

Vol 5 Issue 3 Dec 2015

ISSN No : 2249-894X

*Monthly Multidisciplinary
Research Journal*

*Review Of
Research Journal*

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Welcome to Review Of Research

RNI MAHMUL/2011/38595

ISSN No.2249-894X

Review Of Research Journal is a multidisciplinary research journal, published monthly in English, Hindi & Marathi Language. All research papers submitted to the journal will be double - blind peer reviewed referred by members of the editorial Board readers will include investigator in universities, research institutes government and industry with research interest in the general subjects.

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Review Of Research

EPIDEMICS OF TYPHOID & MALARIA IN JALGAON CITY: A GEOGRAPHICAL APPRAISAL

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Satish Jadhav

ABSTRACT

Urbanization is an important demographic shift worldwide. Today, nearly half the world population is urban. In India the rate of urbanization is also high in the last decade. It is major challenge for urban health. Urbanization has been traditionally linked to development and development with health. Indian

cities are divided into two parts: one half lives in relatively clean and healthy environs, while the other lives in congested and overcrowded slums. The main objective of the present paper is to understand the incidence and distribution of Typhoid and Malaria study in Jalgaon city. The study is mainly based on the primary data, collected through well structured schedule, on purposively stratified random sampling method. Highest incidence and incidence rate of typhoid is recorded in ward no. 67, which is slum locality. The average incidence rate of typhoid is found 0.46 persons per thousand populations in the study area. In slum locality incidence rate is concentrate is Moderate category, followed by Low (16 wards) and High (12 wards) category. In ward no. 56 and 67 highest incidence of malaria (14) are recorded. The highest (2.70)



rate of malaria is found in ward no. 67 and the average incidence rate of malaria is 0.41 persons per thousand persons in the study area. Out of 69 wards, in 33 wards no malaria patients are recorded in surveyed households. Very High incidence category of malaria is concentrated in 13 slum wads, followed by High in 12 wards in non slum locality. While, in 4 slum localities malaria incidence are found nil (ward no. 9, 12, 23, & 48). The proportion of morbidity cases of malaria to total no. of morbidity cases of all communicable diseases in that ward are concentrated in High and Very High category in both slum and non slum locality. Whereas proportion of morbidity cases malaria to total no. of morbidity cases of all communicable diseases in the study area are concentrated Very High (11 wards)

categories in slum locality.

KEYWORDS Jalgaon City, Malaria, Typhoid and Urban Health.

1) INTRODUCTION:

Urbanization is an important demographic shift worldwide. Today, nearly half the world population is urban. In India the rate of urbanization is also high in the last decade. It is major challenge for urban health. Indian cities are divided into two parts: one half lives in relatively clean and healthy environs, while the other lives in congested and overcrowded slums. This urban setting reflects that, there are some environmental and other factors behind this.

According to the NFHS-3 reports India's 285.4 million population (28% of the total) live in urban areas (NFHS-3, 2008). Out of these 80.8 million people (25.7% of the total urban) live in below the poverty line. Maharashtra is the highly urbanized state in the India (followed by Tamil Nadu, where urban population is 43.9%). It has an urban population 41.01 million comprising 42.4 percent of the state's population. It is estimated that 32.2 percent of the urban population of the state lives below the poverty line. Maharashtra has the highest urban poor population in India and is rapidly growing. Slum population growths will continue to outpace growth rates of India, Urban Indian, and mega cities. This is currently summarized as the 2-3-4-5 syndromes (Ramani, 2009). In the 1991-2001 decade, as India grew at an average annual growth rate of 2 percent, urban India grew at 3 percent, mega cities at 4 percent and slum populations increased by 5 percent.

Epidemic is an outbreak of a disease or illness that spreads rapidly among individuals in an area or population at the same time. India is endemic to many diseases such as Typhoid, Malaria, Kala-azar, Cholera, Tuberculosis etc. these erupt in epidemic form when conditions are favorable for their spread. Epidemics are disasters by themselves but these can emerge in the aftermath of other disasters as well. The epidemiology is that the distribution of diseases occurs in patterns in a community. An important function of epidemiology is to study these distribution patterns in the various sub groups of the population by time, place and person (Park, 2007). Typhoid is common bacterial diseases transmitted by the ingestion of food or contaminate water, which contain the bacterium Salmonella Typhi.

2) OBJECTIVES:

The main objective of the present paper is to understand the incidence and distribution of Typhoid and Malaria study in Jalgaon city.

3) DATA BASE AND METHODOLOGY:

The study is mainly based on primary sources of data, collected through structured schedule, which included environmental factors such as location of drinking water, source of drinking water, type of house, number of rooms, number of doors and windows etc. Information has been collected by conducting a door-to-door survey of 500 households (each zone consists of 100 households) from 69 wards in Jalgaon City (Table: 1). For primary data collections purposively stratified random sampling method was used. The whole Jalgaon City was divided into five zones viz. Central, East, West, North and South. Again the residential area was divided into two locality viz. Slum and Non-Slum, in order to cater for the variation between different localities of the population. This study was conducted between August-September, 2010 in Jalgaon City. Secondary data were also used, which were collected from various offices of Jalgaon City. For this study Census 2001 and 2011, Government of India, considers as a base line data.

We checked and edited data for accuracy, consistency and completeness. We used Microsoft Excel Software (version 2007) for data entry and data analysis.

Table: 1
A Profile of Household Samples According to Zone and Locality

Zone	Locality	Total Household	% of Household
1 Central	Slum	37	7.40
	Non Slum	63	12.60
2 East	Slum	49	9.80
	Non Slum	51	10.20
3 North	Slum	55	11.00
	Non Slum	45	9.00
4 West	Slum	34	6.80
	Non Slum	66	13.20
5 South	Slum	40	8.00
	Non Slum	60	12.00
Slum		215	43.00
Non Slum		285	57.00
Total		500	100.00

Source: Field Work and Compiled by Researchers, 2010.

4) Study Area:

Present study was conducted in Jalgaon City (Figure: 1), is a district headquarter situated in the northern part of Maharashtra state. It lies between 20° 56' 45" North to 21° 02' 13" North Latitude and 75° 30' 51" East to 75° 37' 31" East Longitude (City Sanitation Plan, 2010) and having height from mean sea-level is about 208.5 meters. The study region has an area of 68.2427 sq km. Administratively it is divided in to 69 wards (Figure: 2). Jalgaon is well connected by rail as well as road to important urban centers of Maharashtra State and neighboring states. The climate of the study area is generally hot and dry and average annual rainfall is 525.80 mm. The average minimum temperature is 11.0 C. and average maximum temperature is 43.50 C. The location of the Jalgaon city is on the right bank of the river Girna. The area surrounding the city is having general slope from south to north. There some hilly area on south side and south-west side. The city is bounded by the Satpura ranges in the north and Ajanta, Satmala and Chandur hills in the south (DPR, 2008). Due to the continental type of location of the city, climate is very hot and dry. May is the hottest month.

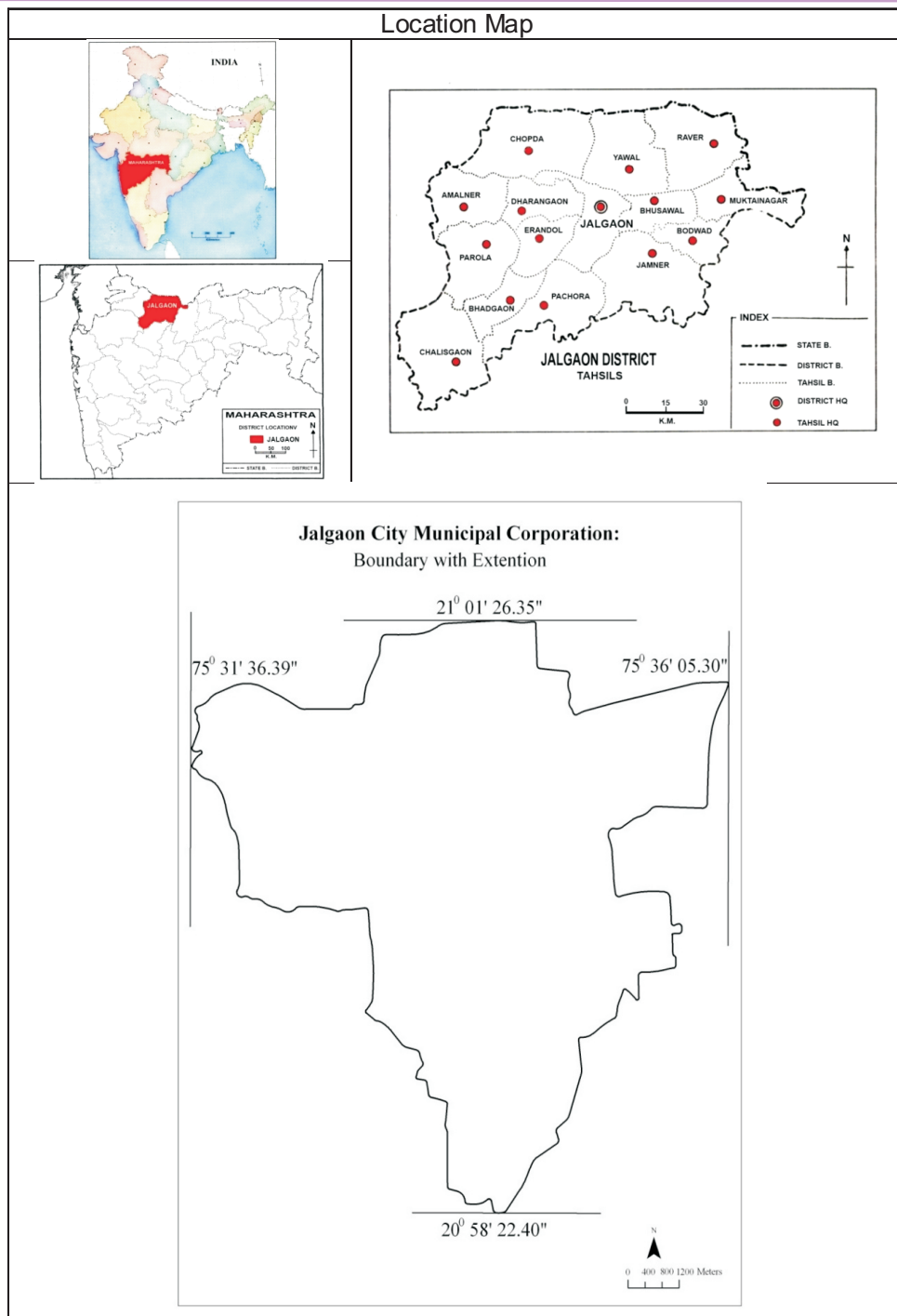


Figure: 1

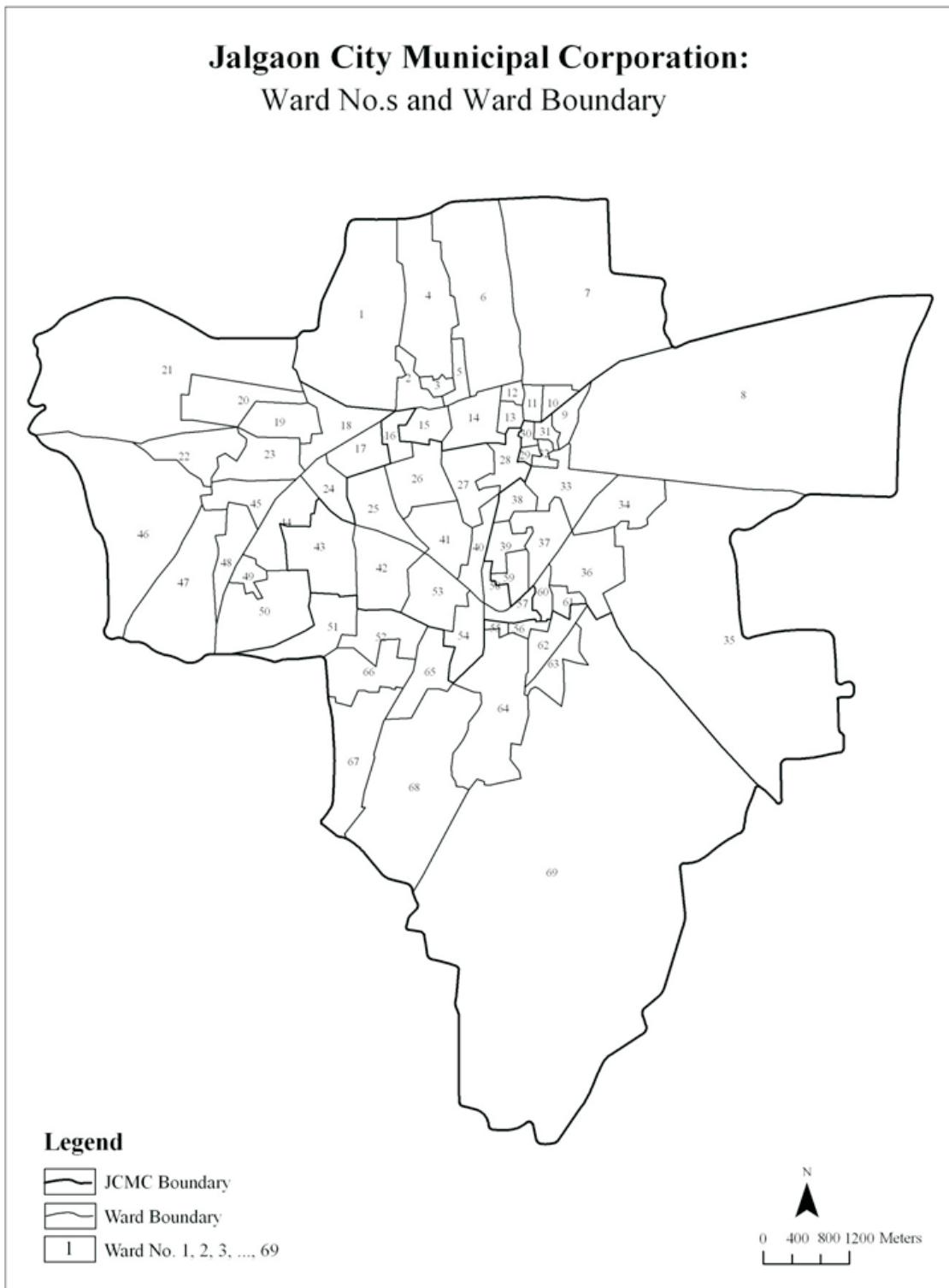


Figure: 2

Jalgaon municipal council was established on November 24, 1864. In 1885 and 1906 Jalgaon become tahsil and district respectively. The state government in its notification has announced the formation of Jalgaon city municipal corporation (JCMC) with effect from March 21, 2003 (CDP, 2011). JCMC serves an area of approximately 68.24 sq km including the city and its peripheral areas and provides a range of civic services to around 4.60 lakh (according to the 2011 census) citizens of the city of Jalgaon.

5) RESULTS AND DISCUSSIONS:

Morbidity data of Typhoid and Malaria has been used for analyzing the epidemiological pattern in the study area. Morbidity data means the number of persons affected with particular diseases. Data regarding the number of morbidity cases were obtained through household health schedule from all 69 wards of the study area. Collected data are analyzed and disease wise distributional maps are prepared. Disease incidence rate can be calculated with the help of the following formula:

$$1) \quad \text{Disease Incidence Rate} = \frac{\text{No. of Persons Infected by a disease in a Ward}}{\text{Total population in the same Ward}} \times 1000$$

Similarly the actual spatial distributions of diseases are shown with help of following ways (Table: 2):

$$2) \quad \frac{\text{No. of persons infected by a disease in a ward}}{\text{Total No. of persons infected by all diseases in that ward}} \times 100$$

$$3) \quad \frac{\text{No. of persons infected by a disease in a ward}}{\text{Total No. of persons infected by the same disease in JCMC}} \times 100$$

For demarcating the incidence rate and ward wise proportions of morbidity cases of these communicable diseases are grouped into four categories as follows:

- I)Low : Up to First Quartile value.
- II)Moderate : More than First Quartile to Second Quartile value.
- III)High : More than Second Quartile to Third Quartile value.
- IV)Very High : More than Third Quartile to Maximum value.

Ward No/ Diseases	A		B		C	
	Malaria	Typhoid	Malaria	Typhoid	Malaria	Typhoid
1	0.76	0.00	4.44	0.00	2.63	0.00
2	0.96	0.38	5.95	2.38	3.29	1.20
3	0.92	0.18	4.95	0.99	3.29	0.60
4	1.20	0.00	8.45	0.00	3.95	0.00
5	0.56	0.19	2.78	0.93	1.97	0.60
6	0.00	0.18	0.00	2.13	0.00	0.60
7	0.19	0.94	0.70	3.52	0.66	2.99
8	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.38	0.00	5.88	0.00	1.20
10	0.36	0.18	4.17	2.08	1.32	0.60
11	0.36	0.36	1.98	1.98	1.32	1.20
12	0.00	0.18	0.00	1.33	0.00	0.60
13	0.17	0.00	1.92	0.00	0.66	0.00
14	0.00	0.35	0.00	5.88	0.00	1.20
15	0.96	1.16	2.98	3.57	3.29	3.59
16	1.10	0.92	7.32	6.10	3.95	2.99
17	0.00	0.18	0.00	2.86	0.00	0.60
18	0.00	0.20	0.00	3.23	0.00	0.60
19	0.00	0.42	0.00	14.29	0.00	1.20
20	0.00	0.00	0.00	0.00	0.00	0.00
21	0.00	0.41	0.00	8.00	0.00	1.20
22	0.00	0.00	0.00	0.00	0.00	0.00
23	0.00	0.20	0.00	11.11	0.00	0.60
24	0.00	0.00	0.00	0.00	0.00	0.00
25	0.00	0.00	0.00	0.00	0.00	0.00
26	0.53	0.18	7.89	2.63	1.97	0.60
27	0.37	0.19	5.56	2.78	1.32	0.60
28	0.00	0.19	0.00	2.44	0.00	0.60
29	0.00	0.00	0.00	0.00	0.00	0.00
30	0.00	0.18	0.00	1.92	0.00	0.60
31	1.36	1.02	4.57	3.43	5.26	3.59
32	0.00	0.00	0.00	0.00	0.00	0.00
33	2.05	1.71	6.67	5.56	7.89	5.99
34	0.00	0.00	0.00	0.00	0.00	0.00
35	0.00	0.00	0.00	0.00	0.00	0.00
36	0.00	0.00	0.00	0.00	0.00	0.00
37	0.00	0.18	0.00	2.70	0.00	0.60
38	0.70	0.88	5.00	6.25	2.63	2.99
39	0.00	0.77	0.00	16.67	0.00	2.40
40	1.08	0.36	8.70	2.90	3.95	1.20

41	0.20	0.20	2.04	2.04	0.66	0.60
42	0.00	0.00	0.00	0.00	0.00	0.00
43	0.00	0.19	0.00	1.85	0.00	0.60
44	0.39	0.19	11.11	5.56	1.32	0.60
45	0.00	0.00	0.00	0.00	0.00	0.00
46	0.00	0.84	0.00	10.00	0.00	2.40
47	0.99	1.19	7.94	9.52	3.29	3.59
48	0.00	1.43	0.00	11.48	0.00	4.19
49	0.58	0.58	3.61	3.61	1.97	1.80
50	0.20	2.00	1.18	11.76	0.66	5.99
51	0.17	0.17	3.33	3.33	0.66	0.60
52	0.20	0.79	1.35	5.41	0.66	2.40
53	0.00	0.19	0.00	3.03	0.00	0.60
54	0.00	0.00	0.00	0.00	0.00	0.00
55	0.95	0.95	7.35	7.35	3.29	2.99
56	2.67	2.10	15.05	11.83	9.21	6.59
57	1.09	0.72	8.00	5.33	3.95	2.40
58	1.07	0.53	7.50	3.75	3.95	1.80
59	0.19	0.19	9.09	9.09	0.66	0.60
60	0.00	0.37	0.00	5.41	0.00	1.20
61	0.19	0.00	8.33	0.00	0.66	0.00
62	0.53	0.35	6.25	4.17	1.97	1.20
63	0.74	0.18	7.14	1.79	2.63	0.60
64	0.00	1.23	0.00	25.93	0.00	4.19
65	0.56	0.19	8.57	2.86	1.97	0.60
66	0.79	1.98	6.56	16.39	2.63	5.99
67	2.70	2.31	12.50	10.71	9.21	7.19
68	0.00	0.18	0.00	3.13	0.00	0.60
69	0.38	0.00	9.09	0.00	1.32	0.00
<p>A: JCMC: Ward wise Incidence Rate of Communicable Diseases per 1000 Population, 2010.</p> <p>B: JCMC: Ward wise Proportion of Morbidity Cases of Communicable Diseases to Total Number of Morbidity Cases of All Communicable Diseases in that Ward, 2010.</p> <p>C: JCMC: Ward wise Proportion of Morbidity Cases of Communicable Diseases to Total Number of Morbidity Cases of All Communicable Diseases in the Study Area, 2010.</p> <p>Source: Field Work Data Computed by Researcher, 2010.</p>						

A) Incidence and Distribution of Typhoid:

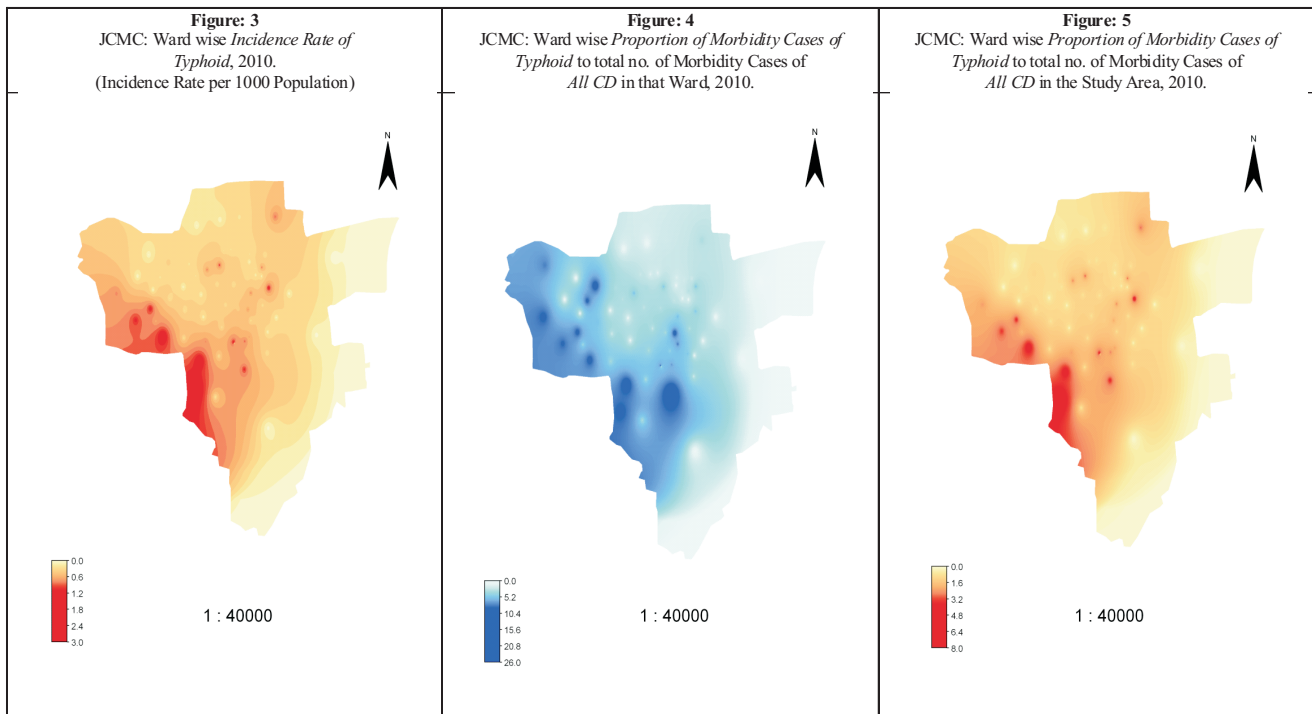
Highest incidence and incidence rate (12 and 2.31 respectively) of typhoid is recorded in ward no. 67, which is slum locality. The average incidence rate of typhoid is found 0.46 persons per thousand populations in the study area. There are 51 wards, where typhoid patients are found in surveyed household. In slum locality incidence rate is concentrate is Moderate (18 wards) category, followed by Low (16 wards) and High (12 wards) category (Table: 3A). While in both ward no. 1 and 4, typhoid incidence found nil and ward no. 12 Moderate incidence rate of typhoid is recorded.

The spatial distributions of typhoid infectious persons are shown Figure: 3, 4 & 5. The proportion of morbidity cases of typhoid to total no. of morbidity cases of all communicable diseases in that ward recorded is highest inward no. 64 (25.93).

EPIDEMICS OF TYPHOID & MALARIA IN JALGAON CITY: A GEOGRAPHICAL APPRAISAL

Table: 3							
		A JCMC: Ward wise Incidence Rate of Typhoid, 2010. (Incidence Rate per 1000 Population)		B JCMC: Ward wise Proportion of Morbidity Cases of Typhoid to total no. of Morbidity Cases of All CD in that Ward, 2010.		C JCMC: Ward wise Proportion of Morbidity Cases of Typhoid to total no. of Morbidity Cases of All CD in the Study Area, 2010.	
Category	Locality	Values	Ward Numbers	Values	Ward Numbers	Values	Ward Numbers
Low	Slum	Nil	(02) 1 & 4	Nil	(02) 1 & 4	Nil	(02) 1 & 4
	Non Slum		(16) 8, 13, 20, 22, 24, 25, 29, 32, 34, 35, 36, 42, 45, 54, 61 & 69		(16) 8, 13, 20, 22, 24, 25, 29, 32, 34, 35, 36, 42, 45, 54, 61 & 69		(16) 8, 13, 20, 22, 24, 25, 29, 32, 34, 35, 36, 42, 45, 54, 61 & 69
Moderate	Slum	(0.01 to 0.19)	(01) 12	(0.01 to 2.86)	(02) 11 & 12	(0.01 to 0.60)	(02) 12 & 23
	Non Slum		(18) 3, 5, 6, 10, 17, 26, 27, 28, 30, 37, 43, 44, 51, 53, 59, 63, 65 & 68		(15) 2, 3, 5, 6, 10, 17, 26, 27, 28, 30, 37, 41, 43, 63 & 65		(20) 3, 5, 6, 10, 17, 18, 26, 27, 28, 30, 37, 41, 43, 44, 51, 53, 59, 63, 65 & 68
High	Slum	(0.20 to 0.72)	(07) 9, 11, 23, 40, 49, 57 & 58	(2.87 to 5.88)	(09) 7, 9, 15, 31, 33, 40, 49, 57 & 58	(0.61 to 2.40)	(06) 9, 11, 40, 49, 57 & 58
	Non Slum		(08) 2, 14, 18, 19, 21, 41, 60 & 62		(09) 14, 18, 44, 51, 52, 53, 60, 62 & 68		(09) 2, 14, 19, 21, 39, 46, 52, 60 & 62
Very High	Slum	(0.73 to 2.31)	(12) 7, 15, 16, 31, 33, 38, 48, 50, 55, 56, 66 & 67	(5.89 to 25.93)	(09) 16, 23, 38, 48, 50, 55, 56, 66 & 67	(2.41 to 7.19)	(12) 7, 15, 16, 31, 33, 38, 48, 50, 55, 56, 66 & 67
	Non Slum		(05) 39, 46, 47, 52 & 64		(07) 19, 21, 39, 46, 47, 59 & 64		(02) 47 & 64

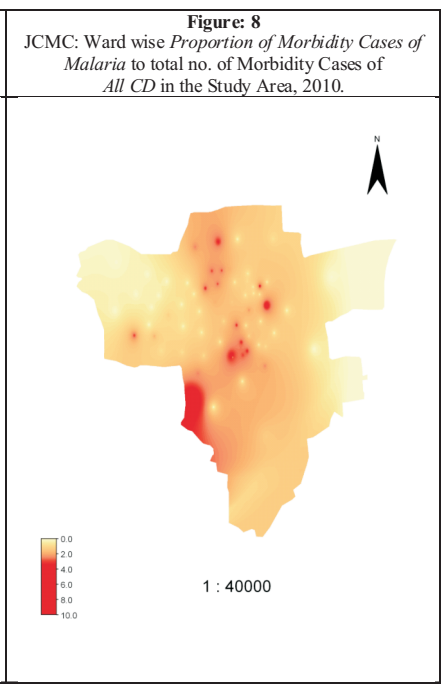
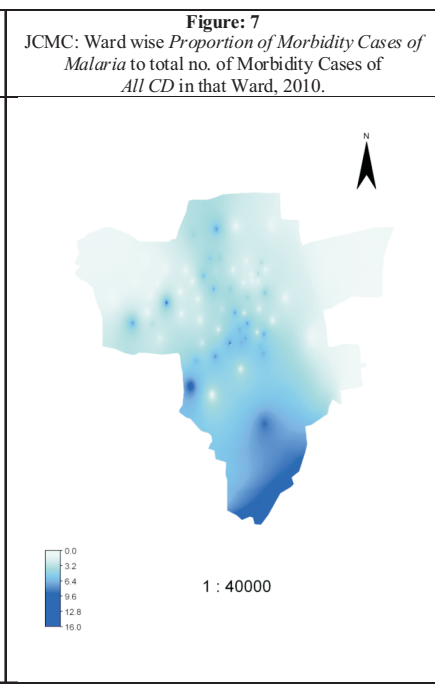
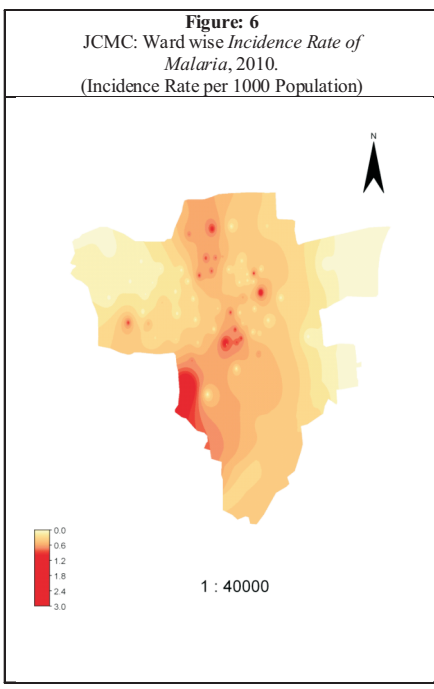
Figures in Bold Parenthesis show Total Number of Wards.
Source: Field Work Data Computed by Researcher, 2010.



EPIDEMICS OF TYPHOID & MALARIA IN JALGAON CITY: A GEOGRAPHICAL APPRAISAL

Table: 4							
		A JCMC: Ward wise <i>Incidence Rate of Malaria</i> , 2010. (Incidence Rate per 1000 Population)		B JCMC: Ward wise <i>Proportion of Morbidity Cases of Malaria</i> to total no. of Morbidity Cases of <i>All CD</i> in that Ward, 2010.		C JCMC: Ward wise <i>Proportion of Morbidity Cases of Malaria</i> to total no. of Morbidity Cases of <i>All CD</i> in the Study Area, 2010.	
Category	Locality	Values	Ward Numbers	Values	Ward Numbers	Values	Ward Numbers
Low	Slum	Nil	(04) 9, 12, 23 & 48	Nil	(04) 9, 12, 23 & 48	Nil	(04) 9, 12, 23 & 48
	Non Slum		(29) 6, 8, 14, 17, 18, 19, 20, 21, 22, 24, 25, 28, 29, 30, 32, 34, 35, 36, 37, 39, 42, 43, 45, 46, 53, 54, 60, 64 & 68		(29) 6, 8, 14, 17, 18, 19, 20, 21, 22, 24, 25, 28, 29, 30, 32, 34, 35, 36, 37, 39, 42, 43, 45, 46, 53, 54, 60, 64 & 68		(29) 6, 8, 14, 17, 18, 19, 20, 21, 22, 24, 25, 28, 29, 30, 32, 34, 35, 36, 37, 39, 42, 43, 45, 46, 53, 54, 60, 64 & 68
Moderate	Slum	(0.01 to 0.17)	(00) 0	(0.01 to 1.18)	(02) 7 & 50	(0.01 to 0.66)	(02) 7 & 50
	Non Slum		(02) 13 & 51		(00) 0		(06) 13, 41, 51, 52, 59 & 61
High	Slum	(0.18 to 0.70)	(05) 7, 11, 38, 49 & 50	(1.19 to 6.56)	(07) 1, 11, 15, 31, 38, 49 & 66	(0.67 to 2.63)	(05) 1, 11, 38, 49 & 66
	Non Slum		(12) 5, 10, 26, 27, 41, 44, 52, 59, 61, 62, 65 & 69		(10) 2, 3, 5, 10, 13, 27, 41, 51, 52 & 62		(09) 5, 10, 26, 27, 44, 62, 63, 65 & 69
Very High	Slum	(0.71 to 2.70)	(13) 1, 4, 15, 16, 31, 33, 40, 55, 56, 57, 58, 66 & 67	(6.57 to 15.05)	(09) 4, 16, 33, 40, 55, 56, 57, 58 & 67	(2.64 to 9.21)	(11) 4, 15, 16, 31, 33, 40, 55, 56, 57, 58 & 67
	Non Slum		(04) 2, 3, 47 & 63		(08) 26, 44, 47, 59, 61, 63, 65 & 69		(03) 2, 3 & 47

Figures in **Bold** Parenthesis show Total Number of Wards.
Source: Field Work Data Computed by Researcher, 2010.



The proportion of morbidity cases of typhoid to total no. of morbidity cases of all communicable diseases in that ward are concentrated in Low (16 wards) and Moderate (15 wards category) in slum locality respectively (Table: 3 B). The proportion of morbidity cases of typhoid to total no. of morbidity cases of all communicable diseases in the study area are concentrated in Moderate (20 wards) category in slum locality, followed by Very High (12 wards) category (Table: 3 C).

B) Incidence and Distribution Malaria:

Both in ward no. 56 and 67 highest incidence of malaria (14) are recorded. The highest (2.70) rate of malaria is found in ward no. 67 and the average incidence rate of malaria is 0.41 persons per

thousand persons in the study area. Out of 69 wards, in 33 wards no malaria patients are recorded in surveyed households. Very High incidence category of malaria is concentrated in 13 slum wads, followed by High in 12 wards in non slum locality (Table: 4 A). While, in 4 slum localities malaria incidence are found nil (ward no. 9, 12, 23, & 48).

The proportion of morbidity cases of malaria to total no. of morbidity cases of all communicable diseases in that ward are concentrated in High and Very High category in both slum and non slum locality (Table: 4 B). Whereas proportion of morbidity cases malaria to total no. of morbidity cases of all communicable diseases in the study area are concentrated Very High (11 wards) category in slum locality, followed by High (9 wards) category in non slum locality (Table: 4 C). The spatial distributional map of malaria infectious persons is given in Figure: 6, 7 and 8.

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