IMPACT OF PANDEMIC ON MORTALITY TRENDS IN TAMIL NADU 2019-2022

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Abstract

INTRODUCTION : Mortality statistics are needed to estimate the measures of health among the population. It helps to understand differentials in population health among different sub groups in the population (1). The trend of mortality is liable to change during a pandemic and there was increase in number of deaths due to COVID-19. This study is done to determine the mortality trends noted in Tamil Nadu from 2019-2022.

OBJECTIVES : The objectives is to determine the trend in all-cause mortality among total population from 2019-2022 and to determine whether there is any difference in mortality among different age groups, genders and among districts for the years 2019-2022

METHODOLOGY : It was descriptive study from the Civil Registration System data of Tamil Nadu from 2019-2022. Data were collected in excel sheet and calculated mortality rates for total population, both genders, different age groups and by districts for the year 2019-2022.

RESULTS : We analysed all mortality records from 2019-2022. A peak in the all-cause mortality (11.44/1000 population) was noted during the COVID-19 Pandemic (2021) which started to decline Post COVID-19 in 2022 (9.07/1000 population), although the mortality was slightly higher compared to Pre COVID-19 period (2019). Similar pattern was observed in both gender. Male mortality was higher than Female mortality in all four years. Among Age groups, there was a drastic increase of mortality in 60 plus age group during COVID-19 (57/1000 population). All-cause mortality was high in Thanjavur district (10.2/1000 population) during 2019 while the mortality was high in Coimbatore during 2021 (14.4/1000 population) and 2022(11.6/1000 population).

CONCLUSION : All-cause mortality had a significant increase in COVID period and the effect is noted in Post COVID period. Gender specific mortality trend is higher in male compared to Female population in Tamil Nadu. Age specific mortality is higher in 60+ age group and it peaked up during 2021 which might be due to the effect of Pandemic. District specific mortality is noted to be higher in Coimbatore during and following COVID-19.

KEY WORDS : Pandemic, Covid19, Mortality

INTRODUCTION

Mortality statistics are needed to estimate the measures of health among the population. It helps to understand differentials in population health among different sub groups in the population.[1] The global burden of disease assessment begins with precise estimation of the number of deaths in each age and sex group. The data of mortality at different age groups is an important catalyst for public policy action.[2] The mortality rates have increased during the COVID-19 period especially in 2021. In 2021, there were about 8.72 deaths per 1,000 persons worldwide.[3] In India the first case of COVID-19 was reported on 27th January 2020.[4] In Tamil Nadu the first case of COVID-19 was reported on 7th March 2020.[5] There was scarce studies noted assessing the mortality of region or country or state before and after a pandemic. Analysing the mortality trends by age groups, gender and district may give valuable insights for public health interventions. This study is done to determine the mortality trends noted in Tamil Nadu from 2019-2022.

OBJECTIVES

To determine the trend in all-cause mortality among total population from 2019-2022. To determine whether there is any difference in mortality among different age groups, genders and among districts for the years 2019-2022.

METHODOLOGY

The study design was a descriptive study of the mortality in Tamil Nadu State for the period 1st January 2019 -31st December 2022. The study population taken for this study is all registered deaths in Civil Registration System (CRS) of Tamil Nadu. We included all deaths reported in Civil Registration System during the 2019-2022.

OPERATIONAL DEFINITIONS : We defined all-cause

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mortality rate as deaths during data period (2019-2022) due to all causes divided by total enumerated population

We defined gender specific mortality rate as deaths during data period (2019-2022) due to all causes of the particular gender divided by enumerated population of the same gender

We defined age group specific mortality rate as deaths during data period (2019-2022) due to all causes of the by total enumerated population

We defined district specific mortality rate as deaths during data period (2019-2022) due to all causes of the by total enumerated population of the district

SAMPLE SIZE : We considered all deaths reported during the study data periods for analysis.

DATA COLLECTION PROCEDURE : We collected the mortality data from Civil Registration System software from State Bureau of Health intelligence & population data maintained at statistical division of Public Health Department as enumerated from Census 2011. Both data collected and compiled using excel sheets.

DATA ANALYSIS : We calculated all-cause mortality, gender specific mortality, Age group wise mortality & district wise mortality using proportions for each category of mortality. We used Excel Software for analysis

HUMAN SUBJECT PROTECTION

Our study got approved by Institutional Ethics Committee of Tamil Nadu Public Health department; we maintained privacy and confidentiality in such a way that no personal data was used or revealed during analysis or report preparation & presentation

RESULTS

All-cause mortality rate of total population was 8.42/ 1000 population in 2019 which peaked to 11.44 / 1000 population in 2021 during Covid-19 Pandemic is statistically significant and started decreasing to 9.07 per 1000 population in 2022. The same peak is noted in gender specific mortality rate for both male (13.38/1000 population) and female (9.50/1000 population) during 2021 same as all-cause mortality while it is slightly higher for Male compared to Female. (Table 1)

Age group specific mortality of 0-18 years was almost 1/1000 population for all three years (2019,2021 &2022) which had a slight decrease in 2020 0.9/1000 population. Age group specific mortality of 19-45 years was 2.5 /1000 population on 2019,2020 & 2022 and 2.9 /1000 population on 2021. Age group specific mortality of 46-60 years was 10/1000 population on 2019, 11.2/1000 population on 2020

& 10.5/1000 population 2022 and 13.9 /1000 population on 2021. Age group specific mortality of above 60 years was 40.4/1000 population on 2019, 44.1/1000 population on 2020 & 45/1000 population on 2022 and 57 /1000 population on 2021(Chart 1).

Table 1 : All-cause mortality of total population and both genders

Year	Total Mortality rate		Mortality rate by gender	
	Mortality rate	Confidence Intervals	Mortality rate (Male)	Mortality rate (Female)
2019	8.42	8.40 - 8.44	10.02	6.81
2020	9.08	9.06 - 9.10	10.79	7.36
2021	11.44	11.42 - 11.47	13.38	9.50
2022	9.07	9.06 - 9.10	10.61	7.54

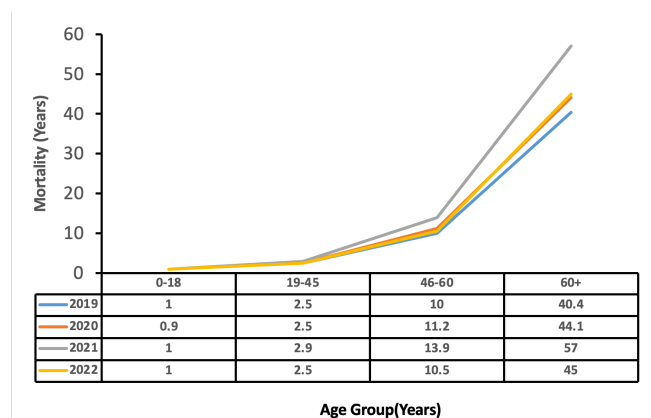|	0-18	19-45	46-60	60+
2019	1	2.5	10	40.4
2020	0.9	2.5	11.2	44.1
2021	1	2.9	13.9	57
2022	1	2.5	10.5	45

Figure 1 : Mortality rate among various age groups

All-cause mortality in districts was high in Thanjavur district (10.2/1000 population) followed by Madurai(9.9/1000 population), Tiruchirapalli (9.8/1000 population), Perambalur & Coimbatore (9.7/1000 population) in 2019. The mortality was lowest in Thiruvallur (5.6/1000 population) followed by Chengalpattu (6.0/1000 population) & Tiruppur(6.5/1000 population) in 2019. All-cause mortality in districts was high in Madurai district (10.7/1000 population) followed by Tirunelveli (10.5/1000 population), Perambalur & Thanjavur (10.4/1000 population) in 2020. The mortality was lowest in The Nilgris (6.4/1000 population) followed by Tiruppur (7.6/1000 population) &Thiruvallur(7.7/1000 population)in 2020.All-cause mortality in districts was high in Coimbatore (14.4/1000 population) followed by Madurai (13.6/1000 population) & Erode (12.8/1000 population) in 2021. The mortality was lowest in Nilgris (8.1 /1000 population) followed by Thiruvallur (8.8/1000 population) & Nagapattinam (9.4/1000 population) in 2021. All-cause mortality in districts was high in Coimbatore district (11.6/1000 population) followed by Tirunelveli

(11.1/1000 population), Vellore (10.8/1000 population) & Madurai (10.7/1000 population) in 2022. The mortality was lowest in Thiruvallur (7.3/1000 population) followed by Nilgris (7.4/1000 population) & Krishnagiri (7.6/1000 population) in 2022. (Table 2)

Table 2 : Mortality rate among districts

District	Mortality Rate by Districts			
	Years			
	2019	2020	2021	2022
ARIYALUR	9.7	9.9	11.5	9.1
CHENGALPATTU	6.0	9.8	12.1	8.7
KANCHEEPURAM				10.4
CHENNAI	9.5	8.7	12.6	9.3
COIMBATORE	9.7	10.0	14.4	11.6
CUDDALORE	6.8	7.9	9.6	7.8
DHARMAPURI	8.1	8.2	10.0	8.1
DINDIGUL	9.1	9.0	11.5	8.9
ERODE	9.5	9.6	12.8	10.4
KANNIYAKUMARI	7.8	8.0	10.6	9.2
KARUR	8.8	9.4	12.1	9.6
KRISHNAGIRI	6.7	7.8	9.6	7.6
MADURAI	9.9	10.7	13.6	10.7
MAYILADUTHURAI	7.3	8.3	9.4	8.1
NAGAPATTINAM				8.0
NAMAKKAL	8.2	8.4	10.6	8.5
PERAMBALUR	9.7	10.4	12.2	9.2
PUDUKKOTTAI	9.0	9.3	11.0	8.8
RAMANATHAPURAM	7.9	8.5	10.1	8.3
SALEM	8.5	9.1	12.7	9.4
SIVAGANGA	9.2	9.9	12.1	9.6
TIRUNELVELI	9.6	10.5	11.7	11.1
TENKASI				9.0
THANJAVUR	10.2	10.4	12.7	10.3
THE NILGIRIS	7.0	6.4	8.1	7.4
THENI	8.5	9.4	11.5	9.4
THIRUVALLUR	5.6	7.7	8.8	7.3
THIRUVARUR	9.5	9.6	11.6	9.0
THOOTHUKKUDI	8.8	8.7	10.7	8.4
TIRUCHIRAPPALLI	9.8	10.1	12.5	9.8
TIRUPPUR	6.5	7.6	10.4	8.5
TIRUVANNAMALAI	8.3	8.8	10.2	8.1
VELLORE	8.1	8.8	11.0	10.8
RANIPET				7.5
TIRUPATHUR				7.1
VILLUPURAM	7.8	8.8	9.5	7.5
KALLAKURICHI				6.8
VIRUDHUNAGAR	9.4	9.4	11.3	9.6

DISCUSSION

The overall mortality is higher (11.44/1000 population) in 2021 during the COVID period and the post COVID effect is also seen as the mortality rate is slightly higher in 2022 (9.08/1000 population) compared to 2019 (8.42/1000 population). The mortality noted in Tamil Nadu follows the pattern seen in most countries, with higher rates of mortality among men than women.[6] A study done in Tamil Nadu also has revealed the same that the mortality is higher among men compared to women.[6] The mortality by age group is higher in above 60 years (57 /1000 population) especially during the COVID period (2021) and it is the one age group which has increased drastically during the COVID period and the post COVID effect is also seen in 2022 (45 /1000 population) compared to 2019 (40.4/1000population). It was noted in a study that People less than 65 years old have 16–100 fold lower risk of COVID-19 deaths than older people.[7] Among district specific mortality it was noted that during 2019 it was high in Thanjavur (10.2/1000 population), 2020 it was higher

in Madurai district (10.7/1000 population), 2021 it was higher in Coimbatore (14.4/1000 population) &2022 it was higher in Coimbatore district (11.6/1000 population). The pattern is almost same in most of the districts. The mortality has peaked in 2021 and started to decrease in 2022 with post COVID effect. Coimbatore district is having the highest mortality compared to other districts during 2021-2022.

CONCLUSION

All-cause mortality had a significant increase in COVID period and its effect is noted in Post COVID period. Gender specific mortality trend is higher in male compared to Female population in Tamil Nadu and the trend has been same during COVID-19. Age specific mortality is higher in 60 plus age group and it peaked up during 2021 which might be due to the effect of Pandemic. District specific mortality is noted to be higher in Coimbatore during and following COVID-19 and it is lower in the Nilgris district during COVID-19

RECOMMENDATION

Cause specific mortality analysis has to be done for these four years to identify the specific causes specifically for mortality among elderly and other age groups. Gender specific Cause of death must be analysed especially in male gender to identify the specific reasons for increased male gender mortality. The districts with higher mortality rates are to be analysed more to identify the reasons for increased mortality.

LIMITATIONS

The data was taken from deaths registered in Civil Registration System. There might be a variation in the district specific mortality as the deaths which are registered might be from the same residence or another residence.

CONFLICT OF INTEREST Nil

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