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Original Research Article

Seasonality and Socio-Demographic Changes associated with Mumps in a Tertiary Care Centre in North East India

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Abstract

Background: Mumps is an acute and highly contagious disease of the salivary glands caused by the mumps virus (paramyxovirus parotitis). It is characterized by pain and swelling in the parotid gland region associated with fever. It is usually mild but, in some cases, it may cause complications. The incidence of mumps reduced dramatically after the implementation of immunization against mumps worldwide, however, the incidence of mumps has been on the rise in recent years. The morbidity of mumps virus infections also presents a seasonal variation that has been well recognized in different regions, relationship between climatic factors and the occurrence of mumps could help improve both disease forecasting and preventive efforts. Also, sociodemographic factors of mumps, will provide data support to key groups and regions for prevention and control.

Aims and Objectives: (1). To assess the relationship between the occurrence of mumps and climatic factors. (2). To determine the sociodemographic factors of susceptible population.

Methods: Any case presenting to the OPD of the Otorhinolaryngology department, Nalbari Medical College and hospital with signs and symptoms of mumps infection is evaluated for epidemiological exposure, clinical particulars (signs, symptoms, date of onset of symptoms) and socio-demographic profile such as gender, age, occupation and residential address were also collected.

Results: there were a total of 130 patients, max prevalance were seen in the age group of 11-20 years, with equal distribution among male and female patients, none of the patients were immunised and all were from a low socioeconomic background and rural area. In our study, the maximum number of cases were seen in the late winters and spring season.

Conclusion: The lack of education and awareness hinders the parents in recognizing and assessing the risk of mumps exposure in a timely manner, thereby increasing the likelihood of infection and complications. Warmer weather might be associated with behavioral patterns such as increased contact in children, which could in turn promote mumps infection. In order to achieve effective mumps prevention and control, a multi-pronged strategy is recommended.

Keywords: Parotitis, Mumps, Seasonality.

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Introduction

Mumps is an acute and highly contagious viral disease which primarily affects the salivary glands, caused by the mumps virus (paramyxovirus parotitis). [1]

Non-specific symptoms that can precede parotitis include fever, headache, malaise, and anorexia. The incubation period is typically 16 to 18 days, but it can range from 12 to 25 days. [2] Transmission occurs by droplets and direct close contact. [2] It usually affects children aged between 5-9 years. [1,3] It is usually a mild disease. However in some cases, it may cause complications such as aseptic meningitis, viral encephalitis, pancreatitis, orchitis, oophoritis and deafness. [1,2,4].

Mumps is a viral disease that can be prevented by vaccination. The most commonly used formulation

for the mumps vaccine is the trivalent measles, mumps and rubella (MMR) formulation. [3] For a preventive level of immunity, MMR vaccine is applied twice- the first dose is applied at 12th month and the second dose between age 2 and 6 years. [3] The incidence of mumps reduced dramatically after the implementation of immunization against mumps worldwide, however, the incidence of mumps has been on the rise in recent years.

The morbidity of mumps virus infections also presents a seasonal variation that has been well recognized in different regions. [1] In temperate climates number of mumps cases peak during the end of winter and spring months. In areas where the mumps vaccination programme is routinely implemented, seasonality is not evident but sporadic cases and epidemics occur all year round. Further investigation of the relationship between climatic factors and the occurrence of mumps could help improve both disease forecasting and preventive efforts.

Also, socio -demographic factors that reported to influence the immunisation programs in low and middle-income countries are parents' education, migration, war, place of residence rural-urban, access to health care, gender and religion and ethnicity. Determination of socio-demographic risk factors for mumps may provide valuable information for to key groups and regions for prevention and control. [3]

This study aims to explore the seroprevalence of mumps and its association with some social determinants in the scope of the vaccination programme

Aim and Objective:

1. To assess the relationship between the occurrence of mumps and climatic factors
2. To determine the socio-demographic factors of susceptible population.

Material and Methods

This study is a hospital-based prospective observational study, conducted under the Department of Otorhinolaryngology and Head and Neck Surgery, Nalbari Medical College and Hospital for a period of 1 year. The study population consists of patients presenting with signs and symptoms of mumps/parotitis to the OPD of the Otorhinolaryngology department, Nalbari Medical College and Hospital.

Any case presenting with signs and symptoms of mumps infection is evaluated for epidemiological exposure, age, sex, housing, occupation, immunization status, past history of such attack among the members of the family/patients, history of exposure to mumps case, clinical manifestations developed by the patient and treatment profiles related to the cases were gathered.

Mumps/parotitis is diagnosed clinically. As defined by WHO, an illness 'with acute onset of unilateral or bilateral tender, self-limited swelling of the parotid or other salivary gland(s), lasting at least 2 days, and without other apxarent cause', were considered as clinical mumps. Follow up will be done to look for any complications.

The data was collected after obtaining written consent. The study was approved by the Ethics Committee of Nalbari medical college and hospital.

Inclusion Criteria: Patients with acute pain and swelling unilateral or bilateral in the parotid region who consent for the study, follow medical advice and come at regular intervals for follow-up.

Exclusion Criteria:

Patients with:

- Acute suppurative parotitis.
- Recurrent Parotitis.
- Parotitis due to granulomatous diseases (Tuberculosis, Sarcoidosis, etc.,)
- Sjogren's syndrome
- Neoplastic lesion of the parotid gland (Benign/ Malignant).
- Sialolithiasis
- Cysts

Results

Table 1:

Age	Gender		Immunisation Status	Complications	
	Male	Female		Male	Female
1-10	22	13	Nil	Orchitis	
11-20	26	17	Nil	Orchitis	
21-30	7	21	Nil		SNHL (2)
31-40	6	12	Nil	Orchitis (2)	SNHL (1)
41-50	3	2	Nil		
51-60	1		Nil		

Gender: A total of 130 patients met the above criteria, after informed consent. The incidence was equal between male and female patients.

Age: The cases were stratified into 6 groups by age: 1-10 years (n = 35), 11-20 years (n = 43), 21-30 years (n = 28), 31-40 years (n = 18), 41-50 years (n = 5) and 51-60 years (n = 1). The highest incidence was seen in children aged 11-20 years, accounting for 33% of cases. With increasing age, the incidences showed a downward trend.

Immunisation status: None of the patients were immunised with the Mumps vaccine (MMR).

Complications: In this study, the complication that the patients presented with were, Orchitis (3.07%) and Sensorineural hearing loss (2.30%)

Table 2:

Month	Demography		Socio-Economic Status	
	Rural	Urban	BPL	APL
January	19		19	
February	16		16	
March	22		22	
April	16		16	
May	7		7	
June	11		11	
July	13		13	
August	6		6	
September	9		9	
October	3		3	
November	3		3	
December	5		5	

Demographic Distribution: In this study, 100% of the patients were from rural area with a low economic status.

Seasonal Distribution: In this study, we observed that the maximum number of cases were in the late winters and spring season.

Discussion

Of the 130 patients included in this study, majority of the patients were in the age group of 11-20 years.

The population of study was from a rural area. It is also observed that all these patients came from a low socio economic status, a similar observation was made by the Turkish Demographic Health Survey conducted in 2013, wherein low level of vaccination uptake was associated with living in a rural region, having a non-educated mother, having a high birth order and being in the lowest quintile of income. [3] In particular, children in large families are at significantly increased risk of viral transmission due to prolonged exposure to shared living, learning and recreational environments. [4]

The lack of education and awareness hinders the parents in recognizing and assessing the risk of mumps exposure in a timely manner. [4] These parents may underestimate the strength of the contagiousness of the infection and the potentially serious risks, which leads to a weak sense of precautionary awareness of mumps, failure to take timely and effective precautionary measures, as well as failure to bring their children to seek medical treatment in a timely manner, thereby increasing the likelihood of infection and complications. [4]

We have also observed that 100% of the affected population was not vaccinated. In Turkey, a few studies evaluated mumps seropositivity by ELISA before the mumps vaccine introduced into the universal immunization programme in 2006. Mumps seropositivity was reported as approximately 80% in a hospital in Ankara during October 2005–June 2006 among the 9-16 years age group. [3] Mumps seropositivity was 35.3% among 331 unvaccinated 0-59 month aged children in Adana Province in 2005. [3] Therefore, it is crucial to keep the vaccine coverage at the highest levels in the target age groups in order to keep the level of immunity in the community above the herd immunity threshold. [3]

Regarding the effect of seasonality we have observed maximum number of cases in the winters and spring season. In a study by Fu. X et al, they observed two peak periods of mumps between April to July and December to January of the next year. [5] However in a study by Onozuka D, Hashizume M, the number of mumps cases increased with either an increase in temperature or relative humidity. This increase was strongest in children aged <5years, and progressively decreased with age. [1]

A recent epidemiological study indicated that physical activity during adolescence is lower during winter and increases during warmer months. Warmer weather might be associated with behavioral patterns such as increased contact in

children, which could in turn promote mumps infection. [6]

In order to achieve effective mumps prevention and control, a multi-pronged strategy is recommended. It should be through the coordinated efforts among government agencies, CDCs, healthcare facilities, and schools, jointly implement health education programs, emphasizing key transmission routes (primarily respiratory droplets, secondarily fomite contact), cardinal symptoms (parotitis/ fever), and vaccination benefits.

Vaccination efforts should prioritize verifiable high-risk groups, including children aged 4–6 years, migrant children (via cross-regional immunization records), under-vaccinated children (tracked through immunization information systems), and daycare attendees/multi child households. Concurrently, family-centred prevention should reinforce hand hygiene, surface disinfection, and caregiver education on warning signs, ensuring priority protection for epidemiologically vulnerable subgroups.

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