

Housing and sanitation and their association with gastro-intestinal and respiratory illness; A case study of Githembe slums, Nairobi, Kenya

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Abstract

Objectives: The survey was carried out to determine the state of housing and sanitation in Githembe, and their association to gastro-intestinal and respiratory infection.

Design: A cross-sectional survey

Setting: A slum named Githembe in Nairobi

Subjects: 85 households were selected by systemic method of sampling in the area. Households were sampled at an interval of every 3rd house.

Main outcome measures: Disease burden, relationship of over crowding to both respiratory and gastro-intestinal illnesses, risk factors such as eating food from kiosks, distance from source of water and closeness of latrine.

Results:

Common diseases at the time of interview were; Malaria 32%, Respiratory infection 32% and Gastro-intestinal illness 13%. Longer distance from water source was found to be a risk factor (R.R.=1.19). 10.6% of the houses had no latrines (R.R=1.25 risk factor). While 38.5% of those who had dirty toilets suffered gastro-intestinal illness compared to 31% of those with clean toilets. Households, which disposed waste in refuse dumps, reported 42% incidence of disease compared to 18% for those with refuse pits. Presence of faecal matter in the compound was found to be a risk factor (R.R=1.16). 64% of houses were of temporary nature with 78% of those houses inadequately ventilated. In 69.2% of crowded houses, respiratory illnesses were reported, and consumption of cooked food from vendors and kiosks daily was found to be a predisposing factor to gastro-intestinal illness.

Most household head were in the economically productive age group 25-44 years (61.2%) with 8% having no formal education.

Conclusion: There is strong association between inadequately ventilated, crowded housing with gastro-intestinal and respiratory illness

Key words; housing, sanitation, respiratory illness, gastro-intestinal infection, crowding.

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Introduction

The problem of sanitation is a worldwide phenomenon especially in the developing countries. The population explosion has brought with it a lot of poverty especially in the rural areas leading to rural-urban migration.

In Kenya, the situation is bad with country's birth rate being one of the highest in the world. The exodus from the rural areas has led to the development of many slums around the posh residential estates and major towns. Although these slums fall under specific local authorities, the population in these slums is too high that the local authorities are unable to either plan to housing or provide sanitary services. This situation has left the slums in very deplorable states.

The houses are made of temporary and cheap materials, while faecal and refuse disposal issues are left unattended leading to dump sites and sewerage problems. This state of affairs impacts heavily on the health of the residents Who usually suffers from gastro-intestinal and respiratory diseases among others? If the government does not ensure effective preventive and curative healthcare system and the every one finds accommodation with piped water, sanitation, cooking and washing facilities the poorer groups will continue to suffer disease, disablement and premature deaths.¹⁾

One of the consequences of being poor is having little choice about where you can live and what kind of housing and basic services available to you. Most low-income communities cannot successfully negotiate for extension of piped water supplies, garbage collection or healthcare services to their settlements or to be included in road or drainage networks. Since low income settlers have little or no access to basic services provided by the city authorities, their rights should be upheld and protected against other urban actors such as land lords who seek to evict them, factory owners who pollute their land, air and water and land grabbers who want the settlements for other developments. Once evicted they end up in worse housing at worse location and worse health status.²⁾

The researchers took Githembe slums as a case to determine the association of sanitation and housing to gastro-intestinal and respiratory diseases.

Although many aspects of life in the cities are conducive to improved health, the odds against good health (and for children's survival) are greater for city dwellers in slums who are severally exposed to hazards of malnutrition, inadequate shelter, poor sanitation, pollution and other psychological and social stress.³⁾

Significance/justification

The study hopes to have gathered information of importance to the country, the Ministry of Health and all concerned stakeholders for use in planning action-oriented policies and intervention strategies for the overall objective of improving the housing and health status of Githembe residents and other slums in general.

Objective

To find out the association between sanitation, housing, gastro-intestinal and respiratory tract illnesses in Githembe slums of Nairobi.

Specific objectives

- To find out the role of water source, storage and usage in relation to disease pathogenesis
- To estimate the available living space per occupant in relation to disease
- To find out if there is any relationship between ventilation, type of cooking fuel and diseases
- To establish the availability and usage of latrine and methods used in waste disposal

Research questions

- What is the relationship between overcrowding and disease?
- How does food handling influence disease?
- What is the relationship between indoor air pollution and disease?
- How does the water source, storage and usage influence disease?
- How does availability and usage of latrine affect health?
- Which are the methods used for waste disposal?

Material and Methods

Study area: Githembe slums are situated to the west of Nairobi city about 10km from the city centre. The slum is in Riruta location of Dagoreti division of Nairobi province and lies in the armpit of the junctions of the busy Naivasha and Ngong roads.

Riruta location has a population of about 70000 (1989 census-central bureau of statistics) and the population of Githembe is estimated at 4000 people. Majority of the housing and one-room rental units made either of timber or iron-sheets. Accessibility to the interior is poor, more so during the rainy season. The drainage system of this area is poor thus causing a major sanitation problem.

Target population; The study targeted the residents of Githembe over sixteen years of age and the physical environment.

Research methods; Cross-section study.

Sampling method; Transect method was applied and households picked through systematic sampling where every third house was picked.

Sample size; 200 houses.

Research process; An interviewer schedule and an observation checklist were used to collect the data.

Research period; October 1999

Response rate; 42.5%

Content of Questionnaire; The interviewer schedule sort to find the following;

Age, gender, education level, period of residence, awareness of diseases, disease burden on family, space occupancy, source of lighting, cooking fuel, used source of water, storage of water, treatment of water, amount of water used per day, source of food, latrine provision, general status of the compound.

The observation checklist sought to find the following;

Type of housing, lighting ventilation, general state of the physical environment state of latrine, refuse disposal method and site, liquid waste management.

Statistical methods; Data was entered and analysed using software programme; Excel. Percentages were calculated and the findings presented in tables and figures.

Results

A total of 85 respondents were interviewed of whom 74 (87%) were female while males were 11 (13%).

This may have been due to most men being out at work, living mainly the women in the houses. Assessment of level of education revealed that 92% of the respondents had been to school, 52% attained only primary education, 38% secondary, 2% college, while 8% had no education at all (See Table 1). 52 (61%) of respondents lived in crowded housing with an average space area of sq. ft. A minimum number of 2 occupants in a single room unit was recorded. While the maximum number of occupants recorded in one unit was 9 persons.

36 (69%) of the respondent reported having had suffered from respiratory illness in the last four weeks, compared to 16 (31%) who reported illness but lived in not crowded housing. A relative risk of (R.R=1.43) was calculated indicating that crowding is a risk factor in respiratory illnesses.

With regard to gastro-intestinal illnesses 34.5% of the sample households reported incidence of disease with 61.3% of the incidences being reported in crowded housing (See Table 2).

78% of the sample houses had inadequate ventilation

Table 1 Socio-demographic Characteristics of the respondents

	No.	Percent (%)
Gender		
Males	11	13
Female	74	87
Marital status		
Married	64	75
Single	12	14
Divorced	5	6
Widowed	4	4
Separated	1	1
Education		
Primary	44	52
Secondary	32	38
College	2	2
None	7	8

Table 2 Disease prevalence

	No.	Percent (%)
Housing		
Crowded	52	61
Not crowded	33	39
Respiratory illness	52	
Crowded	36	69
Not crowded	16	31
Gastro-intestinal illness	31	
Crowded	19	61
Not crowded	12	39

while 22% had adequate ventilation. The R.R=1.48 was indicative of poor ventilation being a risk factor to respiratory illness (See Table 3).

As concerning water, the average amount of water stored per household is about 80 litres. Households that stored more than 80 litres of water had a relative risk of 1.31 compared with those households storing less than 80 litres. Thus storing more water in the small crowded single rooms was found to be a risk factor since prolonged storage increased the likelihood of contamination of water before usage. 39.5% of households drawing water from a distance >50 meters yet only 33.3% of the households drawing water from a distance <50 meters reported disease. Short distance to water source is therefore slightly protective for gastro-intestinal illness (See Table 3).

On environmental status in relation to gastro-intestinal illness the study found that 35% of the households with

Table 3 Respiratory, Gastro-intestinal illness and housing/sanitation factors

	Diseased	No diseased	Total	R.R.	Comment
Respiratory illness					
Ventilation					
Inadequate	45	19	64	1.48	Risk factor
Adequate	10	11	21	1	
Total	55	30	85		
Gastro-intestinal illness					
Volume of water					
<80 litres	16	31	47	1	Risk factor
>80	17	21	38	1.31	
Total	33	52	85		
Water usage					
<50 litres	14	25	39	1.03	Risk factor
>50 litres	17	29	46	1	
Total	31	54	85		
Boiling water					
Not boiling	8	14	22	1.14	Risk factor
Boiling	15	32	47	1	
Not always	8	8	16	1.57	Risk factor
Total	31	54	85		
Distance of source					
>50 meters	17	26	43	1.19	Risk factor
<50 meters	14	28	42	1	
Total	31	54	85		
Latrine status					
Present	27	49	76	1	Risk factor
Absent	4	5	9	1.25	
Dirty	18	29	47	1.23	Risk factor
Clean	9	20	29	1	
N/A	4	5	9	1.43	Risk factor
Distance					
>30 meters	7	13	20	0.95	Risk factor
<30 meters	24	41	65	1	

latrine at a distance >30 meters reported disease and the relative risk equalled to 0.95.

Disposal of wastewater was either on the open yard or open drains which were in most cases blocked. These disposal methods accounted for 97% (30/31) of those who reported gastro-intestinal illness. Most households, 78% disposed refuse in dumps and 42% of these households reported gastro-intestinal illness. While in those

households that used refuse pit for disposal of waste accounted for 18% of the reported cases of gastro-intestinal illness (See Table 3 and 4).

The study found out that in the households bought food from kiosks and vendors daily accounted for 56% of the cases of reported gastro-intestinal illness, while those who are occasionally from the same sources accounted for only 30% (See Table 5).

Table 4 Environmental status in relation to gastro-intestinal illness

WASTE DISPOSAL MODE	STATUS	WITH DISEASE	WITHOUT DISEASE	TOTAL	% WITH DISEASE	%TOTAL
DUST BIN	PRESENT	0	2	2	0%	2%
	ABSENT	31	52	83	37%	98%
REFUSE DUMP	PRESENT	28	38	66	42%	78%
	ABSENT	3	16	19	16%	22%
REFUSE PIT	PRESENT	3	14	17	18%	20%
	ABSENT	28	40	68	41%	80%
FAECAL MATTER	PRESENT	12	18	30	40%	35%
	ABSENT	19	36	55	35%	65%
OPEN DRAIN	CLEAR	1	6	7	14%	8%
	BLOCKED	14	25	39	36%	46%
	ABSENT	16	23	39	41%	46%
FLIES	PRESENT	20	30	50	40%	59%
	ABSENT	11	24	35	31%	41%
CONDITION OF COMPOUND	CLEAN	8	23	31	26%	36%
	DIRTY	23	31	54	43%	64%
	TOTAL	31	54	85	36%	

Table 5 Frequency of eating-place visits and disease

Eating place	Occasionally		Daily	
	Diseased	Not diseased	Diseased	Not diseased
Kiosk	10	24	6	5
Vendor	1	2	4	3
Total	11	26	10	8
Percentage	30	70	56	44

DISCUSSIONS

The research found out that most of the household heads are married. It also found out that most of them are of primary or secondary school level. Majority of the heads are in the economically productive age group of 25-44 years. Due to the low level of education and most of the heads being employed in the informal sector, this would explain why most of the respondents are living in

this area, which has low housing status and low sanitary services. Most of the houses are temporary with most of the respondents disposing their waste in dumps and open drains, which were blocked.

Crowding was found to have an influence on respiratory illnesses with children in the age bracket of 0-10 being more affected. This may be due to them not having developed full immunity. Although little association was found between gastro-intestinal illness and crowding, the age brackets of 0-10 and 21-30 were found to be more affected. School children are often group that has the highest inflection rate as well as the highest worm burden, which contribute greatly to the contamination of the environment⁴. It is important to note that mothers may not be in full control of what their children may consume from time to time. For the age bracket of 21-30, one may argue that these people are out of the house most of the time and are therefore likely to eat from kiosks and food vendors.

Whereas crowded households generally reported high incidences of respiratory diseases, the study found out

that households using tin candle as a source of lighting and charcoal as cooking fuel reported more cases of the disease^{5, 6}. This may be attributed to the emission of carbon compounds from these sources. While discussing indoor pollution, one cannot ignore the issue of ventilation, where households with inadequate ventilation were found to have more cases of respiratory disease. This may be because the fumes emitted are not expelled from the room fast.

It was also found out that there is association between the distance of the water source and gastro-intestinal illness. The closer the water source, the lower the incidence of disease. In review studies on health, impact of water supplies carried out in the last thirty years found that in most cases where water supply has been improved there was a reduction of diarrhoeal disease, closely associated with easy access to water source. The review concluded that water quantity appears more important than quality as a means to control diarrhoeal diseases in contaminated environment⁹.

Boiling drinking water reduces the incidence of the disease. The amount of water stored did not show any protection from the disease. It may be because the residents keep a lot of water due to shortages but not to increase the rate of usage.

The condition of the compound was found to bear a lot of significance to disease. This factor was compounded by the presence of flies, faecal matter, and household waste, these appeared to increase the risk of disease. Dirty toilets within a short distance from the house were found to be a slight risk factor to disease. While the reason behind dirty being a predisposing factor is understandable, the short distance may be explained in relation to presence of flies. When the distance of the toilet from the house is short, then flies can easily reach the house.

The research concluded that there is an association between crowded housing, inadequate ventilation and respiratory illnesses; sanitation and gastro-intestinal illness.

The Study recommends that:

- The drainage system of Githembe be improved by clearing them and provision of slabs with an appropriate gradient. This can be a joint effort by landlords and the local authority (Nairobi city commission)

- The same actors should improve solid waste management.

The housing status should be upgraded with adequate toilet facilities, which should be periodically checked by the concerned authority.

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