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Health status of people of slums in Nairobi, Kenya

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Abstract

The objective of this study was to describe the health status of people living in the slums of Nairobi. It was designed as a cross-sectional study based on data from visitors at a clinic at Trnava University located in Mukuru slum in Nairobi. There were about 16,000 visits registered at Mary Immaculate Clinic of Trnava University in Nairobi during 2 years of operation. A random 5% sample was drawn from the paper-card database of this clinic to assess basic characteristics and health complaints of visitors. Both self-reported health complaints and diagnoses written by physicians were used to assess health status of participants. More females with average age (by slum) ranging from 20.46 to 21.30 years than males with average age ranging from (by slum) 15.86 to 19.49 years are the visitors of the clinic. The major self-reported health complaints of visitors were cough, abdominal pain, and headache for both sexes. The most frequent diagnoses were consequently virosis, acute respiratory infections, and bronchitis. Differences in health complaints by slums were observed and are described herein. The major health complaints and diagnoses in addition to the differences in health complaints and diagnoses by slum show that environmental conditions can have major influences on health status. Therefore, environmental improvements are important in the improvement of health status. A very high prevalence of respiratory complaints and gastrointestinal problems signify that improvements in air pollution reduction, drinking water provision, and waste management in slums can lead to more significant and sustainable improvements in health status than just simple treatment. This fact should be taken into account when planning future relief programs.

Keywords: Health status; Slums; Kenya

1. Introduction

Until recently, Kenya's development has been mostly focused in the urban areas. This has led to a large influx of migrants from the rural to the urban areas. Together with political and economic instability, this influx has forced more people to live below the poverty line, concentrated in the slums.

Nairobi, Kenya's capital city, has been changing quickly with regard to population growth, expansion in socioeconomic structure, and even political outlook. One main problem is that the population growth rate is much higher than the possible economic development. Lack of job opportunities in rural counties results in urban migration, which further complicates the situation in urban areas. Many people in the city are unable to get the scarce well-paying jobs and therefore resort to settling for employment in manufacturing industries and other casual jobs where they are very low paid. With sparse income, the majority of the city residents opt to stay in the slums, which therefore have been expanding rapidly (USAID, 1993). The expression "slum" has been replaced by the term "informal settlement." The former was like a condemned area despite the presence of residents who were a contribution to a large portion of the country's labor force. A few such informal settlements in the city are Korokocho, Mathare, Mukuru, Kawangware, Soweto, and Kibera, which is the largest. The use of the term informal settlements started in 1972, when the chief allocated plots of land to people who were landless before independence. This was informal squatting, no ownership of land or title deeds. Nairobi is made up of seven divisions. Within those divisions there are over 78 informal settlements; Korokocho in Kasarani division is probably the second largest of the Nairobi slums (AMREF, 1997).

The rapid concentration of people in slums has created social and medical problems. The situation is not getting any better, which is why prompt action

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should be taken. Mukuru slums are no exception. They are situated on the southeast part of Nairobi, along the Ngong River, exactly between the industrial area and the affluent residentials of South B.

Life in the slums has common characteristics. The majority of migrants are driven to the city by poverty and start their urban life in the worst areas. Overcrowding and lack of drainage and sanitary systems create conditions hazardous to health. The need for water and sanitary disposal services is acute. Most slum households must fetch their water from a standpipe and deposit their waste in open drains. The rate of infection is high; therefore there is constant risk of epidemic. Slum dwellers are entirely dependent on cash for their food. As incomes are very low, children are malnourished. Onis et al. (1993) described the prevalence of underweight, stunting (small), and wasting (thin) among under-5-year-olds in 79 developing countries, based on national surveys in 1980–1992. The percentages of underweight, stunting, and wasting in children under 5 years in Kenya 1987 was 14.3%, 32.2%, and 4.5% respectively. Most mothers work and are absent from home. Children fend for themselves, in the care of older peers. Many are abandoned or leave home at early age.

The Mukuru slum has a population around 70,000 people living in an area of about 2.3 km^2. Its location near the industries is a major reason why many people come to live in it; the rents are low and employment can be found in the industries. Poverty is widespread in the slum areas as there are poorly structured houses with weak building materials, poor spacing (house of 3×4 m), and insufficient ventilation. Mostly the roofs are made of iron sheets or tins and walls of either mud, wood, or iron sheets, with very few cemented floors. Most floors are earthen and usually very damp.

The houses are usually congested with at least five people in many cases (Table 1). The single rooms have various functions such as kitchen, sleeping room, dining, and bathrooms. This poses a great danger to health. The houses are usually congested and every space of land utilized; recently, "flats" have emerged in the slums. There are neither roads, proper garbage collection equipment, nor solid waste disposal facilities. There is no drainage of storm water, therefore in rainy seasons some loosely structured houses are carried away by floods. Open channels are flooded with human waste. The slums have no access to urban sanitation services. Nairobi city council cleaning services do not cover the slums and as a result the residents dump solid waste in open drains or in small lanes within the slums. Liquid waste oozes from houses into the lanes, forming pools of dirty waste within the areas. Most of the Nairobi slums have a few pit latrines which serve a great population, while few slums have none; thus there is an eruption of "flying toilets." A report on the urban environment sanitation project by UNDP-World bank on regional water sanitation in 1997 also indicated that about 150 people share one pit latrine and up to 54% households do not have bathing facilities. Most of the people defecate in plastic bags and then wrap and throw them like other solid wastes. This gives the slums an additional bad smell and predisposes the community to many diseases associated with poor hygiene (Figs. 1 and 2).

Furthermore, electricity from the industries is not professionally extended, and due to its illegality, most are dug underground and sometimes exposed. Most people use kerosene, charcoal, or firewood for cooking, in the corner of the houses or outside. The majority eat food without remains, in case of remains often the food is poorly stored due to lack of storage facilities, exposing

Table 1
Percentage distribution of household size by towns in Kenya

	1/2	3/4	5/6	7/8	9/10	11+
Nairobi	32.5	35.7	21.6	5.3	3.5	1.4
Mombasa	31.6	29.7	18.7	9.7	3.9	6.5
Kisumu	20.9	28.4	23.5	18.5	5.2	3.4

Source of data: Office of the president and Ministry of planning and National development; Central bureau of statistics, Nairobi, Kenya, 1994 survey.

Fig. 1.

Fig. 2.

it to dust and flies. At available food vendors along the slum pathways, the food is prepared in unhygienic conditions.

The general education level in slums is low, with only 14% of the population finishing high school and 33% not going beyond primary school. Only 2% have post-high school education (USAID, 1993). The schools in slums are inadequate for the large population of children, and some schools have as many as 1500 children with an average class size of 50–60 pupils. Unfortunately, a majority of schools in slums are begun as a business venture and do not truly meet their function as learning institutions—in most cases teachers are themselves not trained. Many children do not go to school, and they are seen wandering around and sniffing glue. Many of the cities' street children live in the slums, returning home in the evenings.

There are large populations of young people in slums, seeking employment or merely surviving in other ways. Crime is prevalent, there are many places of entertainment and liquor consumption (especially local brews), and commercial sex workers are on the increase. The women who engage in this trade are among the poorest, and have hardly any resources for their healthcare; the children they produce often end up in the streets and eventually become commercial sex workers themselves (AMREF, 1996). Chiefs and administration police carry out the local administration mostly in various slums.

There are no public government or municipal health facilities in slums. In and around the slums are the following medical institutions: one national hospital, one governmental dispensary, several private clinics, and one missions hospital. The latter serves most of the dwellers because it is affordable and provides laboratory services and medicaments at no extra charges. The place and nature of the people's work make it difficult to balance between their health needs and their economic needs. This is especially a problem for breadwinners who are paid only for what they contribute; a day off means missing the day's salary. Hence the cheap private clinic is not sufficiently utilized. Although Scwarcwald et al. (2000) described the huge 7-year difference between life expectancy of people living in slums of Rio de Janeiro compared to other parts of the city, little is known about health status of people living in slums in other cities or countries. This paper aims to contribute to knowledge on health concerns of poor people living in slums.

The Mary Immaculate Clinic (MIC) of Trnava University has operated since 1999 in collaboration of Trnava University and Mukuru Promotion Centre in Nairobi, Kenya. Its objective is twofold:

(1) to provide basic health care service to people in slums of Nairobi, especially in Mukuru area (The basic rule of the clinic is that only people residing in Mukuru slums may be admitted to the clinic. As part of the admission procedure each patient has to state his/her residence place. There is a small admission fee of 20 Kenyan schillings; however, even this fee might be remitted if the person does not have funds to cover it. The clinic provides basic general practitioner treatment and simple surgical treatment with limited laboratory techniques to confirm diagnosis. In more complicated cases, patients are referred to hospitals, mostly to Kenyatta National Hospital in Nairobi. The clinic does not provide pregnancy care and immunization services.) and
(2) to serve as an education base for a group of students of the public health program of the Trnava University in Nairobi.

The presence of other health services in slums of interest is rather weak. There is one larger private clinic in Kayaba slum and smaller private clinics in other slums. The smaller clinics are usually unlicensed and run by clinical officers. Maternity health services are provided either by these smaller clinics or by the National maternal hospital.

Due to lack of information from literature, the objective of this paper is to make available some knowledge in the field of health concerns of slum dwellers in Mukuru slums of Nairobi. The study leading to this paper involved teaching epidemiology of chronic diseases and health promotion as a practical example of how to make a random sample and analyze health concerns of visitors of the MIC in collaboration with teacher and students.

2. Materials and methods

This analysis was based on a representative sample of visitors of the MIC during the time period of June 1999–May 2001. The time of primary visit was taken as a starting point of analysis. There were about 16,000 visitors recorded at the clinic during the time of observation. An approximately 5% of visitors was selected using random selection from the paper-card database. Envelopes with patient data were picked by hand from files with closed eyes as a method of randomization. Each envelope represents one patient in the files. Altogether, files of 760 participants were analyzed using Microsoft Excel and EpiInfo 2000 software. Each visit of each participant was calculated separately to obtain as precise as possible the seasonal and causal distribution; this resulted in 1576 visits. Age was always calculated at visit date. Patient complaints rather than diagnoses were used as unit of health outcome evaluation due to the fact of limited possibilities to confirm diagnoses. However, an attempt has been made to reclassify health complaints into ICD-9 codes with the objective to allow comparison of data with those published in the Global Burden of Disease (GBD) (Murray and Lopez, 1996). The plan of reclassification was as follows: virosis, rhinitis, and acute respiratory infection—reclassified into respiratory infection category; pharyngitis, tonsilitis, bronchitis, and asthma—reclassified into respiratory diseases category; enteritis, gastritis, amebiasis, giardiasis, malaria, and typhoid fever—reclassified into infectious and parasitic diseases category; and injury and surgery—reclassified into injuries category.

3. Results and discussion

Table 2 shows sex and residence distribution of visitors. Four major slums, Kayaba, Mariguini, Fuata Nyayo, and Commercial, provided about 90% of all visitors. There is a population of about 23,000 in Kayaba, 12,000 in Mariguini, 12,000 in Fuata Nyayo, and 6000 in Commercial. By distance, Commercial is the closest to the clinic (up to 1 km) followed by Fuata Nyayo and Mariguini, and Kayaba is the farthest, being in distance up to 4 km from the clinic.

Table 2
Distribution of visitors by place of residence and sex

Residence	Males	Females	Total
Commercial	65	69	134
Fuata Nyayo	195	188	383
Kayaba	179	311	490
Lunga Lunga	7	5	12
Mariguini	156	266	422
Others	64	71	135
Total	666	910	1576

The mean number of visits is about two per participant during the time of observation. Table 3 shows means, medians, and modes of numbers of visits by residence and sex. The *P* value in this table presents the significance of the difference in between males and females in number of visits. There are no significant differences between males and females in number of visits, in contrast to differences between places of residence. We see that females and males from Mariguini are the most frequent visitors of the clinic; the less frequent visitors are males from Kayaba and females from Fuata Nyayo.

Distribution of visitors by age at visit and sex is shown in Fig. 3. Age groups of 0–9 and 20–39 years are the most frequent visitors of the clinic, which is likely (no exact data known to authors) in compliance with the age distribution of slum dwellers.

There are some interesting differences in age structure of visitors by residence. The proportions of males among 0- to 4-year-old visitors from Commercial and Fuata Nyayo is much higher than those from Kayaba and Mariguini. Interestingly, there were only three female visitors from Commercial in the age group of 35–54 years in the sample. In contrast to this finding, the highest proportions of both males and females over 55 years among visitors are from Commercial slum. Despite the females from Commercial, the age group of 0–4 years both for males and for females comprised the largest groups of visitors in all other slums. From Commercial, females of 25–29 years comprise the largest age group among females. These differences suggest that between slums there are significant age differences among inhabitants.

Table 4 presents the mean age, median, and mode of age of visitors by major places of residence. The *P* values indicate results of a test of difference of mean age between males and females; a noticeable significant difference of mean age of males and females was found among visitors from Fuata Nyayo and Kayaba. In general, mean age of males coming to the clinic is much lower than that of females. Murray and Lopez (1996) using disability adjusted life years (DALYs) indicate that most of the burden of disease in sub-Saharan Africa originates in the age group of 0–4 years (52%) and that about 60% of the disease burden is related to the age group of 0–14 years. Our observations presented in Fig. 3 are in good agreement compliance with these results.

Fig. 4 shows the seasonal pattern of the number of visits at the clinic. The only complete year of observation was the year 2000; therefore evaluation of the seasonal pattern is only suggestive. A lower plateau is visible in the first 6 months of the year followed by a higher level in the second half of year. A peak around January–February is visible both in 2000 and in 2001

Table 3
Mean number of visits, median, and mode by sex and residence, June 1999–May 2001

Residence	Sex	Mean	Median	Mode	Standard deviation	*P* value
Commercial	Males	2.20	2	1	1.49	0.8955
	Females	2.26	1.5	1	1.94	
Fuata nyayo	Males	2.07	1	1	2.09	0.3256
	Females	1.82	1	1	1.38	
Kayaba	Males	1.84	1	1	1.71	0.2269
	Females	2.13	1	1	1.91	
Mariguini	Males	2.43	2	1	2.64	0.7709
	Females	2.56	1	1	2.91	

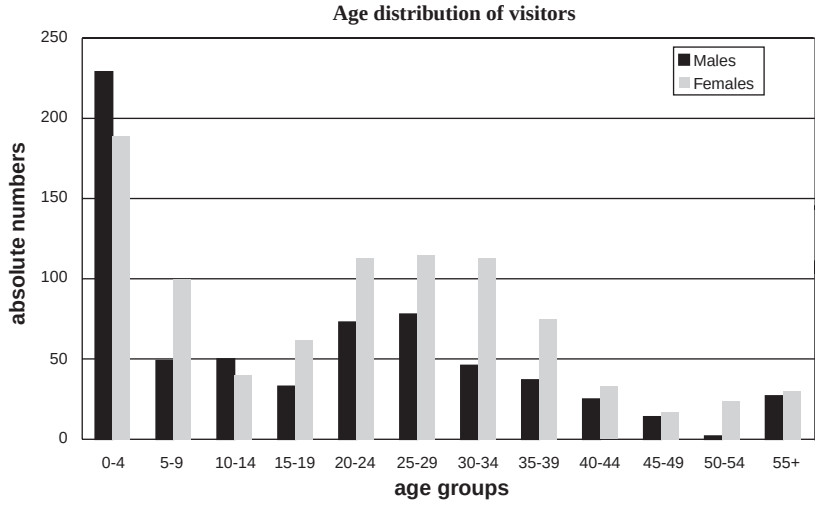

Fig. 3.

Table 4
Mean age, median and mode by residence and sex

Residence	Sex	Mean	Median	Mode	*P* value
Commercial	Males	19.49	20	1	0.5965
	Females	20.98	23	21	
Fuata nyayo	Males	17.07	9.5	1	0.0021
	Females	22.30	24	1	
Kayaba	Males	15.86	10.5	1	0.0011
	Females	20.46	22	1	
Mariguini	Males	19.43	22.5	1	0.2416
	Females	21.41	21	1	

P value is of significance of difference between two sexes.

but on levels lower than those of August and October in 2000.

Health status of participants was evaluated using three categories of health complaints reported by visitor and the diagnosis if there was any. Health complaints were assigned to rank first, second, and third as they were reported on paper card. Table 5 presents the major health complaints by gender as listed by visitors of the MIC. The most frequent combinations were headache, cough, chest pain or backache and joint pain.

The four major complaints were cough, abdominal pain, chest pain, and headache both of males and

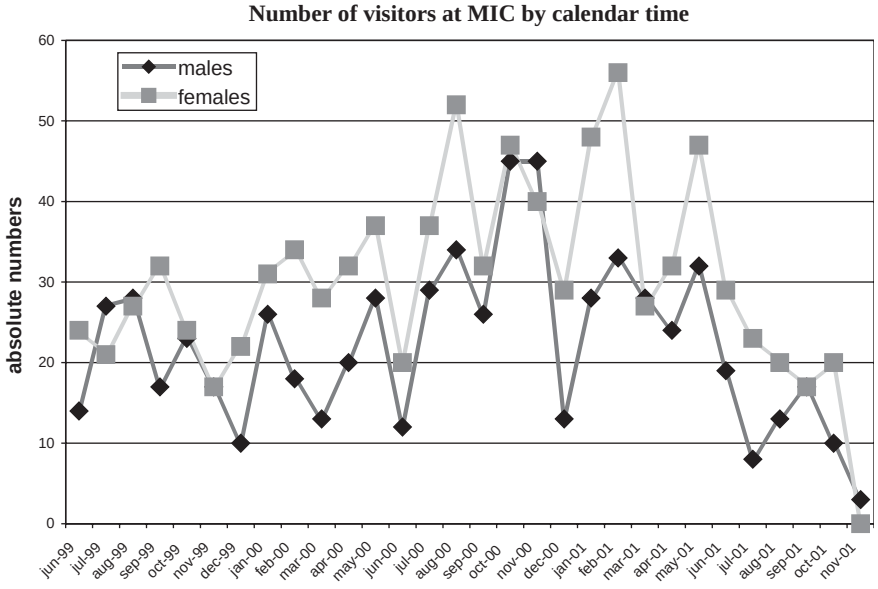

Fig. 4.

Table 5
Health complaints of visitors of MIC by gender

Complaints	Males						Females					
	1		2		3		1		2		3	
	Abs.	%	Abs.	%	Abs.	%	Abs.	%	Abs.	%	Abs.	%
Abdominal pain	55	8.7	31	7.3	19	8.7	94	11.0	60	10.2	31	9.3
Back pain	11	1.7	10	2.3	4	1.8	17	2.0	39	6.6	16	4.8
Chest pain	35	5.5	31	7.3	10	4.6	43	5.1	49	8.4	16	4.8
Cough	166	26.3	68	16.0	27	12.4	193	22.6	76	12.9	45	13.5
Diarrhoea	35	5.6	37	8.7	17	7.8	56	6.5	44	7.5	18	5.3
Fever	34	5.5	48	11.3	26	11.9	43	5.1	35	5.9	23	7.0
Headache	36	5.7	25	5.8	14	6.4	90	10.5	37	6.3	43	13.0
Injury	23	3.6	0	0	0	0	9	1.0	1	0.2	1	0.3
Common cold	22	3.5	18	4.2	8	3.7	11	1.3	22	3.7	7	2.1
Wounds	26	4.2	3	0.7	1	0.5	11	1.3	1	0.2	3	0.9
Skin changes	21	3.3	4	0.9	5	2.3	26	3.0	6	1.0	5	1.5
Joint pain	13	2.1	14	3.3	8	3.7	18	2.1	10	1.7	13	3.9
Others	153	24.3	137	32.2	79	36.2	244	28.5	208	35.4	112	33.6
Total	630	100	426	100	218	100	855	100	588	100	333	100

females, being responsible for about 50% of health complaints. This finding is in good compliance with that of Rahman et al. (1989) from slum dwellers of Dhaka. They found fever (31.6%), intestinal problems (26.3%), measles (11.8%), skin diseases (7.9%), and chronic respiratory infections (9.2%) as major health complaints of slum dwellers of Dhaka. Interestingly, among visitors of MIC, measles were reported on a lower level than that in Dhaka. A major difference by sex is visible only in the case of headache; females more frequently reported it. In the category "other" all other health complaints with occurrence of less than 10 persons were summarized.

The same group of complaints is present among second and third health complaints. The only change can be seen with higher prevalence of fever and diarrhoea.

Some differences between slums emerged for health complaints. First of all, in all groups but females from Commercial, cough was the major health complaint. At least one in five comes with cough as the major health complaint to the clinic. Second, abdominal pain is more or less at the on same prevalence level in Fuata Nyayo, Kayaba and Mariguini, but higher in Commercial, especially among females. On other hand there is a very low, or even close to 0 prevalence of diarrhoea among visitors from Commercial compared to

those of the other three slums. This suggests important environmental differences among slums. Injuries and wounds seem to be the domain of males rather than females.

Health complaints by age give an interesting view on age and disease differences among visitors. Cough, diarrhoea, fever, common cold, and skin changes are the most common health complaints in childhood followed by abdominal pain, back pain, joint pain, and chest pain in adulthood both for males and females.

Evaluation by diagnosis gives an important comparison to health complaints. First of all, one should state that diagnoses are not always found in the paper-card files. Therefore, less information compared to that on health complaints was available. The major diagnoses by gender are shown in Table 6.

Virosis, pharyngitis, bronchitis, rhinitis, acute respiratory infections, and asthma are responsible for close to 50% of diagnoses of visitors at MIC, both among males and among females. The second most important group represents enteritis and parasitic diseases; typhoid fever is present on about 10% of all diagnoses. Sex differences can be seen in the cases of bronchitis, asthma, and injuries. The major role of respiratory diseases is clear also from this evaluation and it is in good accordance with health complaints. Percentages presented in Tables 5 and 6 might be considered prevalence with some level of uncertainty related to representativeness of the sample. Comparing with rather rare literature on this topic, Biswas et al. (1999) described significantly higher prevalence of acute respiratory infections among under-5-year olds of a slum community in India. Parental smoking and solid fuel use for cooking were recognized as important risk factors. Especially, the solid fuel used for cooking in Mukuru slums could be an important risk factor also under Nairobi conditions. Our attempt to compare presence of diagnosis groups with diagnosis groups responsible for DALYs given in the GBD study (Murray and Lopez, 1996) gives rather disputable results. Both respiratory infections and respiratory diseases are present in our population sample at much higher extents (about 32% and 15–17%, respectively) than described as responsible for DALYs (about 9% and 3%, respectively, in the case of year 2000 estimates). In contrast, both infectious and parasitic diseases and injuries are present in lower percentage (about 25% and 8%, respectively, in our population) than responsible for DALYs (about 40% and 20%, respectively). There can be many factors responsible for these differences, including size of population (a relatively closed population of one slum complex in our study compared to a large sub-Saharan Africa population in the GBD study), geographical characteristics of the region (Nairobi is located at high altitude; therefore less malaria is observed), higher than usual air pollution caused by heavy traffic, and crowded housing under slum conditions.

Table 6
Diagnosis of visitors as written in paper cards

Diagnosis	Males		Females	
	Abs.	%	Abs.	%
Virosis	94	19.3	122	19.3
Pharyngitis, tonsillitis	19	3.9	26	4.1
Bronchitis	62	12.7	57	9.0
Rhinitis	6	1.2	10	1.6
Acute respiratory infection	52	10.8	71	11.2
Asthma	2	0.4	12	1.9
Enteritis, gastritis	49	10.1	53	8.4
Amebiasis, giardiasis	20	4.1	24	3.8
Malaria	10	2.1	9	1.5
Typhoid fever	43	8.8	62	9.8
Injury	29	6.0	19	3.0
Surgery	11	2.3	4	0.6
Others	89	18.3	163	25.8
Total	486	100	632	100

A comparison of diagnosis by slums and sex was completed with the same objective as that in the case of health complaints. Clearly the highest asthma prevalence was found in Fuata Nyayo slum, especially among females. Bronchitis is much lower among females from Commercial than in other groups. Males from Commercial create an interesting group; there are neither significant cases of parasitic diseases nor injuries reported among them.

Most respiratory diseases (not asthma) were diagnosed among children. About 50% of malaria among males and 30% among females were diagnosed in age the group of 0–4 years.

The high prevalence of respiratory disease and asthma might be surprising, but only at first sight. Mohamed et al. (1995) described in their case–control study of schoolchildren from Nairobi significantly elevated odds ratios of asthma with regard to dampness in the child's sleeping area, air pollution in the home, and presence of rugs or carpets in the child's bedroom. Ezzati and Kammen (2001) assessing the exposure–response relation of indoor air pollution and acute respiratory infections in central Kenya found extremely high level of indoor air pollution expressed as PM_{10} (particles less than 10 μm) around 1000–2000 $\mu g/m^3$. This high level of pollution was due to burning biomass in house. de Francisco et al. (1993) found smoke during cooking to be the strongest risk factor for mortality from acute lower respiratory tract infections in Gambian young children. Smith et al. (2000) did a critical review of the quantitative literature linking indoor air pollution from household use of biomass fuels with acute respiratory infections in young children in less developed countries. They concluded that indoor air pollution originated from biomass burning in houses multiplied by the large

population at risk in the developing world gives high importance to this issue. McMichael (2001) states that the greatest aggregate burden of disease and premature death from air pollution is due to traditional heavy exposures to indoor air pollution in Third World rural and urban slum settings. The practice in slums of Mukuru is very similar to that described in their paper, moreover even higher levels of PM_{10} might be expected in Nairobi due to the generally high level of air pollution in the city.

How to help Africa? This question is frequently posed in developed countries. The answer is not an easy one, even when one has personally experienced Africa. First of all, there is an urgent need for more research, especially internationally driven research using valid and established methodologies in each branch of public health (e.g., environmental health, nursing, etc.), The objective of such research should not be limited to infectious disease or even directly to HIV/AIDS, malaria, and tuberculosis. There must be a look to the health of Africans through priorities of general world health policy, especially in light of the inequality. If there are inequalities in the world (no doubt about it) and in health (no doubt about it), then Africa is the best example of these inequalities. The health of middle class or rich people of Nairobi is quite different from the health of slum dwellers as are their living environment and living conditions. The urban–rural differences (not evaluated in this paper) might be similarly striking. Any help (financial, educational, medical, etc.) should be clearly addressed rather than just given to a country. Otherwise it can even contribute to extension of existing inequalities and worsening of the situation rather than starting an improvement. The "evidence-based" character of help must be extended here from purely medical aid to economic, social and other assistance. As Barret and Browne (1996) described, medical interventions such as immunization and treatment may help to reduce the incidence of many diseases, but the major health risks cannot be effectively tackled by this way.

Last but not least due to this evidence base, it would be extremely useful to establish a directory of "what works" methods with regard to helping Africa. Good examples certainly exist, some of them have already been published (Harpham et al., 1988) or can be found on the Internet (The Mukuru Recycling Centre, 2002). Obviously, only "hand by hand" interventions addressing environmental conditions, social conditions (mostly education), and community health (primary health services and health education) would bring improvement of health status under such living conditions as the slums. The Healthy cities (The Healthy Cities, 2002) approach and policy framework offers one of these good examples to be applied also in conditions on sub-Saharan Africa.

4. Conclusions

Although this analysis has been done on only a 5% sample of visitors of the MIC, it provides important and valuable insight into the real health situation of people of the slums in Nairobi. The major findings can be summarized as follows:

- Four slums, Kayaba, Commercial, Mariguini, and Fuata Nyayo provide the vast majority of visitors. This fact should be taken into account when considering opening future health services for people in slums in Nairobi.
- Females are more frequent visitors of the clinic than males and this finding is in good accordance with knowledge from most of clinics worldwide. Mean age of females by slums is fairly stabile, it varies between 20.46 and 21.41 years compared to between 15.86 and 19.49 years for males. This difference also shows that males usually come at younger age and females in adolescence or adult age.
- The average number of visits at the clinic is about 2 per visitor; however, there are individual cases when visitors come more than 10 times.
- Differences in health complaints and diagnoses by slum show that some environmental conditions can have major influences on health status of people. Therefore, environmental improvements are important in improvement of health status. Very high prevalence of respiratory complaints and gastrointestinal problems suggest that improvement in air pollution, drinking water provision, and waste management in slums can lead to more significant and sustainable improvement in health status than just simple treatment. When planning future help, this fact should be taken in account.

The question "how to help Africa?" has frequently been raised during recent years at different scientific and policy meetings. From our experience, investment in education, environmental infrastructure, and sanitation seems to be much more important than investment in direct medical treatment or care, of course without decline in medical treatment and care.

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