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Drinking water and related health hazards in Khartoum squatter settlements.

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Abstract

Population growth within the Third World has had a large impact on the cities of such nations. Large scale population growth in urban dwellings results in a multitude of interrelated problems including lack of housing, abject poverty and fatal diseases. Investigations of such problems are designed to expose these conditions and possibly find solutions. This paper addresses the problem of water quality and related diseases within the squatter settlements of Khartoum.

Introduction

Khartoum metropolitan areas share many similarities with other Third World countries concerning urbanization. Many problems are associated with rapid urban growth, due to natural increase of the population, rural to urban migration, governmental housing policy and reclassification of urban areas.

The most striking phenomenon of rapid and uncontrolled urban development is the growth of squatter settlements. These developments occur due to the already stated reasons, the excess of housing demand over supply and failure of both public and private sectors to provide low income housing. Human settlements are created only when needed and exist as long as they are necessary. This is only when there are 'needs expressed by forces strong enough to justify its existence' (Ekistics, 1969). In Burgess' Zonal Patterning of urban areas, (Park, Burgess, and McKenzie, 1925) these developments lie within the commuter belt, within a journey time of 30-60 minutes of the Central Business District (C.B.D). Dwyer's (1975) locational model of spontaneous settlements in the Third World locates them in the periphery of urban centres.

The squatter settlements might have problems attributed to their own creation. This paper will highlight the health problems connected to water supply which is a prevailing problem in these areas, as illustrated by the Green - Belt area of southern Khartoum.

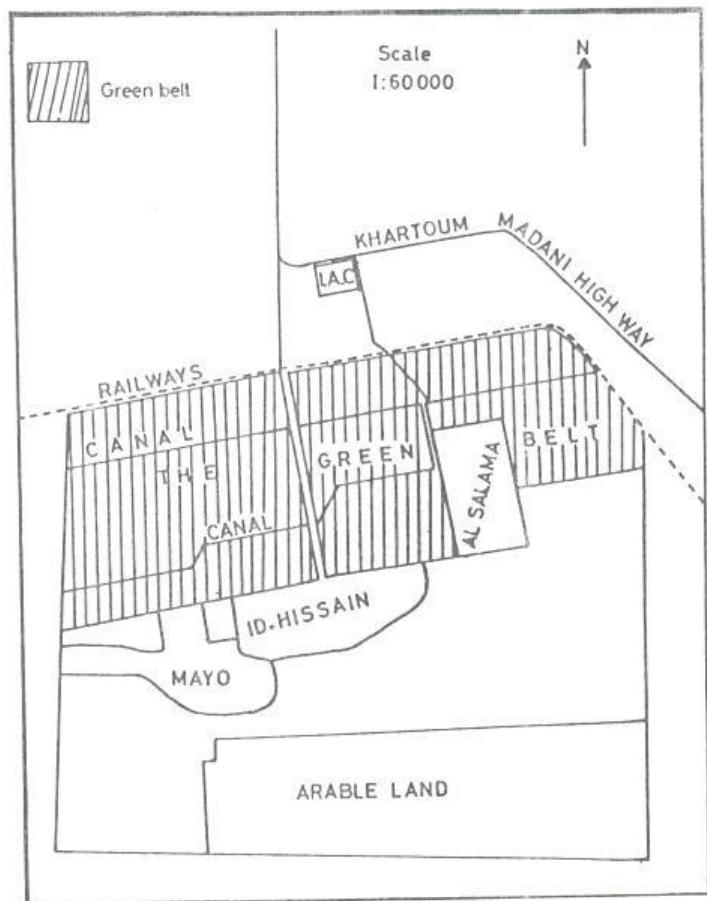


Figure 1

The study area

Source : Department of Survey - Sudan air photographs

No. 064-052-085 (1984).

Scale 1:20,000 reduced to 1:60,000

The green-belt area

The green-belt area is a peripheral, reception area for most of the rural migrants to Khartoum in recent decades. Initially it comprises the settlements of Mayo, ID - Hissain, and al-Sallama (Figure.1). ID-Hissain and al-Sallama are old villages that date back more than a century. They expanded after the rapid growth of Khartoum, but still conserve their native identity and their traditional ethnic structure. These two villages represent the reclassification of urban areas in Sudan, because they became part of al-Sahafa Town Council. The Mayo area in comparison is a typical squatter settlement, approximately 10 Kilometres from the C.B.D. of Khartoum Town. Mayo has been in existence for the last 20 years as a result of the transfer of population from the small illegal residential concentration near Khartoum Industrial area. Mayo developed through time and gained more land than that planned by the government.

Although the three settlements were not planned by the government authority, the people of ID-Hissain and el-Sallama were more aware of the importance of a properly planned residential settlement. The result is an organized and semi-official planned residential area. The situation is different in the Mayo area, which is lagging behind in the basic requirements for a healthy residential area. This has a great effect on Public health exemplified by the poor quality of drinking water.

Quality of water for human consumption

A safe drinking water supply is vital for human health. Much of the poor health conditions that encourage disease agents in the developing countries are due to the lack of a safe drinking water supply. Nyrumby (1986; p27) indicated that 300 million people in Africa did not have access to a safe drinking water supply and sanitation in the years 1981-1991. UNICEF (1988; p68) reported that in Sudan only 60% of the people in urban areas have access to safe drinking water supply, while it is only 10% of the Sudan's rural population who have such a service. The segment of the population in urban areas who do not have access to safe drinking water are those in the peripheries of big towns, where squatter settlements are found.

From the viewpoint of public health, water should be provided in adequate quantities. The World Health Organization (1983) has stipulated that 40 to 50 litres per day per person is adequate. Water quality is another important parameter required for Public Health. The quality of Water can be indicated by the presence or absence of pathogenic organism, since the presence of faecal material in waters, presents the most immediate hazard to Health. For individual or small community supplies, water is considered as contaminated if it is repeatedly found

to contain more than 10 coliform 1 *'Escherichia Coli'* per 100 ml of water (World Health Organization, 1983).

Water can affect health in quite a number of ways. Four Groups of 'water-linked' diseases exist. The first group are the 'water-washed' diseases such as diarrhoea, dysentery, scabies. The second group are 'water-borne' diseases that are due mainly to dirty water, such as viral hepatitis, poliomyelitis, gastro-enteritis, infantile diarrhoea, amoebiasis, roundworm, whipworm, threadworm, etc.

The third group are 'water-related' diseases that are transmitted by insects breeding in water. The fourth group are 'water-based' diseases where a part of the life-cycle of an infective agent takes place in an aquatic animal, such as piliarsia. Statistical evidence suggests that, 'water-linked' diseases are influential on health and mortality in developing countries. It was estimated in 1980 that about 50000 people die every day all over the world from 'water-linked' diseases (Nyumbu, 1980). Diarrhoea is the most common disease in tropical areas and is responsible for the spread of morbidity in all age groups.

Water-supply in the green-belt area

The main sources of water supply in this area are the boreholes, communal pipes and vendors.

Settlement	Piped		Communal		Vendors		Total	
	No.	%	No.	%	No.	%	No.	%
Mayo	17	2	26	3	837	95	880	100
II-Hissain	35	78	1	2	9	20	45	100
Al-Sallama	39	95	0	0	2	5	41	100

Table 1 Distribution of Water Supply within the area by type (% by household).
Source: Field Survey, 1987

Table 1 shows that the majority of households in the Mayo area do not have access to a piped water supply and are therefore served by vendors. In the other two areas the situation is clearly different. In al-Sallama village, the percentage of households served by piped water is equal to that served by vendors in Mayo area.

The price of water in the Mayo area is fixed by vendors. During the field survey it was 25.P.T. for a tin (4 gallons). Calculations for the proposed amount by the W.H.O. means that for a household of three persons 18.50 (L.S) per month per head in needed to meet that amount of water. A household served by home piped water usually pays 10 (L.S) per month. However most of the households cannot afford that amount of money and they either reduce their consumption of water per day or use communal pipes which in most cases are long distances from houses. The reduction in the required amount of water mean these societies succumb to the risk of the afore-mentioned 'water-washed' diseases.

Table 2 indicates that faecal contamination of borehole water in the Mayo area during January 1987 exceeds the limit of 10/100 ml, documented by W.H.O. (1983). This means that it was unsuitable for human consumption. By June this faecal contamination has been reduced due to the efforts of Goal Organization. In the other two areas, no faecal contamination in water is detected.

The bacteriological test confirmed the presence of faecal contamination in water distributed by vendors. This is because the main water pipe at the borehole is in close contact with earth contaminated by animal faeces. This is in addition to the lack of vendors personal hygiene and the use of filthy barrels.

The presence of faecal matter in water is a real hazard to health in these areas, especially due to water - borne diseases. Diseases in this group are detected to be the major cause of morbidity and mortality among infants and young children (aged 1-5 yes). Diarrhoea, typhoid and malaria constituted 37.77% of the overall specific causes of death among infants. These diseases, in addition to poliomyelitis are responsible for 52.7% of the overall causes of death among children aged 1-5 years. This impact is of more significance in the Mayo area than in the other two settlements, as attributed to quality of water.

Conclusion

Squatter settlements are problem areas in the urbanization of the Third World. The lack of services is a major obstacle to the provision of a healthy residential environment. The presence of safe drinking water is vital for human existence because water is very sensitive to disease transmission and the consequent health hazards. This has been proven in the squatter settlements of Khartoum.

Settlement	Source of Sample	MPN Coli /100ml	E.Coli Type 1 /100ml	Date
Mayo	Borehole	14	ve	Jan 1987
	Com.pipe	7	ve	Jan 1987
	Vendors	present	ve	Jan 1987
	Borehole	zero	zero	June 1987
	Vendors	present	ve	June 1987
ID-Hissain	Borehole	zero	zero	June 1987
AI - Sallama	Borehole	zero	zero	June 1987

Table 2: Presence and absence of faecal contamination in water in the Green-Belt Area.

Notes : (1) MPN : Most probable Number of coliform /100 ML.

(2) Coliform : Type of Bacteria which are Pathogenic

(3) E.coli Type 1 : Type of Bacteria Detective to Faecal Contamination.

Source : Field Survey , 1987

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