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Original Research Article

A study on mumps infection in children aged 1-12 years in a tertiary care hospital, South India: a cross-sectional study

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ABSTRACT

Background: Mumps is a highly contagious disease effecting children globally with disease presentation varying from being asymptomatic to unilateral or bilateral parotid gland enlargement. It causes serious complications like orchitis, aseptic meningitis, pancreatitis etc. During introduction of MR vaccine in NIS by the Government of India, Mumps vaccine was not included due to lack of enough data representing actual burden of the disease in our country.
Methods: This study was done from January 2024 to August 2024 following a surge in Mumps cases in children aged 1 to 12 years attending paediatrics department, Rangaraya Medical College, Kakinada.
Results: A total of 76 children were included in the study. Children were mostly in the age group 6-10 years (44). Both male (37) and female (36) children were equally affected. Most of the children were from rural areas (67%). 75 (98.7%) children were completely vaccinated with the majority being vaccinated in the Government sector (86.85%). Only 9 (11.85%) children received mumps vaccine. Contact with an individual with mumps was seen in 51 children (67.11%). The majority of the cases were reported during the months of March-April (89.47%). All 76 children presented with parotid swelling either unilateral (22) or bilateral (52) with 2 children having both parotid and submandibular gland swellings. Mumps-related complications like pancreatitis, aseptic meningitis and both were seen in 6 cases,4 cases and 2 cases respectively.
Conclusions: The government of India is to take necessary action to include the mumps vaccine in the UIP along with the MR vaccine to prevent mumps and its complications.

Keywords: Aseptic meningitis, Mumps, National immunization schedule, Parotid swelling, Vaccine

INTRODUCTION

Mumps is a vaccine-preventable disease-causing significant disease burden globally, with an incidence of 100-1000 cases/ 10000 population in countries where routine immunization of children where mumps vaccine is not included in routine immunization with epidemic peaks every 2-5 years.[1] The disease burden in India has not been accurately documented and there is no nationally representative data. Mumps is an age-old viral illness caused by paramyxovirus affecting humans causing unilateral or bilateral enlargement of parotid glands.[2] It is usually a self-limiting illness but complications like mastitis, orchitis, oophoritis, encephalitis, aseptic meningitis, polyradiculitis, cerebellar ataxia, facial palsy, pancreatitis, hearing loss, etc, can be seen in 10-40% of affected individuals.[3]

Teratogenic effects like aqueductal stenosis leading to hydrocephalus are known to occur when mumps affect pregnant women. Though most children present with classic symptoms of fever and parotid gland enlargement, about 30% of infected individuals may be asymptomatic or have atypical presentation without parotitis. During the introduction of the MR vaccine into the National Immunization Schedule (NIS) by the government of

India, IAP strongly advocated to include mumps vaccine too as it causes a significant disease burden. Lack of proper surveillance as it is not a notifiable disease and lack of enough studies to indicate the burden of the disease in the community were a few reasons for not including the MMR vaccine in the national immunization schedule.[1]

Globally around 120 countries have included the mumps vaccine in their national schedule but not in India.[4] In India, this vaccine which is indigenously made is available in the private sector with two doses given to children at 9 months and 15-18 months of age.

With most children being immunized in the government sector following the National immunization schedule, these children do not receive the Mumps vaccine and are at risk of the disease.

This study was undertaken in the Department of Pediatrics, Rangaraya Medical College in South India from January 2024 to August 2024 following an increase in the number of mumps cases in children attending the Pediatric outpatient department and being admitted into hospital with complications.

METHODS

Study place

This is a hospital-based observational cross-sectional study done in the Department of Pediatrics, Government General Hospital Kakinada.

Study population

All children between 1 year to 12 years of age who attended to pediatric outpatient department or were admitted as patients in pediatric wards and pediatric intensive care units with clinical features of mumps.

Study duration

The duration of study was from January 2024 to August 2024.

WHO guidelines for acute onset of unilateral or bilateral swelling of the parotid gland or other salivary glands lasting for 2 or more days without any apparent cause was taken as the case definition of mumps.

Inclusion criteria

Children between 1 year to 12 years of age with clinical features of mumps.

Exclusion criteria

Children who had parotid swellings due to noninfectious causes like blocked parotid duct, tumors, trauma, etc. Children whose parents/guardians did not give consent to the study.

Statistical analysis

A predesigned proforma was used to collect data about children presenting with clinical features of mumps such as sociodemographic details like age, sex and place of residence, clinical presentation with fever, unilateral or bilateral parotid enlargement, etc, complications like pancreatitis, aseptic meningitis, orchitis etc.

Vaccination status of the child with regards to vaccination in the Government or private sector, vaccination with the mumps vaccine, contact with a case of mumps, hospitalization and treatment details were noted. Data was entered into an excel sheet and analyzed using SSP24 software using various statistical tools.

RESULTS

A total of 76 children were included in the study. Children in the age group 1-5 years were 24, 6-10 years were 44 and above 10 years were 8.

Both male (37) and female (36) children were equally affected and the mean age was 7 years.

Most of the children were from rural areas (67%). 75 (98.7%) children were completely vaccinated with the majority being vaccinated in the Government sector (86.85%).

Only 9 (11.85%) children out of 75 children received mumps vaccine in private clinics. Contact with an individual with mumps was seen in 51 children (67.11%).

The majority of the cases were reported during the months of March-April (89.47%) a few cases in January to February (2.63%) and May to June (7.9%).

All 76 children presented with parotid swelling either unilateral (22) or bilateral (52) with 2 children having both parotid and submandibular gland swellings.

The next predominant presenting complaint was fever seen in 58 children (76.32%).

Other common complaints seen in the children were abdominal pain, odynophagia (10), vomiting (10), headache (9), sore throat (8), irritability (6) and ear pain (2).[2,6,8-10,12]

Mumps-related complications like pancreatitis, aseptic meningitis and both were seen in 6 cases, 4 cases and 2 cases respectively.

11 (14.47%) cases were hospitalized due to complications and were all successfully discharged. One child with pancreatitis was not admitted due to parental refusal.

Table 1: Sociodemographic details of the children.

S. no.	Factor	Frequency	(%)
1	**Age (in years)**		
	1-5	24	31.58
	6-10	44	57.89
	>10	8	10.53
2	**Sex**		
	Male	37	47.36
	Female	36	48.68
3	**Residence**		
	Urban	23	30.27
	Rural	51	67.10
	Tribal	2	2.63
4	**Vaccination**		
	Vaccinated	75	98.7
	Government sector	66	86.85
	Government +private sector	9	11.85
	Not vaccinated	1	1.3
5	**Mumps vaccine**		
	Received	9	11.84
	Not received	67	88.16
6	**Contact history**		
	Yes	51	67.11
	No	25	32.89
7	**Seasonal prevalence**		
	January-February	2	2.63
	March-April	68	89.47
	May-June	6	7.9
	July-August	0	0

Table 2: Clinical profile of the children.

S. No.	Factor	Frequency	(%)
1	**Clinical features**		
	Fever	58	76.32
	Parotid swelling	76	100
	B/L Parotitis	52	68.42
	U/L Parotitis	22	28.95
	B/L Parotitis+Submandibular swelling	2	2.63
	Abdominal pain	12	15.79
	Headache	9	11.84
	Odynophagia	10	13.16
	Ear pain	2	2.63
	Vomitings	10	13.16
	Sore throat	8	10.53
	Irritability	6	7.89
2	**Complications**		
	Nil	64	84.22
	Pancreatitis	6	7.89
	Aseptic meningitis	4	5.26
	Both pancreatitis and aseptic meningitis	2	2.63
3	**Hospitalization**		
	Yes	11	14.47
	No	65	85.53
4	**Outcome**		
	Discharged	11	100
	Death	0	0

Table 3: Vaccine received/not received age group.

Vaccine status	Age group			Total
	1-5 years	6-10 years	>10 years	
Vaccine not received	21	40	6	67
Vaccine received	3	4	2	9
Total	24	44	8	76

Pearson Chi-Square 1.656 (Value) For Vaccine status against Age group, 2 (df), p value-0.437 (Not significant)

Table 4: Vaccine Received/Not Received *Sex.

Vaccine Status	Gender		Total
	Female	Male	
Vaccine not received	36	31	67
Vaccine received	3	6	9
Total	39	37	76

Pearson Chi-Square 1.321 (Value) For Vaccine status against Sex, 1 (df), p value- 0.250 (Not significant)

DISCUSSION

A total of 76 cases were included in the study done over 8 months from January 2024 to August 2024 at Government General Hospital Kakinada. Children below 5 years were 24 and 52 children were above the age of 5 years with mean age was 7 years. Prevalence among male (37) and female children (36) was almost the same with the highest number of cases reported in March and April.

WHO has reported 5,00,000 mumps cases annually worldwide from 1999-2019 with a significant surge in cases in the past decade in South America, Australia and Iran.[5] India, too has seen a surge of mumps cases in the previous decade with reporting of multiple outbreaks from different parts of the country in 2023. Mumps outbreaks are known to occur periodically with intervals of 5-10 years.

A temporal analysis of mumps cases from 2014-2023 has shown a trend of distinct rise and fall of cases with surges in 2015, 2016, 2019 and 2023. Lack of surveillance and reporting in 2020 and 2021 due to Covid pandemic could be the reason for less number of cases in those years.[6] WHO reported an incidence rate of mumps cases as 70/10,00,000 population and 107.4/10,00,000 population in 2022 and 2023 respectively.[7]

The Global Health Observatory data reported 764 mumps cases in India during 2021-2022, particularly affecting children. Mumps outbreaks have been reported in 2023 highest in Jammu and Kashmir (476 cases in 22 outbreaks), Kerala (86 cases in 6 outbreaks), Tamil Nadu (inSivagangai), Chhattisgarh (Rajnandgaon) and Karnataka (Udipi, 6 outbreaks) in October and November 2023 mostly affecting children.[8] The outbreak which started in October 2023 in Kerala, Tamil Nadu and Karnataka was followed by a resurgence in cases in Telangana and Andhra Pradesh in 2024. Kerala alone has reported 15,637 cases till March 2024 with 6,675 cases in March alone. Navi, Mumbai also saw a surge in cases in 2023-2024 since July 2023, when 217 cases were documented.[9] The increase in the number of cases reported at our institution could be the continuation of the outbreaks that started in India in 2023.

Many of the studies from India reported a higher incidence in male children. A study by Dharmapalan D et al in Navi Mumbai included 122 boys and 95 girls (ages between 7 months to 15 years) with a median age of 6.2 years.[10] 150 cases were studied by Ummer M Bhat et al, in a tertiary hospital in Kashmir in which 87 cases (58%) were males and 63 (42%) cases were females with a median age of 8.2 years.[11] Higher incidence in male children (60%) compared to the female children (40%) with a median age of 9.4 years was also seen in a study by Chandrakanth S Moghe et al, a study on 162 children from Jaisalmer, Rajasthan.[12]

In the present study peak number of cases, 68 (89.47%) were seen in March and April 2024. Mumps cases were reported in large numbers between December 2023 to February 2024 from Navi Mumbai and from October 2023 to March 2024 from Kerala. News reports of an increase in Mumps cases were being reported from November 2023 in the states of Telangana, Andhra Pradesh, Himachal Pradesh, Rajasthan and Delhi.[9] A study in Jaisalmer in 2016 reported an outbreak between July and September.[12]

In the present study, only 9 (11.84%) children who were vaccinated in both Government and private sectors received the mumps vaccine. This is almost similar to the study by Bhat UM et al in Jammu and Kashmir (10%).[11] Due to a lack of logistics serological assessment for mumps antibodies could not be done. All the children who received the mumps vaccine were from urban areas. They received vaccines available in the National immunization schedule in the Government hospitals and those vaccines that are not provided in the government sector like MMR were taken in private clinics. After the inclusion of newer vaccines like pentavalent, mumps and

PCV in the government sector majority of parents are opting for immunization in the government sector thus missing the MMR vaccine which is not included in NIS. Bakker et al study from Canada reported mumps cases in 15% of vaccine recipients.[13]

Currently, MMR is not included in the Universal immunization program and is only available in the private sector.MR vaccine for Measles and Rubella is being given in 2 doses at 9 months and 15-18 months whereas MMR vaccine is given at 9-12 months,15-18 months and 4-6 years in the private sector. Studies have shown that one dose and two doses of MMR vaccine result in 87.4% and 100% seroconversion rates for mumps respectively.[14,15] Children who are unvaccinated for mumps (9.1%) were found to be seropositive for antibodies in a study by Bhoomika Saxena et al, which could be attributed to subclinical or atypical infection. The study also reported that a single dose of the mumps vaccine is not enough and natural immunity in Indian children is not sufficient for protection after exposure.[16]

IAP recommends at least 2 doses of the Mumps vaccine for prevention of Mumps. In this study, 4 out of 9 children who received the Mumps vaccine were between 9 to 11 years and the remaining children were between 5-6 years of age. Longitudinal studies have shown waning immunity for mumps among vaccinated individuals leading to a shift in affected age groups to adolescents and adults.[16]

Most parents are unaware of the mumps vaccine and only those who can afford vaccination in the private sector receive mumps vaccine. With more than 80% of children in India receiving vaccination in the public sector most of the children are being deprived of Mumps vaccine. Most of the children (67%) had a positive contact history in the study indicating it is a highly contagious disease with a high secondary attack rate in children. In some cases, even the adults in the family were affected.

Fever (76%) and bilateral parotid swelling (68%) were the predominant presenting symptoms in this study. Unilateral parotid enlargement was seen in 28% of cases and both parotid and submandibular glands were involved in 2% of cases. A similar clinical profile was reported in studies in Kashmir and by Arshad et al and Moghe et al.[11,12,17] Fever was present in a higher number of children in studies by Indranil et al (92.3%) and a study in Odisha (94%).[18,19]

In this study complications related to mumps such as pancreatitis were seen in 6 cases, aseptic meningitis in 4 cases and both pancreatitis and aseptic meningitis in 2 cases respectively. Other complications like orchitis and oophoritis were not reported. No complications were seen in the study done in Odisha. Pancreatitis and orchitis were seen in 4 cases and 1 case respectively in the study done by Moghe et al, in Rajasthan.[12,19] All the children with complications were appropriately managed and discharged. Studies have shown that complications due to mumps in the post-vaccination era are less than compared to the pre-vaccination era.[20]

CONCLUSION

There has been a definite surge in mumps cases in India from October 2023 to March 2024. The number of cases seen is only the tip of the iceberg with many cases being under-reported, asymptomatic, or subclinical.

Mumps disease is not included in the IDSP (Integrated Disease Surveillance Programme) report given by health institutions; thereby mumps cases may not be accurately reported unless there is an outbreak. Mumps disease is to be included in this report to know the actual burden of the disease in the community. Most of the children in India are being vaccinated in Government hospitals as per UIP which does not include the MMR vaccine. People are largely unaware of the availability of mumps vaccine and only a few of them particularly in urban areas are getting their children vaccinated for mumps.

The government of India is to take necessary action to include the mumps vaccine in the UIP along with the MR vaccine to prevent mumps and its complications.

This study includes mumps in children based on clinical definition. Serological studies could not be done to confirm the diagnosis. Children who attended the Government hospital were only included. Those children presenting to private clinics and other hospitals were not included, hence the actual burden of cases may not be reflected. Children who presented to OP (outpatients) were not followed up for complications.

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REFERENCES

1. Ashishtha VM, Yadav S, Dabas A. IAP position paper on the burden of mumps in India and vaccination strategies. Indian Pediatr. 2015;52:505-14.
2. Betáková T, Svetlíková D, Gocník M. Overview of measles and mumps vaccine: Origin, present and future of vaccine production. Acta Virol. 2013;57:91-6.
3. Rubin S, Kennedy R, Poland G. Emerging mumps infection. Pediatr Infect Dis J. 2016;35:799-801.
4. Paul S, Mahajan PB, Sahoo J, Bhatia V, Subba SH. Investigating Mumps Outbreak in Odisha, India: An Opportunity to Assess the Health System by Utilizing the Essential Public Health Services Framework. Am J Trop Med Hyg. 2017;96(5):1215-21.

5. Rana MS, Usman M, Alam MM, Tahir M, Ikram A, Zaidi SSZ, et al. The emergence of mumps after the COVID-19 pandemic in Pakistan: Time to consider MMR vaccination strategies. J Infect. 2023;86(5):133-4.
6. Bashar MD, Gnanasekaran S. Mumps resurgence in India in the decade 2014-2023: a trend and geospatial analysis. 2024. Available from: https://doi.org. Accessed on 12 August 2024.
7. World Health Organization. Mumps reported cases and incidence. WHO. Available at: https://immunizationdata.who.int. Accessed on 17 August 2024.
8. World Health Organization. Global Health Observatory Data Repository. Mumps - Reported cases by country. WHO. Available at: https://apps.who.int/gho/data/view.main. Accessed on 21 August 2024.
9. India Today. Why India is reporting a mumps infection spike. Available from: https://www.indiatoday.in/india. Accessed on 12 August 2024.
10. Dharmapalan D, Gavhane J, Patil A, Shahane S, Warad S, Yewale Y, et al. Mumps Epidemic in Navi Mumbai in 2023-24: Lessons for the Health Management System. Indian Pediatr. 2024;24:97.
11. Bhat UM, Mir NY, Farooq W, Zaman BU, Malik MI. Clinical profile of mumps in children in a tertiary care hospital in Kashmir. Int J Contemp Pediatr. 2023;10:290-4.
12. Moghe CS, Goel P, Singh J. Mumps outbreak investigation in Jaisalmer, Rajasthan, India, June-September 2016. J Med Virol. 2019;91(3):347-50.
13. Bakker W, Mathias R. Mumps caused by an inadequately attenuated measles, mumps and rubella vaccine. Can J Infect Dis. 2001;12(3):144-8.
14. Saffar H, Mousavi S, Saffar H. Seroconversion rates following 2 doses of measles-mumps-rubella vaccination given at the ages 12 and 18 months: data for a possible additional dose at older age. BMC Immunol. 2022;23:2.
15. Gomber S, Arora SK, Das S, Ramachandran VG. Immune response to second dose of MMR vaccine in Indian children. Indian J Med Res. 2011;134(3):302-6.
16. Saxena B, Ramachandran VG, Saha R, Shah D. Mumps Antibody Titer in MMR-Vaccinated and Vaccine Naïve Children at a Public Hospital in Delhi. Indian Pediatr. 2021;58(2):137-9.
17. Arshad AS, Shamila H, Khan I, Syed MA. Patterns of mini-outbreaks of mumps at South Kashmir, Pulwama, India 2007-2011. Nitte University J Health Sci. 2013;3:52-5.
18. Saha I, Haldar D, Paul B, Shrivastava P, Das D, Pal M, et al. An epidemiological investigation of mumps outbreak in a slum of Kolkata. J Commun Dis. 2012;44:29-36.
19. Paul S, Mahajan PB, Sahoo J, Bhatia V, Subba SH. Investigating Mumps Outbreak in Odisha, India: An Opportunity to Assess the Health System by Utilizing the Essential Public Health Services Framework. Am J Trop Med Hyg. 2017;96(5):1215-21.
20. Davison P, Rausch-Phung EA, Morris J. Mumps. In: StatPearls. Treasure Island (FL): StatPearls Publishing. Available at: https://www.ncbi.nlm.nih.gov.

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