

Spatial analysis of prevalence of disease in greater Hyderabad: A case study of pandemic covid-19

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Abstract

The spatial analysis of prevalence of disease focus on the disease prone areas. The Hyderabad city is the one of Metros in the India, which is evident of highest number of Pandemic Corona Virus Disease 2019 (COVID-19) cases. Spatial analysis of COVID-19 gives the understanding of pattern of disease spread in Hyderabad. Most of the cases in Telangana State are reported from Grater Hyderabad only. In this paper an attempt is made to study the spatial distribution pattern of Pandemic COVID-19 in Greater Hyderabad, in the months of April 2020 and July 2020. The spatial distribution is presented using GIS (Geographical Information System). The study revealed that, in the south-eastern part of the city, Hayath Nagar circle in L.B Nagar zone is not being recorded any COVID-19 cases.

Keywords: prevalence, disease, pandemic, spatial, prone

1. Introduction

Spatial analysis of disease gives the understanding of pattern of disease spread in an area. The spatial analysis of prevalence of disease focus on the disease prone areas. The Pandemic Corana Virus Disease 2019 (COVID-19) is an infectious disease, which is caused by the Severe Acute Respirary Syndrome coran virus (SARS – Cov-2) (Wikipedia 2020). The COVID-19 spreads primarily from infected persons saliva and other droplets discharged from the nose and mouth (WHO, 2020). The first case of COVID-19 reported in 30th January 2020 from Wuhan china. COVID-19 first case reported in India on 1st March 2020. The unprecedented increase of cases started from April 2020 onwards. More than 50% of COVID-19 cases of Telangan are reporting from the Greater Hyderabad only. COVID -19 is can be caused by air and droplet infection, city like highest of population and high number urban poor are at risk for this this. The spatial distribution analysis of this disease will give track the disease spread and identify the population at risk. Place of first affect and its spreading

pattern can be observed using GIS (Martellucci et.al 2020)).GIS based distribution and interpolation method helpful in finding the disease spread. High density of cases in metros and low density cases in country side (Franciel Eduardo et.al 2020). COIVDI 19 affect the people, economy and international trade and tourism (Jai Kumar *et al* 2020).In this paper an attempt is made to study the spatial distribution pattern of Pandemic COVID-19 in Greater Hyderabad, in the months of 15th April 2020 and 16th July 2020. The spatial distribution is presented using GIS (Geographical Information System). Slums and urban poor are more vulnerable to diseases (Sheela Prasad, 2013).

2. Study Area

Hyderabad is one of the mega cities of India and is the capital of Telangana state. The city lies at 17°.36' N latitude and 78°.47' E longitude. Greater Hyderabad is divided into 6 zones and 30 circles. The geographical areal extent of greater Hyderabad is 675 sq.km and has the 6.9 million residents (census, 2011).

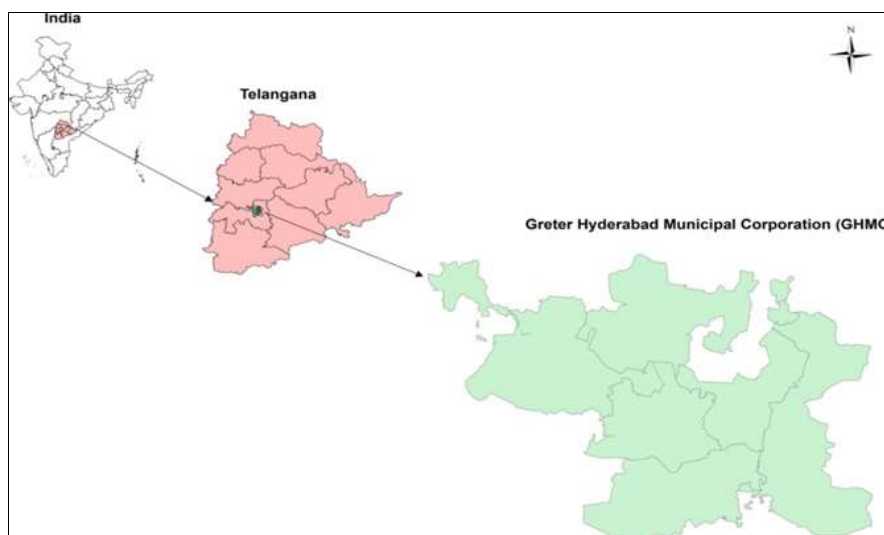


Fig 1

3. Objective of the study

- To analyze the zone wise and circle wise Spatio-temporal distribution of Pandemic COVID-19 in Greater Hyderabad

4. Data Base and Research Methodology

The study is based on secondary data provided by Greater Hyderabad Municipal Corporation (GHMC). Arc GIS software is used to generate maps of spatial distribution of COVID-19 in Greater Hyderabad, which will be used as a Decision Support System (DSS) which will be useful in the preparation of action plan.

5. Zone Wise Distribution of Covid -19 Cases in April 2020

Greater Hyderabad reported 258 positive COVID-19 cases as of 15th April 2020. The zone wise analysis of COVID-19 cases revealed that, highest number of 107 cases are in Charminar zone and least number of COVID-19 cases in L.B Nagar zone (table 1). Around the 68% cases are in

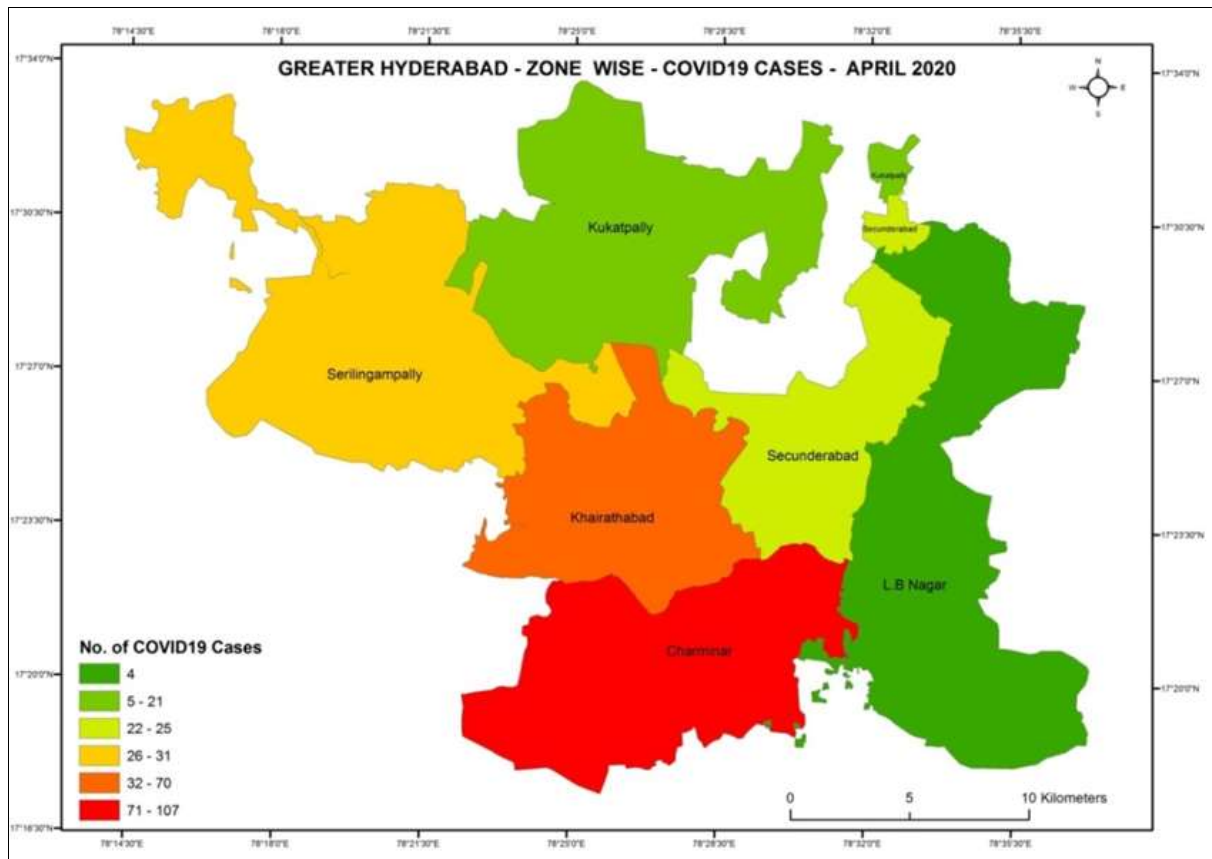
Charminar and Khairathabad zones. Kukatpally zone has 8.1% positive COVID-19 cases.

Table 1: Zone Wise COVID-19 Cases – April-2020

S.No	ZONE	Total COVID-19 Cases	Percentage (%)
1	Charminar	107	41.0
2	Khairathabad	70	27.0
3	Kukatpally	21	08.1
4	L.B. Nagar	04	01.6
5	Secunderabad	25	09.7
6	Serilingampally	25	09.7
Total		258	100.0

Source: Greater Hyderabad Municipal Corporation (GHMC), April, 2020

The spatial distribution of COVID -19 cases showed that, less number of COVID-19 cases are in north –eastern and south eastern spread L.B nagar zone. The inner core Secunderabad zone has only 25 cases, though it recorded first COVID-19 positive case (fig 2).



Source: Greater Hyderabad Municipal Corporation (GHMC), April, 2020

Fig 2

6. Zone Wise Distribution of Covid -19 Cases In July 2020

Out 16,114 positive COVID-19 cases 4,901 are from Khairathabad zone only and it's constituted of 30.4% of total cases as of 16th July 2020

In Greater Hyderabad (table 2). Secunderabad zone have recorded with second highest positive COVID -19. The 6% cases are in Serilingampally zone.

The Kukatpally zone with 4.4% cases is in least number of positive COVID-19 cases.

Table 2: Zone Wise COVID-19 Cases – April-2020

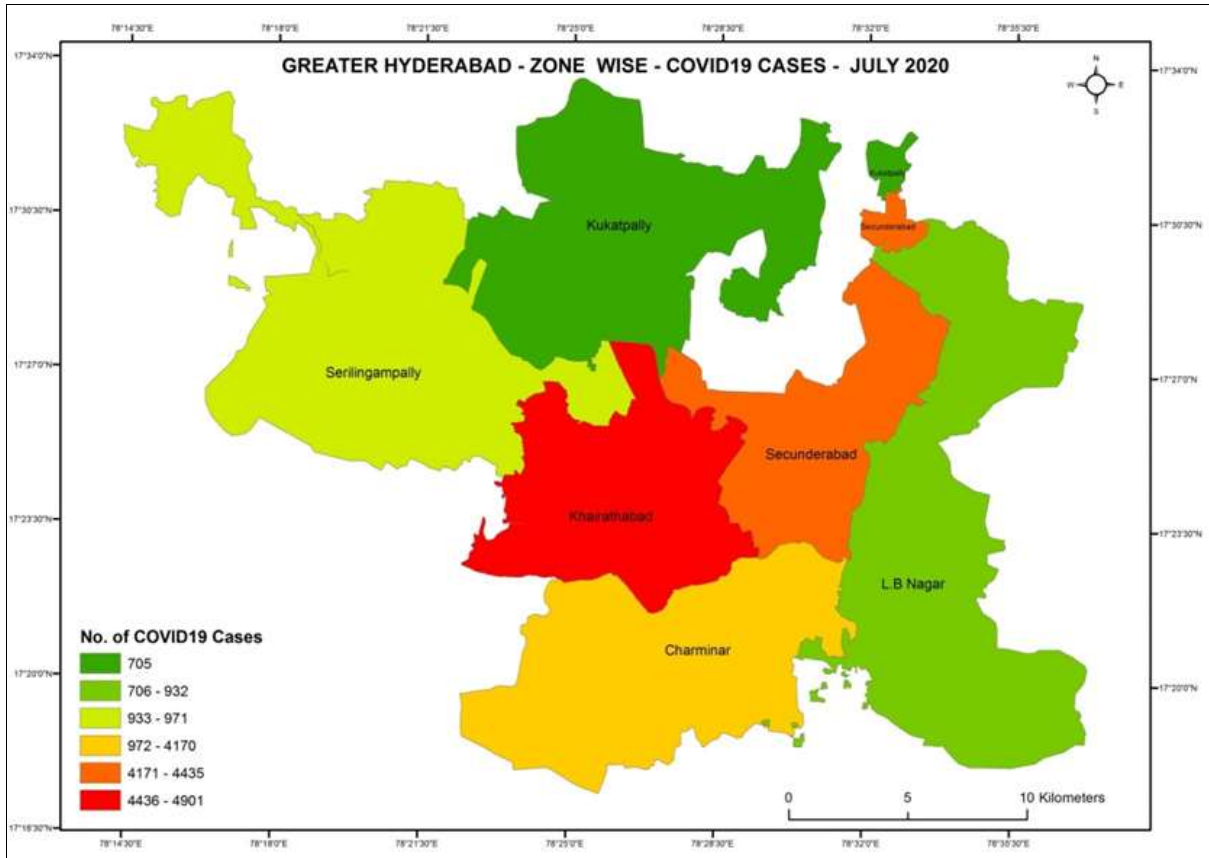
S.No	ZONE	Total COVID-19 Cases	Percentage (%)
1	Charminar	4170	25.9
2	Khairathabad	4901	30.4
3	Kukatpally	705	04.4
4	L.B. Nagar	932	05.8

5	Secunderabad	4435	27.5
6	Serilingampally	971	06.0
Total		16114	100

Source: Greater Hyderabad Municipal Corporation (GHMC), April, 2020

The spatial distribution pattern of COVID-19 cases shows that, highest numbers of cases are spread in the old city of Hyderabad consisting of Khairatabad, Secunderabad and

Charminar zones (fig 3). Outer peripheral zones Kukatpally, Serilingampally and L.B Nagar zones have less number of COVID-19 cases.



Source: Greater Hyderabad Municipal Corporation (GHMC), April, 2020

Fig 3

7. Circle Wise Distribution of Covid -19 Cases in April 2020

Out of 30 circles L.B Nagar and Hayath nagar circle did not recorded

single positive COVID-19 cases as on 15th April, 2020. The Malakpet and Mehadipatnam circles have 71 COVID -19 cases out of 258 cases, which constitute of 27.5% (table 3).

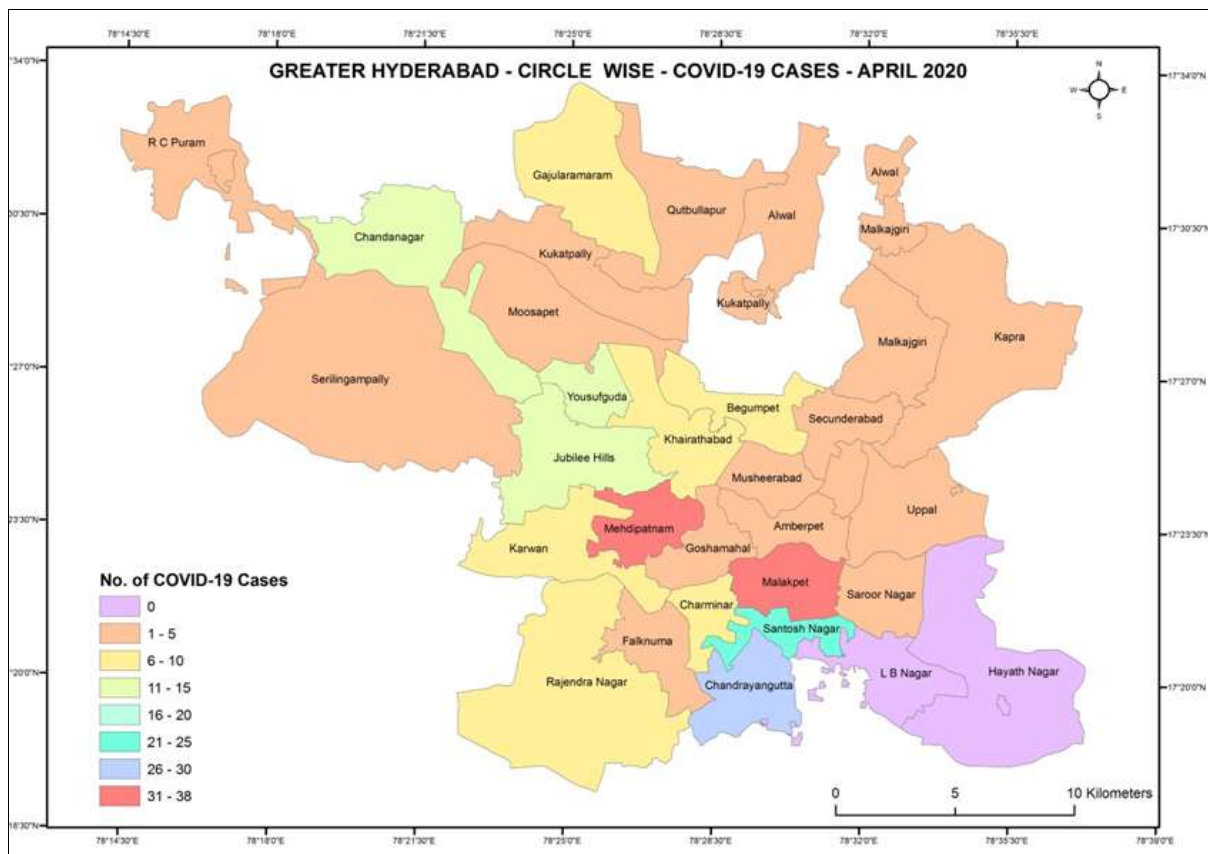
Table 3: Zone Wise COVID-19 Cases – April-2020

S.No	COVID-19 Cases	No. of Circles	Total COVID-19 Cases	Percentage (%)
1	0	02	0	0
2	01-05	14	30	11.6
3	06 - 10	06	49	19.0
4	11 - 15	03	38	14.7
5	16 - 20	01	16	06.2
6	21 - 25	01	25	09.7
7	26 - 30	01	29	11.2
8	31 - 38	02	71	27.5
Total		30	258	100.0

Source: Greater Hyderabad Municipal Corporation (GHMC), April, 2020

The circle wise pattern of prevalence of COVID-19 cases revealed that, outer peripheral circles in south- eastern part of city

Is not being affected by COVID-19 and north-east, north and south-east circles are recorded only less number of cases (fig 4)



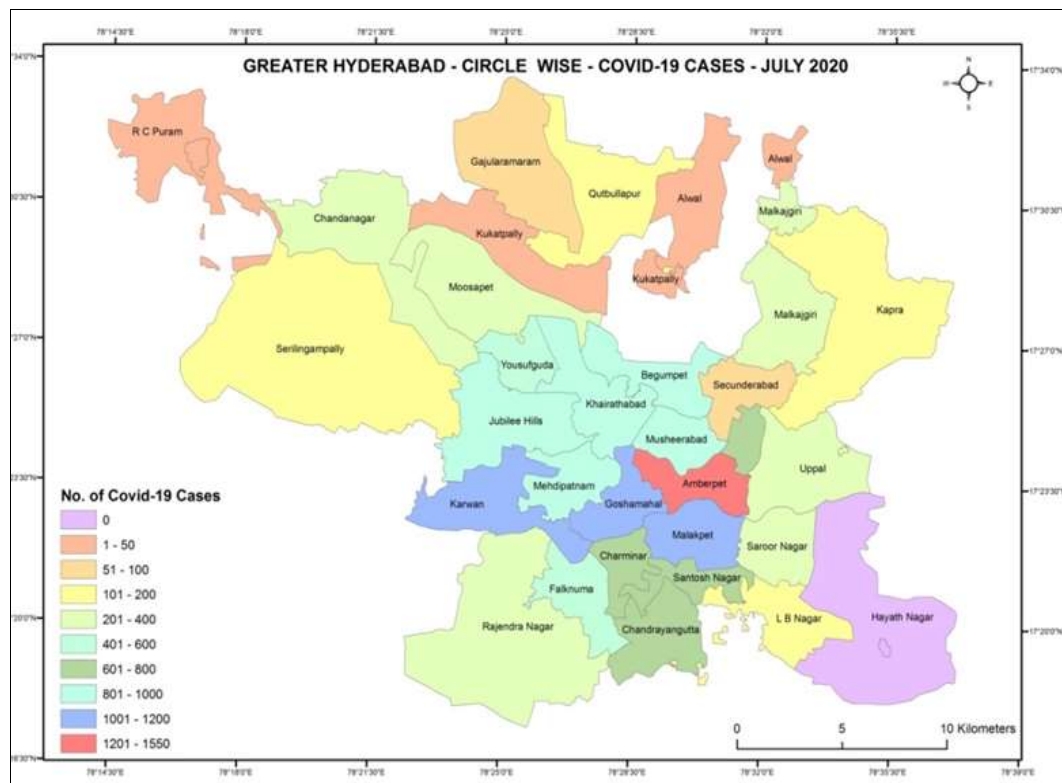
Source: Greater Hyderabad Municipal Corporation (GHMC), April, 2020

Fig 4

8. Circle Wise Distribution of Covid -19 Cases in July 2020

The spatial pattern of distribution of positive COVID-19 cases in 30 circles

of Greater Hyderabad shown that, peripheral circles in north-east Alwal circle and north-west R. C. Puram circle have less than 50 COVID-19 cases. Highest cases are in city’s inner core circle (fig 5).



Source: Greater Hyderabad Municipal Corporation (GHMC), July, 2020

Fig 5

Out of 16,114 COVID-19 cases, amberpet circle have 1,550 cases and constitute of 9.6% in of COVID-19 cases in Greater Hyderabad (table 4). COVID-19 presence not seen in Hayath nagar.

Table 4: Zone Wise COVID-19 Cases – April-2020

S.No	COVID-19 Cases	No. of Circles	Total COVID-19 Cases	Percentage (%)
1	0	01	0	0
2	01-50	02	44	0.3
3	51-100	01	82	0.5
4	101-200	05	743	04.6
5	201-400	06	1796	11.0
6	401-600	02	1096	06.8
7	601-800	04	2878	18.0
8	801-1000	05	4543	28.0
9	1001-1200	03	3382	21.0
10	1201-1550	01	1550	9.6
Total		30	16114	100.000

Source: Greater Hyderabad Municipal Corporation (GHMC), July, 2020

Out of 30 circles only two circles have less than 50 cases and constitute only 0.3% of COVID -19 cases city. 21% cases are recorded in Malakpet, Goshamahal and Karwan circles, have 3,382 COVID-19 cases.

9. Conclusion

The spatial analysis of pandemic COVID-19 in Greater Hyderabad revealed that, there is more than 5 times of cases register in July 2020 as compared with April, 2020. The zone wise analysis shown that, majority of COVID-19 cases are in central and southern zones whereas circle wise analysis revealed that, majority of cases are in the inner core circles of the city. The Hayatha Nagar circle did not registered any cases in in April and July 2020. The Spatio-temporal analysis of prevalence of diseases will be great use in identifying the disease spread pattern and tracking. The study can be of great significance in providing directions for formulating the policy implications for making Hyderabad city a better place to live in and combat pandemic COVID-19.

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