7

Socio demographic characteristics of the study participants, Addis Ababa, Ethiopia, April–May 2012
Ethiopian Birr - ETB is an Ethiopian currency

Level of awareness of existing environmental health regulations

The study participants were asked if they were aware of the need for or existence of environmental health regulations. In response, a total of 67.5% of the participants reported that the local administration and the government (through the public sector offices) were instituting actions to curb illegal housing construction. However, 12.5% of the participants believed the public sector offices do not have full control over illegal constructions. About 20% of the participants did not know about the inspection and control activities of the public sector offices to prevent and control illegal constructions in their environment. Of all the participants, 64% believed that the public sector offices and local administration were making an effort to prevent expansion of illegal construction, but 12.8% participants did not agree with the above participants' testimony and believed the actions taken or implemented were not able to fully control illegal construction. About 23% neither agreed nor disagreed with the above two groups.

About 61% of participants believed improper or uncontrolled built environment (housing units or business complexes) could harm human health and affect environmental health. Of these, 48% mentioned overcrowding, 25% communicable diseases, 15% accidents and landslides as major risks due to the substandard and uncontrolled inbuilt environment in their community. But 12% of participants failed to specify effects but mentioned the uncontrolled inbuilt environment as a problem. They were also asked about the conditions and sources of pollution to the environment. About 17% of the participants mentioned the existence of an air pollution source, 49.3% reported factories as the source of pollution, 31.9% mentioned the solid waste disposal landfill as a possible source, 15.3% implied health facilities (incinerators and open fire methods used for medical waste management), 13.2% specified food and beverage facilities (bars, restaurants, hotels), while 10.4% reported vehicles as the main source of air pollution in their locality. (Multiple responses considered in this section.)

About 59% of the participants reported smoke or carbon dioxide from households as a cause of harm to the environment or human beings. Of these 82% of the participants believed smoke from the household could be the cause for respiratory tract infections and 18% reported that smoke emits carbon dioxide/pollutant to the environment.

Few (14 %) participants reported the existence of households, organisations and business complexes that connect their toilet sewerage system to the open drainage system, which becomes a nuisance in the community. In the same vein, 63% of the participants reported individual households as major sources, and 17% of the participants deemed food and beverage establishments to be sources of environmental contamination, while 9% reported factories, 7% schools and 4% public sector offices as major sources of the dislodging/connecting of toilet facilities into open drainage systems in their community.

About 42% reported that they knew the existence of standards and regulations to be followed or implemented to prevent air pollution, of which 57% mentioned cooking done in a separate kitchen, 22% use energy sources which have no or little smoke, and 21% maintain sufficient ventilation everywhere (such as in houses, production centres, transport and recreation areas) because the major contents of the standards/regulations advise the community to prevent and control indoor and outdoor air pollution. 37% of the participants reported that they knew the level of sounds which a human being can tolerate and the level to be avoided in a human environment; at home or workplaces at different times (Table 2). Closer to 34% reported they knew the different sound levels for day and night times and 26.8% reported knowledge of the standards and regulations to be followed and limits for different places. Of participants who reported knowledge on the standards in one or more regulations listed in Table 2, about 75% of them reported health extension workers as a source of information related with health and environment; media (TV, radio and print media) constituted 11%, and 9% are health workers; and the workplace including schools as sources constituted 5% (Figure 1).
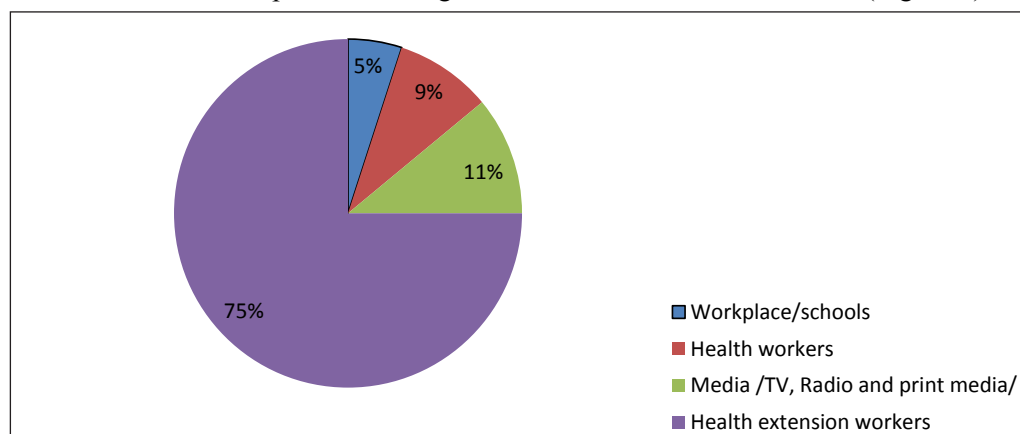
Figure 1:   Sources of information on environmental issues. Eco Health Promotion Study, Addis Ababa, April–May 2012

67% of the participants reported that they knew the laws/regulations that control households and community actions on waste disposal. Of these 51.7% stated individual households and establishments are responsible to keep clean up to a 20 metre radius

from their premises. But, 48.3% of participants did not know the limits but reported the existence of such standards.

Table 2: Knowledge on selected environmental health and protections laws/ regulations and standards, their applications and sources of pollution in Addis Ababa, Ethiopia, April–May 2012

Variable Frequency		Participants	
		%	
Know of standards, regulations, laws to be followed when constructing residential houses: **n=845**	Yes	457	54
	No	388	46
Know of standards, laws, regulations related with environmental protection and environmental sanitation, hygiene: **n= 845**	Yes	473	56
	No	372	44
Know of standards, laws, regulations which advise individuals and firms to prevent air pollutions: **n= 845**	Yes	358	42
	No	487	58
Know of standards, laws, regulations which advise individuals and firms to prevent/control noise pollutions: **n=845**	Yes	311	37
	No	534	63
Know of standards, laws, regulations which should be followed while installing water line or community water points: **n=845**	Yes	407	48.2
	No	438	51.8
Know of standards, regulations, laws which monitor individuals and community action regarding solid waste management: **n= 831**	Yes	332	40
	No	499	60

Determinants of the awareness level of the public of existing environmental health laws and regulation

Selected socio-demographic characteristics as potential predictors sex, age, education, income and assets (owning houses/land) were computed using a logistic regression model with respondent awareness on existing environmental health-related standards/ regulations. Each predictor was computed independently with the outcome variable, and education, assets and income showed a statistical association on univariate analysis. But when these predictors were computed together, the findings were not significant on a multivariate analysis. A test of the full model against the constant-only model

was statistically significant, indicating that the predictors education and house/land ownership/asset as a set reliably indicated relationship with awareness on selected environmental health related standards/regulation (education and ownership) (chi square= 46.450, p=0.000, with df=5). The Wald criterion (Wald chi square statistics) also demonstrated that education and ownership made a significant contribution to prediction (p=0000 and p=0.016, respectively). But when sex, age and income were controlled, they came out as non-significant predictors (Table 3).

Table 3:   Logistics regression using socio-demographic characteristics and public awareness on selected eco-health/ environmental health regulations, Addis Ababa, April–May 2012

Descriptions (Xi) Yes N %			Participants ' responses				Crude OR (95% CI)	Adjusted OR (95% CI)
			No					
			N	%				
Y	Gender (X1)	Male	207	24.5	146	17.3	1.0 (referent)	
		Female	258	30.5	234	27.7	0.695 (0.431,1.120)	0.734 (0.515, 1.046)
	Age (X2)	< 30 years	227	26.8	180	21.3	1.0 (referent)	
		> 30 years	238	28.1	200	23.6	1.060 (0.808,1.390)	1.222 (0.855, 1.745)
	Education (X3)	Can't read/ write	43	5.1	76	9.0		
		Grade 1-6	74	8.7	97	11.5		
		Grade 7-10	133	15.7	121	14.3		
		Grade 11-12	99	11.7	44	5.2		
		College and above	116	13.7	42	5.0	1.495 (1.345,1.662)	1.443 (1.252,1.664)
	Ownership/ House (X4)	Owned the house	193	22.8	192	22.7	1.0	
		Rented/ shared etc.	272	32.2	188	22.2	0.611 (0.377,0.988)	0.657 (0.467,0.925)
	Income (X5)	< 2000 ETB	285	33.7	235	27.8		
		>2000 ETB	46	5.4	20	2.4	1.896 (1.091,3.296)	1.182 (0.656,1.745)

Y: Participants' awareness of existing environmental regulations, while Xi independent variables: X1-Gender, X2-age, X3-eduction, and X4-asset/ownership and X5 income

Policy issues

About 23.2% of participants suggested promotion of existing regulations by monitoring and reviewing the implementation progress, identifying gaps and complementing the existing regulations with strategies to enhance their implementation on a large scale. 21.1% suggested strengthening the enforcing mechanisms for effective use for available environmental health regulations/standards, 20.6% participants mentioned the importance and the application of the industrial and residential regulations at all levels, and 19.5% suggested mainstreaming environmental and ecological issues in every sector where applicable to improve the environmental and eco-health situations. 15.6 % did not provide any recommendations.

DISCUSSIONS

More than 40% of participants did not know of the existence of different regulations provided by the central and regional governments. Of all selected regulations, only two related to construction of housing units and environmental sanitation, and were relatively better recognised (54 and 56% of the participants, respectively). As also found by Kumie and Ahmed (2005), our study participants also quoted mass media as their main information source on existing environmental health regulations (Kumie & Ahmed, 2005). The Federal Ministry of Health of Ethiopia emphasised in its *Hygiene and Sanitation Strategy* document the use of mass media, radio, TV and print media, for dissemination of construction, usage and maintenance of sanitary, latrine extension packages and environmental health-related promotions (FMOH, 2005).

Factories, food and beverage establishments, including the automotive garages were reported as a source of environmental pollutants to the study area. This is in agreement with the studies conducted by Woldeselase in 2008 and 2010 as a source and challenge to the environment if not well implemented according to the safety standards issued by the regulatory body. Further, as reported by the United Nations Development Programme (UNDP), this underlined the failure to institute the regulations that are geared towards safe water resources, and are challenges to the urban environment (UNDP, 2008).

The socio-cultural and economic situation of the study area was reported as a contributing element for the existing environmental health problems. In line with these, Mahiteme (2005) reported that the social organisation and economic status of the community influence the community members' behaviour and actions. A background paper prepared by WHO on social determinants expressed the low social, economic status, including limitations exposing the public to different health-related risks (WHO, 2005).

CONCLUSIONS

This study revealed gaps in the knowledge and applications of environmental health regulations in the two sub-cities in Addis Ababa, Ethiopia. The public awareness of existing environmental health regulations was found to be low (56%) in this study. Educational levels and assets/ownership were found to be the reasons for awareness of the existing environmental health, laws, standards and regulations. Ownership of assets and education tend to influence the public awareness of selected environmental health regulations.

The media (radio and television programmes) contribution was found to be very low (11%) in the dissemination of environmental health issues.

RECOMMENDATIONS

The following recommendations arising from findings as a remedy for the identified knowledge and application gaps are made to various stakeholders.

The Environmental Protection Authority, the Ministry of Health, media and schools should facilitate awareness by creating forums on environmental health geared to different social and economic groups. This would include community conversations at workplaces and community venues, discussion forums at schools and out of schools, and use of IEC/BCC materials at workplaces, schools and in community to increase the awareness of the public on environmental health benefits and importance of the environmental health regulation/standards.

The municipality should assign responsible officers at district and sub-district levels to regulate and reinforce the eco-health regulations at community level.

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