

ORIGINAL ARTICLE - PUBLIC HEALTH

EPIDEMIOLOGY OF REPORTED MUMPS CASES IN
TAMIL NADU, APRIL 2021 TO MARCH 2024*Narmatha K⁽¹⁾, Abinaya P⁽¹⁾, Sankarmani Ramasamy Mathivanan⁽¹⁾, Logaraj M⁽¹⁾**(1) Directorate of Public Health and Preventive Medicine***ABSTRACT**

INTRODUCTION: Mumps is an acute viral illness caused by a paramyxovirus called the mumps virus. Virus is acquired by respiratory droplet transmission. It replicates in the nasopharynx and regional lymph nodes. Incubation period of mumps is usually 16 to 18 days. Variety of causes have been attributed to the recent spike in mumps cases in India, including changing climatic patterns, elevated pollution levels, inadequate preventive measures and weakened immunity. Our study intends to investigate the burden of mumps cases in the last three years and their trend.

METHODS: Mumps cases reported from April 2021 to March 2024, in IHIP-IDSP portal for Tamil Nadu has been collected from the IDSP-IHIP portal and exported to Microsoft Excel. Statistical analysis was done using SPSS 21.0.

RESULTS: Study reported 8 ± 3.14 years as the average age of the mumps cases. Of the reported cases 56.05% of the cases were female, while 43.87% were male. 31% percent of the cases were reported from Chennai. The incidence per lakh population has increased significantly from 0.07 in 2021 to 1.3 in 2024.

CONCLUSION: We conclude that the number of mumps cases has been steadily increasing over the years, with a significant surge in 2024 to suggest that mumps can be included as a notifiable disease in Tamil Nadu to improve surveillance and control measures.

KEYWORDS: Mumps, paramyxovirus, Vaccine Preventable Disease

INTRODUCTION

Mumps virus, which is a paramyxovirus related to parainfluenza, gets transmitted by respiratory droplets. It multiplies in local lymph nodes and nasopharynx. Characteristic parotitis symptoms and additional complications including orchitis and aseptic meningitis are caused by inflammation in contaminated tissues. Incubation period of mumps usually ranges from 16 to 18 days, while it can even extend up to 25 days. Non-specific prodromal symptoms include headache, low-grade fever, myalgia, anorexia, and malaise. The normal presentation of mumps is parotitis, or swelling of the parotid gland, or other salivary gland enlargement that lasts for around five days. Both unilateral and bilateral parotitis are possible.¹

Globally, the most frequent complication of mumps in post-pubertal males is Orchitis, which affects around 30% of unvaccinated and 6% of vaccinated post-pubertal males. Oophoritis, mastitis, pancreatitis, hearing loss, meningitis, and encephalitis are common additional mumps complication, which can occur with or without parotitis or other salivary glands enlargement.¹ Clinical presentation, particularly the presence of parotitis, usually raises suspicions about the diagnosis of mumps. On the other hand, lab testing ought to be done if the mumps is suspected. Viral culture from buccal/oral or urine specimens, or reverse transcriptase-

polymerase chain reaction (RT-PCR) are the two methods used to confirm mumps.¹

Globally, there is a substantial mumps case burden, particularly among countries where the vaccine is not routinely administered. With 100–1,000 cases per 1,00,000 people reported in countries without routine mumps immunization programs, the mumps incidence worldwide is still rather high. India has a high disease burden, as evidenced by the reports²¹ of both cyclic outbreaks and sporadic cases from every part of the nation. According to reports, as of 2012, the incidence of the mumps dropped by 88-97% in countries that provided a single dose of the vaccine and by 62% in nations where routine mumps vaccines were part of national immunisation programs.²

Between September 2009 and November 2014, India's Integrated Disease Surveillance Program (IDSP) recorded 72 mumps outbreaks, totalling 1,564 cases.³ But because IDSP reporting of the mumps is voluntary, many instances may remain unreported, meaning that the true mumps burden in



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India is probably underestimated.³ A variety of causes have been attributed to the recent spike in mumps cases in India, including and preventative measures, changing climatic patterns, elevated pollution levels, and weakened immunity.² Our study intends to investigate the burden of mumps cases in the last three years and the trend.

METHODS

A cross sectional study was conducted from April to June 2024. Data on mumps cases reported from April 2021 to March 2024 were obtained from the Integrated Health Information Portal - Integrated Disease Surveillance Program from Directorate of Public Health, Tamil Nadu. Patients' demographic details and clinical data were obtained from the line listing format of the IDSP Portal, which was kept confidential.

According to Integrated Disease Surveillance Program, Clinical Case of mumps is defined as "Acute onset of unilateral or bilateral tender, self-limited swelling of the parotid or other salivary gland, lasting for two or more days and without other apparent cause".

Laboratory Criteria for Diagnosis included seroconversion or significant (at least fourfold) rise in serum mumps IgG titre as determined by any standard serological assay (or) positive serological test for mumps-specific IgM antibodies. Case Classification included **Suspected**: A case with clinically compatible illness or that meets the clinical case definition without laboratory testing or a case with laboratory tests suggestive of mumps without clinical information.

Probable: A case that meets the clinical case definition without laboratory confirmation and is epidemiologically linked to a clinically compatible case.

Confirmed: A case that meets the clinical case definition or has clinically compatible illness, and is either laboratory confirmed or is epidemiologically linked to a confirmed case. All the collected data were entered into a Microsoft Excel spreadsheet. Each year, the incidence of mumps cases in Tamil Nadu has been calculated independently. Number of mumps reported for the three years, was computed and displayed as time-trend curves. All the analysis was performed by using SPSS version 21.0.

RESULTS

In the study period spanning from April 2021 to March 2024, totally, 1,281 presumptive cases of mumps were documented on the IDSP-IHIP digital platform.

Table 1: Age-wise distribution of mumps cases reported in IHIP-IDSP in Tamil Nadu, April 2021 to March 2024, N=1,281

Age group	n	%
< 5 years	418	32.63
6 to 9 years	507	39.58
10-19 years	132	10.30
20-40 years	36	2.81
41-60 years	139	10.85
>60 years	49	3.83
TOTAL	1281	100.00

Table 1 represents the age group wise distribution of the mumps cases reported. 40% of the cases belonged to the age group of 6 to 9 years, followed by the age group of less than 5 years which is 33%.

Table 2: Gender-wise distribution of mumps cases reported in IHIP-IDSP in Tamil Nadu, April 2021 and March 2024, N=1,281

Gender	n	%
Male	562	43.87
Female	718	56.05
Transgender	1	0.08

Table 2 shows the gender distribution of 1,281 mumps cases recorded in Tamil Nadu between April 2021 and March 2024. 56.05% of the cases were among females and 43.87% among males.

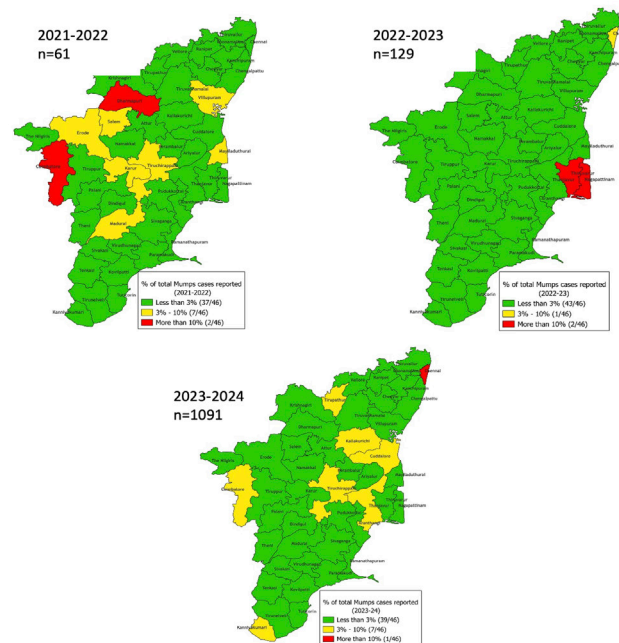


Fig 1: Health Unit District-wise distribution of Mumps cases reported annually in IHIP-IDSP in Tamil Nadu, April 2021 and March 2024, N=1,281

Figure 1 shows that the distribution of mumps cases across districts in Tamil Nadu. In the year 2021 to 2022, totally 61 cases of mumps reported. Coimbatore reported 15% of the total cases and Dharmapuri reported 11% cases. In the year 2022 to 2023, totally 129 cases were reported. Thiruvavur reported 51% of the total cases and Nagapattinam reported 11% of total cases while Chennai reported 4% cases. But there was a sudden surge of 1091 cases in the year 2023 to 2024 with Chennai reporting the highest percentage (27%) and several Health Unit Districts reporting 3 % to 10 % of the total cases.

Table 3: Annual Incidence of Mumps per lakh population in Tamil Nadu as reported by IHIP-IDSP between April 2021 and March 2024, N=1,281

Year	n	Incidence per lakh population
2021-2022	61	0.07
2022-2023	129	0.16
2023-2024	1091	1.30

Table 3 presents data on the incidence of mumps in India from April 2021 to March 2024, highlighting the incidence per lakh population. The incidence per lakh population also reflects this upward trend, increasing from 0.07 in 2021-22 to 1.30 in 2023-24. The incidence rates show a consistent rise, with the most significant jump occurring in 2023-2024.

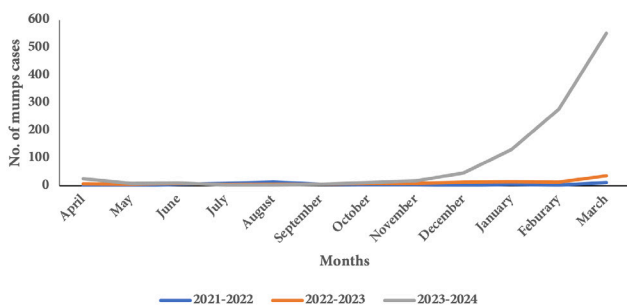


Figure 2: Trends of Mumps in cases reported in IHIP-IDSP in Tamil Nadu, April 2021 to March 2024, N=1281

The graph in Figure 2 displays mumps cases reported from April 2021 to March 2024. In 2021, 2022 and till 2023 the number of reported cases remained quite low, but there was a sharp increase in 2024 which confirms to be an outbreak. The increasing trend and the sharp rise from January to March, 2024 indicate that there may be underlying factors contributing to the higher incidence of mumps, such as changes in environmental conditions, population dynamics, or vaccination coverage which needs to be studied.

DISCUSSION

Mumps is a highly contagious viral disease caused by the mumps virus which exhibits a cyclical trend of outbreaks every 4-5 years, with seasonal variations in incidence with a bimodal distribution.²⁰ Mumps cases are reported daily in real-time on the IDSP-IHIP portal in order to enhance disease surveillance. To comprehend the patterns of mumps in the state of Tamil Nadu, surveillance data was obtained from the IDSP-IHIP site.

Of the 1,281 suspected instances of mumps, the age group with the highest percentage of cases is that of 6 to 9 years old, followed by those under 5 years old. This is in accordance with research conducted in Assam by Sarmah, K. et al.⁹ and in Jaisalmer by Moghe, C.S. et al. (2018).⁵ According to our analysis, more than 50% of the cases reported were females. This is in keeping with research conducted in Odisha by Paul, S. et al. and Rajasthan by Moghe, C.S. et al. However, research from Bhat, U.M. et al. in Kashmir and Raut, C. et al. in Karnataka reveals that men are more frequently affected than women.^{5&11}

Chennai accounted for one-third of the cases reported. This may be because Chennai, the largest and capital city of Tamil Nadu, has a high population density and population migration that can aid in the transmission of disease. This study allows us to observe significant cases recorded between April 2021 to March 2024, may be associated with meteorological elements like temperature and vapor pressure and seasonal behavioural variables which can aid in the spread of the mumps virus, such as higher school attendance and indoor congestion in the summer and increased social interaction during holidays and vacations.¹⁵

According to the search findings, melatonin changes and other seasonal variables may have an impact on human immunological competence and contribute to the seasonal patterns of mumps infections.¹⁶ Summertime's higher temperatures and greater humidity might help the mumps virus survive and spread, increasing the number of cases.¹⁵

During the year 2021-22 only 61 cases of mumps reported in Tamil Nadu. In the year 2022-23, we saw a slight increase with 129 number of cases of mumps. In 2023-24 there was a dramatic increase compared to the previous two years, totally 1,091 cases of mumps were reported during this period. This increase in incidence could be attributed to outbreak of mumps in 2023-24.

This pattern may be suggestive of several of things, including decreasing immunity within the population, inadequate vaccination rates, new viral variants appearing, alterations to the social or environmental elements that

promote the spread of illness.

According to research by Choe, Y.-J., Lee, Y.H., and Cho, S.-I., there was a significant rise in the reported incidence of mumps from fewer than 10 cases per 100,000 to more than 100 cases per 100,000 between 2001 and 2015. During this time, the average yearly percentage change in incidence was 26.8%.¹⁷ According to the European Centre for Disease Prevention and Control, seasonality was more evident in 2016 and 2017, with 1.6 to 2.2 times as many cases recorded in the first half of the year as in the second. In the EU/EEA, there were 2.6 cases of mumps reported for per 100,000 people in 2018.¹⁸ In China, the yearly incidence rate of mumps declined from 199.1 per 100,000 population in 1990-1996 to 45.6 per 100,000 population in 1997-2008 and then reduced to 10.0 per 100,000 population in 2009-2017, according to a study conducted in China by Pang, H., Zhou, Y., Zhao, W., & Jiang, Q.¹⁹ According to study findings, the mumps incidence has exhibited variable trends throughout different time periods and geographical locations. While some places have experienced a notable increase in incidence rates in recent years, others have witnessed decreasing trends. The findings of our study highlights that, there is a significant increase in mumps cases in Tamil Nadu over the past three years, particularly in 2024. The incidence of mumps per 1 lakh population demonstrate a steady increase over the years, indicating a growing public health concern. The gender-wise distribution shows that females are more affected by mumps, while the age-wise distribution indicates that children belonging to the age group of 6 to 9 years were most affected. The study suggests that there may be various factors contributing to the increase in mumps cases, including being a non- Universal Immunization Programme (UIP) vaccine, changes in vaccination coverage with the availability of private vaccines, mutations in the virus, and increased social interaction.

LIMITATIONS

The study relied on a limited dataset of mumps cases in Tamil Nadu from 2021 to 2024. This study analysed data of a particular state in the southern part of India and the findings of which cannot be generalizable to the whole country due to heterogeneity in climatic conditions, vaccination uptake, and socio-economic conditions among different states.

CONCLUSION

In conclusion, the study provides insights into the occurrence of mumps cases in Tamil Nadu over the past three years. The significant increase in mumps cases, particularly

in 2024, highlights the need for enhanced public health measures to control the spread of the disease with particular focus on children aged 6-9 years and the female population who have a considerably higher burden of mumps cases.

RECOMMENDATION

The study recommends that the government may consider making mumps a notifiable disease in Tamil Nadu to improve surveillance and control measures. In order to successfully combat the spread of the mumps component may be added to the UIP schedule as per GOI procedures. There needs to be gender specific interventions with a greater emphasis on health education for women. Preventive measures, such as increased vaccination efforts and public awareness campaigns to educate the public about the importance of vaccination and proper hygiene practices to prevent the spread of mumps should be put into place well before the summer months due to the seasonal peak occurring between June and August, which specifically coincides with Tamil Nadu's summer.

DECLARATION OF INTEREST

The authors declare no conflict of interest

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