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# Incidence of chickenpox and mumps in Karbala Governorate with their seasonal variation

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**Objectives** Chickenpox and mumps are viral diseases caused by varicella zoster virus and mumps virus, respectively. Chickenpox is still a common communicable health problem among children. Mumps tends to affect older children more often than chickenpox. The study aimed to show the annual incidence of chickenpox and mumps with their correlation to gender and age groups.

**Methods** Descriptive retrospective study. Total of 60,499 patients were included in this study. All data are collected during 2016 at Aon Primary Health Centre in Karbala province.

**Results** Data of this study reveals that the incidence rate = 165.3/1000 for chickenpox and 97.5/1000 for mumps. The highest incidence rate for both infections according to age groups was among 5–9 years followed by 10–14 years. Seasonal variation was common during winter and spring for both diseases.

**Conclusion** High incidence for both mumps and varicella zoster infection, in addition, most of the age groups affected were within 5–14 years.

**Keywords** chickenpox, mumps, varicella zoster, Karbala, incidence

## Introduction

Chickenpox is a viral disease caused by varicella zoster virus.<sup>1</sup> The disease characterized by small, itchy blister skin rash.<sup>2</sup> Symptoms start after 10–21 days after exposure to virus.<sup>2</sup> The disease continues to about 5–7 days.<sup>2</sup> Complications may occur in the form of pneumonia, encephalitis and secondary bacterial skin infection of the blisters.<sup>3</sup> Severity of disease is more common in adult than children.<sup>4</sup> Diagnosis of chickenpox is based on clinical background.<sup>1</sup> Exposure to varicella zoster virus infection usually occurs once.<sup>1</sup> Vaccination against varicella protects about 70–90% of people from getting infection.<sup>4</sup> Immunization schedule is usually recommended in many countries.<sup>5</sup> Surveillance data revealed that 140 million cases of chickenpox and herpes zoster occur in 2013,<sup>6</sup> also 6400 death result from infection with varicella in 2015.<sup>7,8</sup> Geographical zone affects distribution of chickenpox, for example, in the temperate areas it usually occurs in a mild self-limiting form and the preschool children are mostly affected.<sup>9</sup>

The epidemiology is different in tropical areas with the percent <60 of immunized adults.<sup>10</sup> Iraq is regarded to be located within the temperate zone.<sup>11</sup>

Mumps virus is the causative agent of mumps.<sup>12</sup> The affected patient had fever, myalgia and generalized malaise.<sup>13</sup> These symptoms are usually followed by painful swelling of one or both parotid glands.<sup>14</sup> Incubation period is 16–18 days and symptoms continue for 10 days.<sup>12,13</sup> Severity of infection is usually more in adults than children.<sup>13</sup>

Mumps may be complicated by meningitis, pancreatitis, deafness and orchitis.<sup>13</sup> Infection gives lifelong immunity.<sup>13</sup> Diagnosis usually depends on the clinical sign and symptoms.<sup>12</sup> Vaccination for mumps is included in immunization programs of most developed countries usually combined with measles and rubella.<sup>13</sup>

Incidence of mumps increases in older age groups, those who have low immunization.<sup>14</sup> Mumps occur usually during

whole in around the equator, but it is more common during winter and spring in the southern northern areas.<sup>13</sup> The current study aimed at following criteria:

1. Clarify the incidence of chickenpox and mumps.
2. Determine whether there is a need for chickenpox vaccine or not.
3. To clarify the effectiveness of mumps vaccine.

## Materials and Methods

A retrospective descriptive study was applied. Collection of data for chickenpox and mumps during the year 2016 from Aon Primary Health Centre in Karbala province was performed. Total of 60,499 patients were included in this study.

All data were analyzed statistically using Excel 2010 and SPSS. Classification of age groups was done according to the surveillance system in Iraq.

## Results

Total incidence rate for chickenpox was equal to 165.3/1000, while incidence rate for mumps was = 97.5/1000 (Tables 1 and 2).

The highest incidence rate for chickenpox according to age groups was among 5–9 years followed by 10–14 years age group (Table 1), the same thing for mumps (Table 2).

No statistical significance for gender distribution among chickenpox and mumps at  $P$ -value = 0.01 (Table 3).

Most of the cases, chickenpox occurs during December with incidence rate = 675.2/1000 followed by April (incidence rate = 432.5/1000) then November (incidence rate = 696.1/1000). For mumps, the highest number of cases is during January (incidence rate = 145.7/1000) followed by March (incidence rate = 274.8/1000) (Figs. 1 and 2).

## Discussion

A high incidence rate for varicella infection clarified by this study compared to previous studies in Iraq.<sup>15</sup> This result may be due to development of health sector that leads to more patients seeking of care, also in neighboring countries incidence was lower as in Saudi Arabia and Turkey.<sup>16,17</sup> High

incidence in the current study may be attributed to lack of vaccine against virus in our country.

Most of the varicella cases occur within age group of 5–14 years which is the same result found by Hanan and Hassan, (2013) study.<sup>15</sup> The study reviled an incidence rate of 12.3/1000 varicella infection among age group >45 years, which is matter of concern because infection in adult is more severe than children.<sup>4</sup>

Seasonal variation for chickenpox was more common during winter and spring because virus is affected by climatic regions, the lowest incidence occurred during summer and these finding confirmed by other studies.<sup>15,16</sup> Gender distribution for both infections clarified high percent of male compared to female, which is similar to Hanan and Hassan, (2013) findings.<sup>15</sup>

Regarding mumps infection occurrence rate = 97.5/1000 was found which is also higher than other studies done in Saudia Arabia, Italy and France.<sup>16,18</sup> Seasonal variation also occur with mumps virus as Iraq regarded a temperate region, most cases happened during winter and early spring, which is also the same result found by Almuneef, (2006) study.<sup>16</sup> For age distribution of mumps cases, 5–9 years were mostly affected which revealed defect in coverage area of the vaccine.

Table 1. Distribution of chickenpox cases among age groups

Age groups	Male		Female		Total	Incidence rate per 1000
	N	%	N	%		
1–4	0	0	1	100	1	11.2
5–9	42	70	18	30	60	665
10–14	19	61.3	12	38.7	31	289.9
15–19	5	71.4	2	28.6	7	70.2
20–44	0	–	0	–	0	0
>45	0	0	1	100	1	12.3
Total	66	66	34	34	100	165.3

$P = 0.01$ ;  $N$ , number of cases.

Table 2. Distribution of mumps cases among age groups

Age groups	Male		Female		Total	Incidence rate per 1000
	N	%	N	%		
1–4	2	50	2	50	4	44.8
5–9	20	80	5	20	25	273.1
10–14	9	43.8	9	56.2	18	171.8
15–19	6	85.7	1	14.3	7	70.2
20–44	1	20	4	80	5	31.6
Total	38	64.4	21	35.6	59	97.5

$P = 0.01$ .  $N$ , number of cases.

## Conclusions and Recommendations

The current study concludes that:

1. Occurrence rate of both varicella zoster and mumps are high in Karbala province compared to other countries.
2. Most of the cases occur at age group 5–14 years for both varicella zoster and mumps.

We recommend the following:

1. Wide surveillance study for chickenpox cases to evaluate the need of the vaccine.
2. Serological study for mumps cases is needed to evaluate the effectiveness and coverage area of the vaccine.

Table 3. Distribution of gender among chickenpox and mumps cases

Month	Chickenpox				Mumps			
	Male		Female		Male		Female	
	N	%	N	%	N	%	N	%
January	1	50	1	50	11	73.3	4	26.7
February	1	25	4	75	4	44.4	5	55.6
March	2	40	3	60	9	81.8	2	18.2
April	21	95.5	1	4.5	2	66.7	1	33.3
May	1	50	1	50	1	50	1	50
June	1	50	1	50	2	66.7	1	33.3
July	1	50	1	50	2	66.7	1	33.3
August	1	50	1	50	1	50	1	50
September	1	50	1	50	2	66.7	1	33.3
October	4	80	1	20	1	50	1	50
November	13	76.5	4	23.5	1	33.3	2	66.7
December	24	70.6	10	29.4	1	33.3	2	66.7
Total	71	72.2	29	27.8	37	62.7	22	37.3

$P = 0.01$ .  $N$ , number of cases.

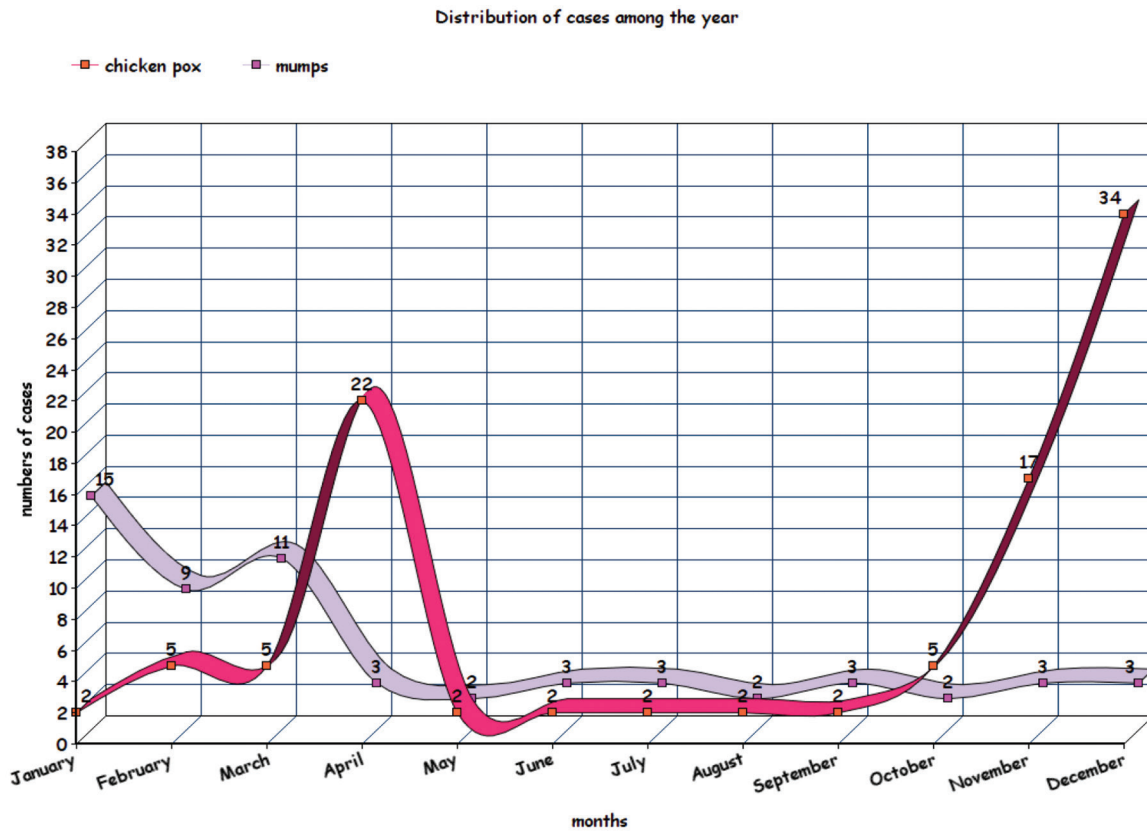


Fig. 1 Distribution of chickenpox and mumps throughout the year.

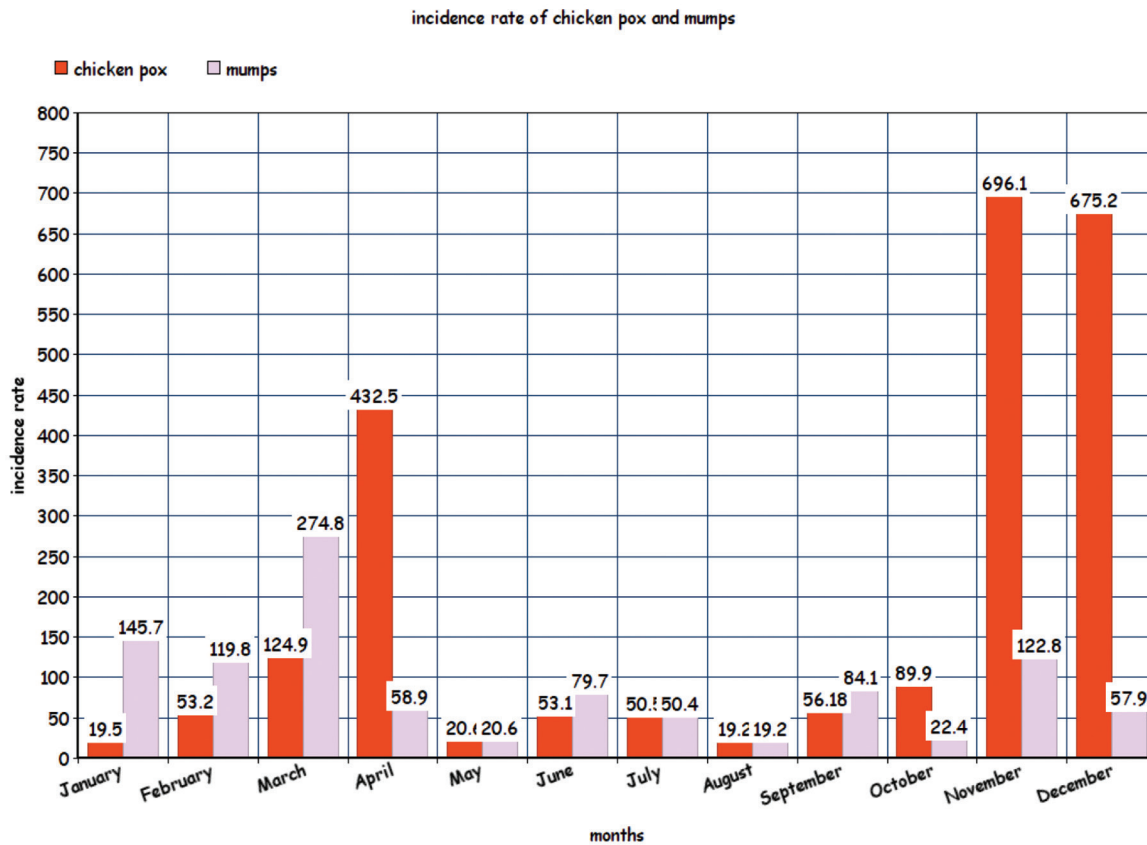


Fig. 2 Incidence rate of chickenpox and mumps.

## References

1. Chickenpox (Varicella) Prevention & Treatment. Centers for Disease Control and Prevention (cdc.gov). 16 November 2011. Archived from the original on 4 February 2015. Retrieved 4 February 2015.
2. Chickenpox (Varicella) Signs & Symptoms. Centers for Disease Control and Prevention (cdc.gov). 16 November 2011. Archived from the original on 4 February 2015. Retrieved 4 February 2015.
3. Chickenpox (Varicella) Complications. Centers for Disease Control and Prevention (cdc.gov). 16 November 2011. Archived from the original on 4 February 2015. Retrieved 4 February 2015.
4. Atkinson W. Epidemiology and Prevention of Vaccine-Preventable Diseases (12 Ed.). Public Health Foundation. pp. 301–323, 2011. Archived from the original on 7 February 2015. Retrieved 4 February 2015.
5. Flatt A, Breuer J. Varicella vaccines. *Br Med Bull.* 2012;103:115–127. PMID 22859715.
6. Global Burden of Disease Study 2013, Collaborators. Global, regional, and national incidence, prevalence, and years lived with disability for 301 acute and chronic diseases and injuries in 188 countries, 1990–2013: a systematic analysis for the Global Burden of Disease Study 2013. *Lancet.* 2015;386:743–800.
7. GBD 2015 Mortality and Causes of Death, Collaborators. Global, regional, and national life expectancy, all-cause mortality, and cause-specific mortality for 249 causes of death, 1980–2015: a systematic analysis for the Global Burden of Disease Study 2015. *Lancet.* 2016;388:1459–1544.
8. GBD 2013 Mortality and Causes of Death, Collaborators. (Global, regional, and national age-sex specific all-cause and cause-specific mortality for 240 causes of death, 1990–2013: a systematic analysis for the Global Burden of Disease Study 2013. *Lancet.* 2017;385:117–171.
9. Vyse AJ, Gay NJ, Hesketh LM, Morgan-Capner P, Miller E. Seroprevalence of antibody to varicella zoster virus in England and Wales in children and young adults. *Epidemiol Infect.* 2004;132:1129–1134.
10. Lee BW. Review of varicella zoster seroepidemiology in India and Southeast Asia. *Trop Med Int Health.* 1998;3:886–890.
11. Aristotle. Meteorology. Bekker numbers 362a33–362b29.
12. Atkinson W. Mumps Epidemiology and Prevention of Vaccine-Preventable Diseases (12 Ed.). Public Health Foundation. 2012. Chapter 14. ISBN 978-0-9832631-3-5. Archived from the original on 6 July 2016.
13. Mumps virus vaccines. (PDF). *Weekly epidemiological record.* 2007;82:49–60. PMID 17304707. Archived (PDF) from the original on 16 March 2015.
14. Hviid A, Rubin S, Mühlemann K. Mumps. *Lancet.* 2008;371:932–944.
15. Khaleel HA, Abdelhussien HM. Clinical epidemiology of chickenpox in Iraq from 2007–2011. *Glob J Health Sci.* 2012;5:180–186.
16. Almuneef M, Memish ZA, Balkhy HH, Alotaibi B, Helmy M. Chickenpox complications in Saudi Arabia: is it time for routine vaccination? *Int J Infect Dis.* 2006;10:156–161.
17. Dinleyici EC, Kurugol Z, Turel O, Hatipoglu N, Devrim I, Agin H, et al. The epidemiology and economic impact of varicella-related hospitalizations in Turkey from 2008 to 2010: a nationwide survey during the pre-vaccine era (VARICOMP study). *Eur J pediatr.* 2012;171:817–825.
18. Nardone A, Pebody RG, van den Hof S, Levy-Bruhl D, Plesner AM, Rota MC, et al. Sero-epidemiology of mumps in western Europe. *Epidemiol Infect.* 2003;131:691–701.

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