International Journal Dental and Medical Sciences Research
Volume 4, Issue 3, May-June 2022 pp: 363-368 www.ijdmsrjournal.com ISSN: 2582-6018

A Comparative Analysis of Covid'19 Pandemic Situation in Chennai Region among the Three Potential Periods (2020, 2021 And 2022), Tamilnadu, India

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Date of Submission: 25-05-2022 Date of Acceptance: 06-06-2022

Abstracts
The present study was undertaken to know the condition of Covind'19 pandemic starting from the potential period of 2020 to 2022 by analysing the secondary data in Chennai region. The data was collected from the internet sources Greater Chennai Corporation- twitter.com/Chennai corp/status. When the pandemic data analysed from the Chennai region for three years from 2020 to 2022 with random sampling of secondary data covering the zonal region of Thiruvottiyur, Manali, Madhavaram, Tondiarpet, Royapuram, Thiru Vi Ka Nagar, Ambatore, Annanagar, Teynampet, Kodampakkam, Valasaravakkam, Alandur, Adyar, Perungudi and Sholiganallur, the percentage of death rate among the total cases in the respective zones was reported to be reduced in Thiruvottiyur (2.16 – 1,23%), Manali (1.26 – 0.62%), Tondiarpet (1.87 – 1.21%), Royapuram (1.71 – 1.2%) and Teynampet (2.1 – 1.42%) and it was fluctuated in the remaining zones. When the percentage of recovered cases analysed among the total pandemic cases reported zone wise, it was found to reduce from 71% to 99% over the period of three years from 2020 to 2022. When the percentage of active reported cases analysed, it was reported to be reduced from 54 to 0.2% in overall all the zones compared. It is predicted from the analysis of the data that there is an impact through the vaccination programme.

I. INTRODUCTION

The World was gripped by a pandemic over the first half of 2020 and identified as a new coronavirus (severe acute respiratory syndrome coronavirus 2, or SARS-CoV-2), and later named as Coronavirus Disease-19 or COVID-19 (Qiu, et al., 2020). COVID-19 has originated in the city of Wuhan in the Hubei province of China and spread rapidly across the world, resulting in a human tragedy and tremendous economic damage. The pandemic incidence of Covid'19 has engulfed many human lives for the period of three years from 2019 to 2022. As well aware, first case of pneumonia was discovered on December 8, 2019 from Wuhan market in China and first death case was announced from China on 11 January, 2020 followed by Nepal, France, Australia, Malaysia, Singapore, South Korea, Vietnam, Taiwan and USA in 13 January,2020 and later the human death has been intensified all over the world (Dong, et.al.,2020; Farboodi, et. Al., 2020 and Zhu, et.al., 2020). WHO declares on 13 March, 2020 that Covid'19 has become pandemic. By mid June of 2020, 4,36,000 death cases were reported over 8 million cases of Covid'19. Earlier many researchers opined that large scale global pandemic was inevitable (Madhav, et.al., 2017; Fan,et.al.,2018; Guerrieri, et.al .,2017; Keogh Brown, et.al.,2008; Ferguson, et.al.,2020). To avoid death cases, public health measures of social distancing were intended (Fong,et.al.2020). Non governmental organization (NGO), community centre, school and business have been required to close down and avoiding mass gatherings. Social distancing was announced to be followed strictly in all the mass gathering centres and by travel was allowed only for essential needs.

All parts of the world are experiencing different kinds of epidemics based on the geographical location, weather conditions, social and cultural practices, food pattern and related causes. But, a major pandemic like covid may bring common health problem to the world as a whole because of the mobility of persons from all over the world. In India, the present pandemic situation make common man to have at least a basic knowledge about his/her own health and community health conditions. In Tamilnadu, vaccination campaign had begun in January, 2021 and was getting very slow responses at the early stage. During April, 2021, the state have faced its assembly elections. By the mid of May 2021, the vaccination campaign of Tamilnadu is spreading up with higher vaccination rates. Widespread awareness have been created among the public and vaccination was opened to 18-44 age group who are being the majority of the population.

International Journal Dental and Medical Sciences Research
Volume 4, Issue 3, May-June 2022 pp: 363-368 www.ijdmsrjournal.com ISSN: 2582-6018

This research paper analyses the Covid'19 in Greater Chennai Corporation (GCC) from 2020 to 2022 for three years including North, Central and South regions. It has total 200 divisions and 15 zones within the city and each zone has 10 -15 divisions. Public health strategies are implemented with effect in controlling the Covid'19 pandemic in all the parts of Greater Chennai Corporation. The city has a well-structured public health system with a zonal officer for each of the 15 zones in charge for the surveillance and response during epidemic. Each zone has a dedicated health work force for medical and public health activities. Sanitary officers and sanitary inspectors are the frontline workers for all field based public health activities.

II. MATERIALS AND METHODS

The present work was carried out in analysing the secondary data available from 15 zones of Chennai region from 2020 to 2022 and the available data was collected from the web site twitter.com/chennaicorp/status. Greater Chennai Corporation – Covid'19 positive cases 30.6.2020, 30.8.21 and 30.3.2022. Thiruvottiyur, Manali, Madhavaram, Tondiarpet, Royapuram, Thiru Vi Ka Nagar, Ambatore, Annanagar, Teynampet, Kodampakkam, Valasaravakkam, Alandur, Adyar, Perungudi and Sholiganallur are the zones of Chennai region undertaking for the present study. The present study was aimed to concentrate the intensification of Covid'19 pandemic spread during the period of three years from 2020 to 2022 since Chennai is the place where the population density is more and containment zones were identified to evolve the proper measures to control the spread of Covid'19 infection.

Timely and reliable data inform the world how the disease is spreading and what impact the pandemic has on lives of people around the world and whether the counter measures taken are successful or not (Roser et al., 2020). At the world level Research and Educational purposes the data are accumulated by the Centre for Systems Science and Engineering at John Hopkins University. The data base provides the numbers as well as visual maps of COVID 19 cases across the world (Dong et al., 2020). The data are corroborated with the WHO's the Centre for Disease Control (CDC) in US and the European Centre for Disease Control (ECDC). Likewise the data for the present study is taken from Greater Chennai Corporation surveillance database and COVID 19 portal of GCC. This data makes the covid'19 cases among the vital periods of three years periods with progression of reduction of cases in Greater Chennai Corporation regions by implementing various methodologies to control and eradicate the covid'19 cases. There are 181 vaccination centres segregated in various division of Greater Chennai Corporation zones. The Urban Community Health Centres are allowed to vaccinate to 1) the students who have to undertake foreign travel for the purpose of education and 2) the persons who have to travel to foreign countries for employment and ante-natal and post-natal mothers (COVID'19 portal@GCC). The result of the data is predicted in tables 1-3.

III. RESULTS AND DISCUSSION

Among the recovered covid'19 cases reported as on 30.06.2020 (Table 1), Royapuram, Tondiarpet, Teynampet, Kodampakkam, Annanagar and Thiru Vi Ka Nagar were found to have higher recovered cases compared to other zones as 5534 with 70%, 4647 with 71%, 3702 with 60%, 3659 with 63%, 3018 with 50% and 2917 with 63% followed with the cases recovered in the remaining zone ranged between 651 with 45% and 1901 with 55% in Alandur and Adyar, respectively. In the death cases reported, Royapuram, Tondiyarpet and Teynampet were found to have higher number of death cases as 135 with 1.71%, 122 with 1.87% and 130 with2.1% followed with the remaining zones ranged between 7 with 0.6% and 74 with 1.27%, respectively. Among the percentage of death cases reported, Thiruvottiyur, Teynampet and Thiru Vi Ka Nagar were found to contain higher percentage of death as 2.16%, 2.1% and 1.99%, respectively. Among the active cases reported, Annanagar, Teynampet, Royapuram and Kodampakkam were reported to have higher active cases compared with other remaining zones as 2946 with 49%, 2363 with 38%, 2212 with 28% and 2094 with 36%, respectively followed with other remaining zones. It is predicted that recovered, death and active cases were reported to be more in Royapuram, Tondiarpet, Annanagar, teynampet and Kodampakkam followed by other remaining zones.

Among the recovered covid'19 cases reported as on 30.08.2021 (Table 2), the zones of Annanagar, Kodambakkam, Teynampet, Adyar, Ambatore and Thiru Vi Ka Nagar were found to have higher recovered cases compared to other zones as 55709, 52517, 49673, 44891,42783 and 41307 with 98% over all recovery followed with the cases recovered in the remaining zone ranged between 8004 and 37788, respectively. It is pertinent to highlight that 98% recovery cases was reported during the year 2021 as on the date specified, where the recovery cases were poor in the year of 2020 and it may due to intensifying awareness as well as vaccination programmes. In Manali and Sholinganallur, the recovery rate was

achieved 99%. In the death cases reported, Annanagar, Teynampet, Kodampakkam and Thiru Vi Ka Nagar were found to have higher number of death cases as 971 with 1.71%, 961 with 1.89%, 939 with with 1.75% and 852 with 2.02% followed with the remaining zones ranged between 77 with 0.95% and 676 with1.48%.respectively. Among the percentage of death cases reported, it was found to be fluctuated in all the 15 zones of Chennai region ranged between 0.85% and 2.02%. In Thiru Vi Ka Nagar, Teynampet and Kodampakkam were found to contain higher percentage of death as 2.02%, 1.89% and 1.75%, respectively. Among the active cases reported, Alandur, Kodampakkam, Annanagar, Adyar and Teynampet were reported to have higher active cases compared with other remaining zones as 192 with 0.8%, 183 with 0.3%, 178 with 0.3%, 164 with 0.4% and160 with 0.3%,respectively followed with other remaining zones. It is predicted that recovered, death and active cases were reported to be more in Annanagar, teynampet and Kodampakkam, Thiru Vi Ka Nagar and Ambatore followed by other remaining zones. It is found that Manali and Sholinganallur were found to have low death rate.

Among the recovered covid'19 cases reported as on 30.03.2022 (Table 3), the zones of Annanagar, Kodambakkam, Teynampet, Adyar, Ambatore, Thiru Vi Ka Nagar and Royapuram were found to have higher recovered cases compared to other zones as 78124, 73652, 73075, 68305, 57348,55791 and 50806 followed with the cases recovered in the remaining zone ranged between 12845 and 49738, respectively. It is pertinent to highlight that 99% recovery cases was reported during the year 2022 as on the date specified, where as the recovery case was 98 and 99% in the year of 2020. It has been increased from year 2022 upto 99%. It may due to intensifying awareness as well as vaccination programmes in between the years. In the death cases reported, Annanagar, Teynampet, Kodampakkam were found to have higher number of death cases as 1051 with 1.3%, 1049 with1.42% and1031 with 1.38% followed with the remaining zones ranged between 80 with 0.62% and 911 with 1.61%, respectively. Among the percentage of death cases reported, it was found to be fluctuated in all the 15 zones of Chennai region ranged between 0.57 and 1.61. But, the higher death percentage was noticed in Thiru Vi Ka Nagar, Teynampet and Kodampakkam as 1.61, 1.42 and 1.38, respectively. Among the active cases reported, Adyar, Teynampet and Annanagar were reported to have higher active cases compared with other remaining zones as 21, 19 and 10, respectively followed with other remaining zones. It is predicted that recovered, death and active cases were reported to be more in Annanagar, teynampet and Kodampakkam followed by other remaining zones. But, the percentage of active cases was reported to be nil.

When the Covid'19 data collected and analysed for three consecutive years from 2020 to 2022, it denoted that the range of recovered cases between 527 and 5534 and its percentage between 45 and 71 in 2020, between 8004 and 55709 with the percentage of 98 except Manali and Sholinganallur registered as 99 percentage in 2021 and between 12845 with 78124 with the overall recovered percentage of 99. Death cases could also be differed over the period of three years and it has become sharply declined in accordance with intensifying the vaccination passing over two doses covering adolescent and adult groups and continuation of spreading awareness over the spread of this virus by adopting different kind of methodologies such as proper masking, sanitising the hand washing quite often and avoid over crowding and creation of medication in all most all the hospitals by clearing ice break among the people, etc. As per the data over the three years period, the range of death cases were seemed to be 7 and 130 with the percentage range of 0.6 and 2.16 in 2020, 77 and 971 with the range of percentage as 0.55 and 2.02 in 2021 and 80 and 1051 with the percentage range of 0.57 and 1.61 in 2022. In active cases, it was seemed to have with the range of 410 and 2946 with the range of percentage as 27 and 53 in 2020, 13 and 183 with the percentage range of 0.2 and 10.8 in 2021 and 1 and 19 with the zero percentage in 2022.

It is concluded from this study that among the recovered cases, the maximum case was obtained as 5534 with the percentage of 70 in 2020, as 55709 with the percentage of 98 in 2021 and 78124 with the percentage of recovered cases as 99 in 2022. It is predicted from this data that the maximum number of cases were recovered only during the period of 2022 and there was a sharp increase of recovered cases up to 99 percentage. When the death cases analysed, maximum death case was noticed as 135 with the percentage of 2.16 in 2020, 971 with the percentage of 2.02 in 2021 and 1051 with the percentage of 1.61 in 2022. The percentage of death was seemed to be reduced from 2.16 to 1.61. In active cases, the maximum number of 2946 with 53% in 2020, 192 with 0.8% in 2021 and 19 with zero percentage in 2022 was recorded. It is predicted that the active cases were likely to be reduced from 2946 to 19 with the percentage from 53 to zero.

As per the recent (2022) data from India, 1,928,974,137 total doses of vaccination have been administered and 139.78 total doses have been administered per 100 population. 44,083,024 persons were received booster or additional doses and 3.19 persons were boosted per 100. There have been 521,920,560 confirmed COVID'19 cases including 6,274,323 deaths were reported (WHO) as on May 20, 2022. As of May 16, 2022, a total of 12,186,798 vaccine doses were administered. As of May 20, 2021, a total of 17,80,217 people were vaccinated, out of which 22,910 were vaccinated in Chennai region. As of May 6, 2022, a total of 37,11,688 people were vaccinated (The Times of India – May 6,2022). It is reported from globe wise that 65.7% of the world population has so far received at least one dose of a COVID'19 vaccines and 11.76 billion doses were administered globally. Out of which, 7.13 million doses have been administered each day and 15.9% of people have been administered at least one dose from low income countries. It is judged that the system planned for the protection of people from the Covid'19 pandemic virus is worked well.

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International Journal Dental and Medical Sciences Research
Volume 4, Issue 3, May-June 2022 pp: 363-368 www.ijdmsrjournal.com ISSN: 2582-6018

Table 1 showing the status Covid'19 cases in Greater Chennai Corporation Zones as on 30.06.2020

S.No.	Name of the Zone	Recovered cases		Deaths		Active cases	
		In Number	In Percentage	In Number	In Percentage	In Number	In Percentage
1.	Thiruvettiyur	1145	52	48	2.16	1027	46
2.	Manali	527	56	12	1.26	410	43
3.	Madhavaran	922	51	20	1.1	877	48
4.	Tondiarpet	4647	71	122	1.87	1770	27
5.	Royapuram	5534	70	135	1.71	2212	28
6.	Thiru Vi Ka Nagar	2917	63	93	1.99	1656	35
7.	Ambatore	1370	59	25	1.08	929	40
8.	Annanagar	3018	50	69	1.14	2946	49
9.	Teynampet	3702	60	130	2.1	2363	38
10.	Kodambakkam	3659	63	74	1.27	2094	36
11.	Valasaravakkam	1494	57	26	1	1081	42
12.	Alandur	651	45	16	1.12	764	53
13.	Adyar	1901	55	44	1.28	1500	44
14.	Perungudi	666	52	16	1.24	608	47
15	Sholinganallur	671	57	7	0.6	490	42

Source: Greater Chennai Corporation-Covid'19 positive cases 30.06.2020. Twitter.com/Chennai corp/status

Table 2 showing the status Covid'19 cases in Greater Chennai Corporation Zones as on 30.08.2021

S.No.	Name of the Zone	Recovered cases		Deaths		Active cases	
		In Number	In Percentage	In Number	In Percentage	In Number	In Percentage
1.	Thiruvettiyur	14959	98	255	1.67	38	0.2
2.	Manali	8004	99	77	0.95	32	0.4
3.	Madhavaran	20307	98	252	1.22	90	0.4
4.	Tondiarpet	35277	98	543	1.51	100	0.3
5.	Royapuram	37788	98	589	1.53	69	0.2
6.	Thiru Vi Ka Nagar	41307	98	852	2.02	104	0.2
7.	Ambatore	42783	98	671	1.54	114	0.3
8.	Annanagar	55709	98	971	1.71	178	0.3
9.	Teynampet	49673	98	961	1.89	160	0.3
10.	Kodambakkam	52517	98	939	1.75	183	0.3
11.	Valasaravakkam	35612	98	463	1.28	156	0.4
12.	Alandur	24610	98	377	1.50	192	0.8
13.	Adyar	44891	98	676	1.48	164	0.4
14.	Perungudi	25494	98	359	1.38	122	0.5
15	Sholinganallur	16445	99	141	0.85	63	0.4

Source: Greater Chennai Corporation-Covid'19 positive cases 30.08.2021. Twitter.com/Chennai corp/status

International Journal Dental and Medical Sciences Research
Volume 4, Issue 3, May-June 2022 pp: 363-368 www.ijdmsrjournal.com ISSN: 2582-6018

Table 3 showing the status Covid'19 cases in Greater Chennai Corporation Zones as on 30.03.2022

S.No.	Name of the Zone	Recovered cases		Deaths		Active cases	
		In Number	In Percentage	In Number	In Percentage	In Number	In Percentage
1.	Thiruvettiyur	20976	99	262	1.23	3	0
2.	Manali	12845	99	80	0.62	2	0
3.	Madhavaran	28343	99	271	0.95	2	0
4.	Tondiarpet	46501	99	570	1.21	4	0
5.	Royapuram	50806	99	615	1.2	5	0
6.	Thiru Vi Ka Nagar	55797	99	911	1.61	2	0
7.	Ambatore	57348	99	748	1.29	1	0
8.	Annanagar	78124	99	1051	1.33	10	0
9.	Teynampet	73075	99	1049	1.33	19	0
10.	Kodambakkam	73652	99	1031	1.38	10	0
11.	Valasaravakkam	49738	99	513	1.02	8	0
12.	Alandur	34798	99	414	1.11	8	0
13.	Adyar	68305	99	744	1.08	21	0
14.	Perungudi	39993	99	388	0.96	4	0
15	Sholinganallur	26407	99	152	0.57	10	0

Source: Greater Chennai Corporation-Covid'19 positive cases 30.03.2022. Twitter.com/Chennai corp/status