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Slums and Incidence of Diseases in Ahmedabad

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ABSTRACT

Across the globe around, there is a steady increase in people residing in urban areas. While the characteristics of each city may vary by local context, urban health face various issues like overcrowding, air pollution, unhealthy diet, inadequate infrastructure, poor solid waste management systems and insufficient access to health facilities in slums. The paper focuses on the slum study and incidence of disease in Ahmedabad. Analysis reveals that the poorest health conditions are observed in the wards of Eastern zone while the wards of West and New-West zone comparatively tend to fare better than the other zones. The interplay of various factors like high slum population, poor water supply coupled with poor sewerage conditions and lack of medical facilities in East zone account for its poor health.

Keywords: infrastructure, slums, sewerage, medical facilities

INTRODUCTION

Urbanization due to migration is a reality and has reached to considerable proportions. As per the Census of 2001, the urban population has increased from 11% in 1901 to 28% in 2001. This increase in urban settlements acts as a double edged sword which on one hand provides people with varied opportunities and scope for economic development and on the other hand exposes the community to new threats. The process of urbanization has led to the process of mushrooming of slums.

A slum is defined as a compact area with a collection of poorly built tenements, mostly of a temporary nature, crowded together and usually with inadequate sanitary and drinking water facilities in unhygienic conditions. India's slum population more than doubled, from 43 million in 2001 to 93 million in 2011 in ten years and it is projected to grow at 5% per year, adding nearly two million every year, according to official Government data (Shrivastava 2012). Overall population of India has grown at an average rate of 2%, urban areas at 3%, big cities at 4% and the slum population at 5% (Report on health of the Urban Poor in India, 2007). Trends in urban

poverty suggest that the number of urban poor is expected to considerably increase in future. Poverty compounded with compromised environmental conditions result in poor health consequences for the urban poor.

The overall study was conducted to fulfill two broad objectives. The first objective was to compare the wards of Ahmedabad with each other in terms of two health indicators: Disease trend rate and MMR. The disease trend rate was studied during 2008-2011 for four major diseases namely Gastroenteritis, Typhoid, Jaundice and Malaria. The MMR was computed for the year 2011. The second major objective was to study the probable reasons for higher incidence of disease in wards of certain zones.

The scope of the study was limited to the city of Ahmedabad. It is the largest city in the state of Gujarat and seventh largest city in India with an area of 190.84 km^2. It has a total population of around 5.5 million. As per the latest census conducted in 2011, there are a total of 439843 slums in the city. According to the Global Report on Understanding Slums 2003, the percentage of Ahmedabad housing categorized as slums increased from 17.2% in 1961 to 22.8% in 1971 and 25.6% in 1991 and it is estimated that 17.1% of Ahmedabad's population lived in slums in 1971. This rose to an estimated 21.4% in 1982. As per the latest figures, 40% of Ahmedabad's population lives in slums and chawls (ibid).

RESEARCH METHODOLOGY

Ahmedabad Municipal Corporation is divided into six zones namely Central zone, West Zone, New West zone, East zone, North zone and South zone. Each zone includes various wards within it. The data used in the study has been supplied by the Ahmedabad Municipal Corporation and based on this data the results have been projected in the paper. To analyze the disease incident rate in each ward, normalization of data was done by computing individuals affected per lakh population for all the four years (2008-2011). This was done for all the four diseases under investigation. To analyze the MMR, number of deaths per 1,00,000 live births was computed for every ward. Once having reached at the disease incident rate and MMR, the rate was compared with that of the ward having minimum rate. This gave an indication as to how far is a ward in terms of health when compared to the one having lowest incident rate.

The study of disease rate was focused across two dimensions: time and space. Firstly, for all the four diseases, identification of wards was done that reported continuous increase or decrease and average increase or decrease in their incident rate during the years 2008-2011. Secondly, the wards of each zone were categorized under various ranges of incident rates based on their respective incident rate. This was done for the year 2011 for all the diseases. Lastly, identification of zones with wards that generally report higher disease incidence was done which was indicative of the health of that ward.

OBSERVATION

1. Disease Incident Rate

a. Space dimension: When the study was conducted across space dimension for all the four diseases, following observations were noted.

Gastroenteritis: Majority of the wards have the disease incident rate in the range 0-50 and 51-100. Only one ward of East and South zone have incident rate in the range 301-400. These are the Bapunagar ward of East zone with an incident rate of 369 and the Vatva ward of South zone with an incident rate of 303. On an average, higher rate of incidence is reported in the wards of East and South zone, West and New West zone report lower incidence rate.

Table: 1 Number of Wards affected- Gastroenteritis, 2011

Zone / **Disease Rate**	**Central**	**West**	**New-West**	**North**	**East**	**South**
0-50	6	10	9	4	3	0
51-100	2	0	1	6	4	3
101-200	1	0	0	1	1	4
201-300	0	0	0	1	4	2
301-400	0	0	0	0	1	1
401-500	0	0	0	0	0	0

Typhoid: All the wards of AMC have incident rate within the range of 0-51 and 51-100, with only Bapunagar ward of East zone with a slightly higher incident rate of 120.

Table: 2 Number of Wards affected- Typhoid, 2011

Zone / Disease Rate	Central	West	New-West	North	East	South
0-50	7	10	9	11	8	7
51-100	2	0	1	1	4	3
101-200	0	0	0	0	1	0
201-300	0	0	0	0	0	0
301-400	0	0	0	0	0	0
401-500	0	0	0	0	0	0

Jaundice: Compared to other diseases, highest incident rates are obtained in the case of Jaundice for the wards. The poorest conditions are observed in Central and South zone with few wards in each exceeding the incident rate of 500 plus. Jamlpur ward of Central zone reports an incident rate of 898. The Behrampura and Danilimda wards of South zone reports disease rate of 1025 and 802 respectively indicating very poor conditions. The range of incident rate of other wards can be captured from the table below.

Table: 3 Number of Wards affected- Jaundice, 2011

Zone / Disease Rate	Central	West	New-West	North	East	South
0-50	2	9	8	6	7	3
51-100	2	1	0	4	1	1
101-200	1	0	1	2	4	1
201-300	1	0	0	0	1	2
301-400	2	0	1	0	0	0
401-500	0	0	0	0	0	1
500+	1	0	0	0	0	2

Malaria: Almost all the wards have incident rates lying in the range of 0-50 and 51-100. Only one and two wards of East and South zone respectively have a slightly higher incident rate.

Table: 4 Number of Wards affected- Malaria, 2011

Zone / Disease Rate	Central	West	New-West	North	East	South
0-50	9	9	9	10	9	7
51-100	0	1	1	2	3	1
101-200	0	0	0	0	1	2
201-300	0	0	0	0	0	0
301-400	0	0	0	0	0	0
401-500	0	0	0	0	0	0

b. Time dimension: When the disease trend was studied for the years 2008-2011 for all the four diseases, it was observed that overall increase (continuous and average)[1] in the incident rate over the years is more than the overall decrease (continuous and average). This is an indication of alarming health conditions in these wards. Another important observation was that it in almost all the diseases, the average and continuous increase in the disease incident rate is maximally observed in the wards of East zone compared to the other zones. The overall picture can be captured through the table below.

Table: 5 **Variation in the disease rate for various wards, 2008-2011**

	Gastroenteritis	Typhoid	Jaundice	Malaria
Continuous Increase	6	14	7	0
Continuous Decrease	1	3	1	9
Average Increase	17	6	8	12
Average Decrease	5	11	9	13

2. MMR

MMR measures the number of women aged 15-49 years dying due to maternal causes per 1,00,000 live births. For Ahmedabad city, the average maternal mortality rate is computed to be 64.17. Though there are many wards in various zones that report zero MMR, highest MMR of

[1] Continuous is the gradual increment/decrement in the disease incident rate in the four years
Average is the increment/decrement in any two intervals out of the three intervals in a span of four years. Eg: An increase in the incident rate during 2008-09, 2009-2010 and a decrease in 2010-2011 would be considered an average increase

511 is observed in Kubernagar ward of North zone. If an average is computed for the overall zones, it is found that North zone reports the highest average MMR of 124 and the least MMR of 29 is observed in the South zone.

DISCUSSION

On analysis of the incident rate of diseases in various zones, it is observed that the most affected zones are the East zone, South zone and the North zone. West, New–West followed by Central zone tends to fare better. There could be various reasons for this disparity in health status within a city. However, the study mainly tries to analyze the reasons under three main heads:

A. Slum population:

In Ahmedabad, there are two types of slums: Chawls which were originally the residential units build in the mill premises for workers, and slums which represent illegal occupation of marginal areas of the city by migrants and other economically weaker sections (Bhatt 2003). The latter lack adequate facilities and basic amenities and are found along the riverfront, low lying areas, vacant private/government land etc.

As a part of the study, coefficient of correlation was computed between the slum population and disease incident rate for each of the four diseases individually. The coefficient's value in each case is though not very close to one, but it being on the positive side indicates that there exists a relation between the two (slum population and increase disease incidence).

Table: 6 Coefficient of Correlation between disease rate and slum population

S.No	Disease	Coefficient of Correlation
1	Gastroenteritis	0.310
2	Typhoid	0.347
3	Jaundice	0.108
4	Malaria	0.0385

Having established a relation between the slum population and disease incidence rate, it becomes imperative to see whether there exists a relation between higher slum population and higher disease incidence rate in a zone. If one were to compare the slum population in various zones of Ahmedabad, it is observed that the highest slum population is in the East zone followed by North

zone. West and New-West zone have the lowest slum population. The table below captures the slum population in various zones for the year 2008.

Table: 7 Zone-wise slum population (2008)

S. No	Zone	Slum and Slum-like population	Percentage of slum population
1	Central	369282	62.13
2	West	334042	40.52
3	New-West	479578	46.62
4	North	582653	61.97
5	East	708750	67.16
6	South	594887	56.45

As the highest incident rate for majority of the diseases is in East zone and so is the slum population, one can infer that higher slum population acts as a breeding ground for various diseases. Eastern Ahmedabad alone accounts for 47% of the slums and 77% chawls of the total slum like areas in Ahmedabad (Ahmedabad CDP, 2006-2012).

The origins of slum in Ahmedabad took place in this zone. The earliest low-income housing developed in the city was built by the mill owners who constructed chawls to house their workers. These were well-planned single room housing units, laid out in rows and rented to the workers. Due to the rent control act, the rents did not change over time. Since the rent levels were extremely low, the owners lost interest in maintaining the houses. Many of the chawls subsequently deteriorated in quality. In some cases the owners sold the chawls at nominal prices. In some cases they stopped collecting the rents, and the occupiers became the de facto owners. Due to the crisis of the textile industry the mills were sold, or were closed down. However, the chawls attached to the mills remained. Retrenchment of the mill workers did not render them homeless or induce them to shift to smaller units. This was because since most of the units were under rent control, retrenchment only influenced the expenditure incurred by the households on maintenance (Mahadevia 2002).

Since then, the number of slums is on a constant increase in this area. Also, an expansion work was carried out in the city's limits in the eastern periphery in 1980's. This was unplanned and the physical infrastructure developed was inadequate and improper which further aggravated the

living conditions of the urban poor in this zone. Various research studies clearly states that success of any slum improvement strategy would depend upon its ability to deal with the slums in Eastern Ahmedabad.

B. Water Related Issues:

There are various water related issues such as water supply coverage, sewerage network, etc which are indicative of the presence or absence of the basic amenities in a zone. As per the Ahmedabad CDP Report, the percentage of population covered for water supply is around 80% in South, North and East zone and roughly 90% in the remaining zones. The table below indicates the water supply coverage of the zones.

Table: 8 Zone-wise coverage of water supply

Parameters	East	West	North	South	Central	Total
No of wards catered	9	9	9	7	9	43
Total area (sq km)	27.51	42.32	32.19	72.32	16.5	190.84
Total area covered by piped water supply (%)	80	95	80	80	98	
Population covered (%)	90	95	90	90	99	

Source: AMC, 2005

Besides inadequate supply of water in Eastern zone, it is known that the newer areas in the eastern zone incorporated within the municipal limits in 1986, still have to be linked with the municipal supply. In the newly merged areas of East Ahmedabad, sewerage facilities are provided in 44 km^2 area, 48km^2 is yet to be provided with sewerage lines. In these areas where sewerage facilities are lacking, the sewage is left out in open through local drains. This sewage flows to open fields, to Khari River and other local drains and finds its way to Kharicut Canal and to Khari River. The Khari River flows down and meets Sabarmati River before Vautha. At some places, illegal connections are made and sewage is discharged into GIDC pipeline, which mixes with partially treated effluent. It is estimated that about 16 Mld sewage is generated from this area and is left untreated (Ahmedabad CDP, 2006-2012).

Storm water drains in the city are poorly developed leading to water logging problems during rainy season in many parts of the western and eastern zone. The storm water drains cover only 23% of the roads. The newly acquired areas of AMC do not have storm water drainage system because of which areas of Odhav (East zone), Naroda (North zone) and Vatva (South zone) experience water logging problems (ibid). All these conditions provide clear evidence that inadequate water and drainage facilities add on to the infrastructural problems in these zones thereby making it more prone to both water and vector borne diseases.

C. Health Facilities:

The presence of medical facilities in a region is indicative of the health infrastructure of a region. Better would be the medical facilities in a zone, lesser would be the number of death cases in that zone (disease incidence rate includes the death cases as well). AMC has a network of 60 medical institutions offering services either free of charge or by levying normal charge. The lower order facilities are lacking in slums. Only one-fourth slum population has access to dispensaries (ibid).

Majority of the medical facilities are located in the Western Zone and New Western zone, followed by Central Zone. The other three zones are deficient in terms of health amenities. South and East zone have no Govt. hospital. As of 2005, East zone had only 1 hospital, North zone had 2 and South zone had 4 hospitals compared to Central and West zone which had 10 and 30 hospitals respectively. Lesser number of medical outlets and lack of access to good healthcare in these zones deteriorate the diseased condition of the individual leading to more number of deaths (ibid).

CONCLUSION

The study conducted revealed the health status of Ahmedabad city on the whole. While it was known that West and New-West zones have better health conditions as regards the disease incidence rate and the MMR, the East, South and North zones comparatively show poor results. The study helped in inferring that presence of high number of slums (which lacks basic amenities and hygiene) in an area makes its population more susceptible to diseases.

Out of all the zones, East zone has the highest slum population. This results in poor living conditions in certain areas of this zone which makes it most prone to various water borne and

vector borne diseases. Besides, inadequate water supply and sewerage network facilities in this zone add on to the woes of its population and thus making them vulnerable to these diseases. Lastly, lack of availability of medical facilities at times of need and during emergencies leads to an increase in the death toll of the patients in this zone. This further aggravates the problem. Thus, poor sewerage conditions, lack of medical facilities and high number of slums in East zone makes it the most vulnerable zone in Ahmedabad.

Initiatives taken by the Government and concerned authorities can be of great help to improvise the situations in Ahmedabad. To keep a check on the increasing disease incidence rate, AMC should ensure proper water supply and sewerage facilities in the regions where these basic amenities are lacking. Also, incentives could be provided to the Link workers and Multi-Purpose Health workers so as to attract and retain them in the medical institutions.

Various initiatives like the Slum Networking Project in 1995 and the Sabarmati Riverfront Project in 1997 have been taken by the Ahmedabad Municipal Corporation to improve the conditions of the slum population by bringing improvements in their physical environment, developing their community and social infrastructure and integrating them with the main city. However, the need of the hour is to ensure that these initiatives taken are being implemented properly and rather than showing progress in papers and reports, the outcomes are actually reaching and assisting the intended beneficiaries.

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