Journal of Medicinal and Chemical Sciences 5 (2022) 1183-1190

Journal of Medicinal and Chemical Sciences

Journal homepage: http://www.jmchemsci.com/

Original Article (Special Issue)

Characteristics of Last Lumps Outbreak in Maysan: Incidence, Demographic Factors, and Mumps-Related Complication

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ARTICLE INFO

Article history

Receive: 2022-05-15
Received in revised: 2022-06-21
Accepted: 2022-07-04
Manuscript ID: JMCS-2206-1544
Checked for Plagiarism: **Yes**
Language Editor:
Dr. Fatimah Ramezani
Editor who approved publication:
Dr. Majid Hajifaraji

DOI:10.26655/JMCHEMSCI.2022.7.6

KEYWORDS

Incidence
Mumps
Outbreak
Infection
Iraq

ABSTRACT

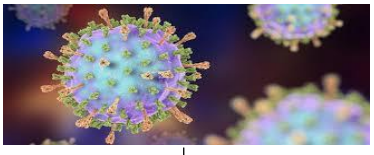
Mumps is a viral infection and one of acute disease caused by virus type called a paramyxovirus. This infection is characterized by many signs and symptoms such as salivary glands (one or more) swelling. In recent years, large outbreak of mumps was re-emerged in many countries which mainly affect the adolescents and young adults. Its incidence varies across countries according to seasonal patterns. Therefore, the aim of this study was to assess the incidence and complications of mumps outbreak in Maysan City.

A retrospective cross-sectional study was conducted, in which all notified and admission records were reviewed in Fever Maysan Hospital since 2013 to 2017 regarding demographic factors, incidence, and complications of mumps infection. Data were analyzed using (SPSS, Version 20) with a statistical test (chi-square).

A total of (3141) cases were reported during the last five years, an increasing incidence of mumps infection was found in 2016 (70.7%) followed by 2017 (22.7%), and most of cases were males (66.2%). Incidence rate was high in the age group of 5-14 and 15-45 years old, and also (53.1% vs. 35%), and (64.7%) of cases were reported in urban area. The complication rate was 5.06%, and most of them were males as 81.3% in the age group of 15-45 years old with a high rate of complications in urban area.

The study concluded that there is a high incidence rate of mumps cases in 2016, which indicated as outbreak, most of them males in the age group of 5-45 years old and most of them were from urban area with a high complication rate (5%).

GRAPHICAL ABSTRACT



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Introduction

The virus causes the mumps disease from paramyxovirus family; it causes an acute respiratory infection. Mumps is identified by the symptom of fever, with enlarge, swollen, and painful neck glands [1]. It is an envelope (RNA) virus with a single-stranded [2]. Mumps is a highly infectious disease and rapidly spreads in susceptible individuals. Based on our knowledge, the only host of mumps is human that is a known one to yet. The close contact is the main route of mumps transmission. The infectious period is between seven days pre-onset of parotitis to nine days afterwards [3, 4]. The pattern of disease varies from subclinical infection to severe like meningoencephalitis [5]. The primary school-aged children and some adolescents are under a high risk of being infected by mumps more than other age groups [5, 6]. More than forty percent of patients with mumps have at least one of the following complications: orchitis, aseptic meningitis, oophoritis, pancreatitis, encephalitis, nephritis, arthritis, thyroiditis, myocarditis, deafness [6-8], and rarely death [9]. Mumps is similar to many viral infectious diseases that has been affected by the seasonal variations recognized in different areas and countries. For instance, in the USA [1], a seasonal variation was detected, and incidence peak was in April, while in other countries, the same matter of seasonal variation was noticeable such as the incidence peak occur in the early-summer, spring, autumn, and winter in China, Jordan, and Ireland [10,11,112], respectively. The seasonal variation of mumps incidence gives evidence that meteorological factors have an important role in outbreak occurrence [13].

Due to the effects of the weather factors on infectious diseases, it is of high significance at global level in recent years in the context of climate changes [7]. The vaccine against measles, mumps, and rubella viruses (MMR) was recommended in national programs of immunization in many countries during the 1970s– 80s; therefore, incidence of mumps was declined with an adequate coverage rate of vaccination [14-17]. Usually the mumps disease occur in children and in pre-vaccine era, the incidence of mumps that was reported annually in some European western countries ranged from 100 to 600 per 100,000 people [18]. By using mumps vaccine, the incidence rate has been decreased significantly in some countries [15, 19, and 20]. During the last decade, there have been mentioned some reports from different areas with established programs of mumps vaccine about extensive outbreaks of mumps, which predominantly happened in vaccinated children, adolescents, and young adults [21-24].

The aim of this study was to assess the mumps incidence rate and the related complications during the outbreak in Maysan City.

Materials and Methods

A retrospective cross-sectional study was done in Maysan City, Iraq. It was carried out in 2022. The study reviewed all notified and admission records in Fever Maysan Hospital during the period of 2013-2017, and all patients were selected according to inclusion criteria (depending on clinical diagnosis) to participate in our study. The current study was conducted based on the guidelines of the Declaration of Helsinki and it was approved by the Ethical Committee of the College of Medicine, University of Maysan. Data were collected by using special forms of data sheet, prepared by researchers, and depend on the standard forms and criteria (age, gender, address, and types of complication). By using the available SPSS-20 (Statistical Packages for Social Sciences-Version 20), the data was analyzed, and then it was presented in the form of figures and tables.

The statistical relationship was tested by statistical tests and significance was considered when P-value was equal or less than 0.05.

Results

The total cases of study sample were (3141) cases of mumps that were reported during the period of 2013 to 2017, and a high incidence rate of mumps infection was found in 2016 (70.7%) followed by 2017(22.7%), as displayed in Figure 1.

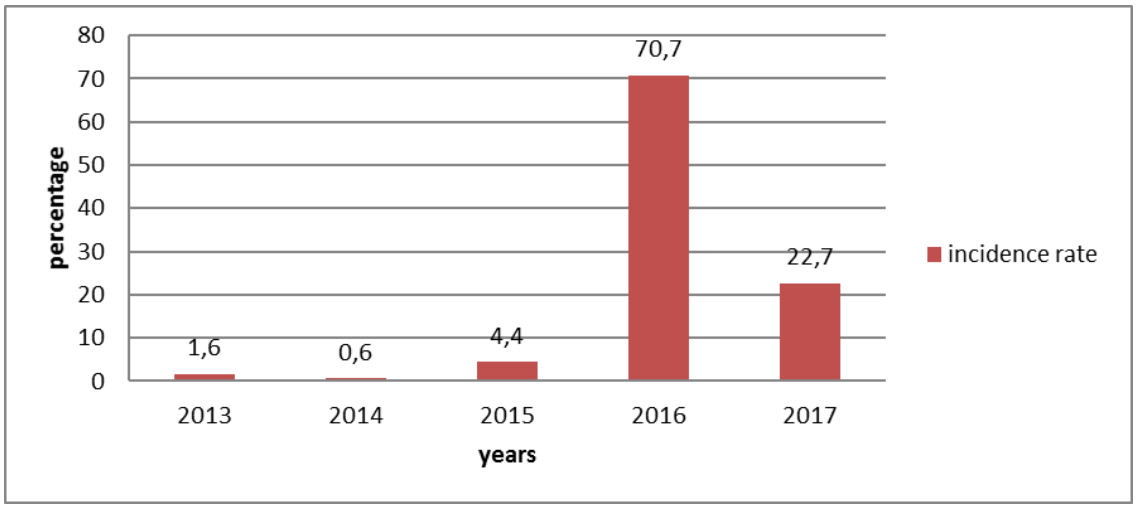

Figure 1: Incidence rate of mumps cases according to years

The study found that most of cases were males (66.2%) during the outbreak in 2016 and other years, as depicted in Figure 2.

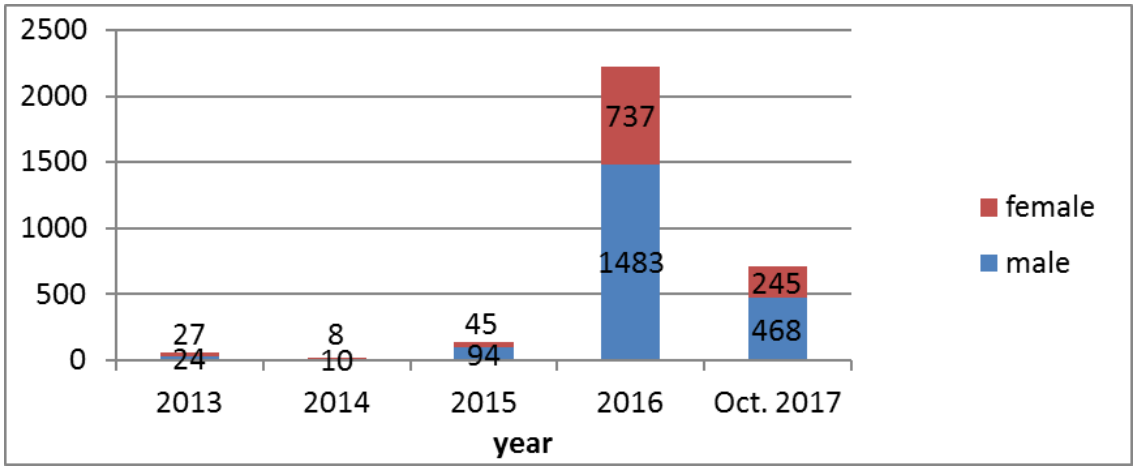

Figure 2: Mumps cases distributed according to gender and reported years

Regarding the age groups, incidence was high in the age group of 5-14 and 15-45 years old (53.1% vs. 35%) and less among the age groups less than 1 year and above 45 years old, as shown in Figure 3.

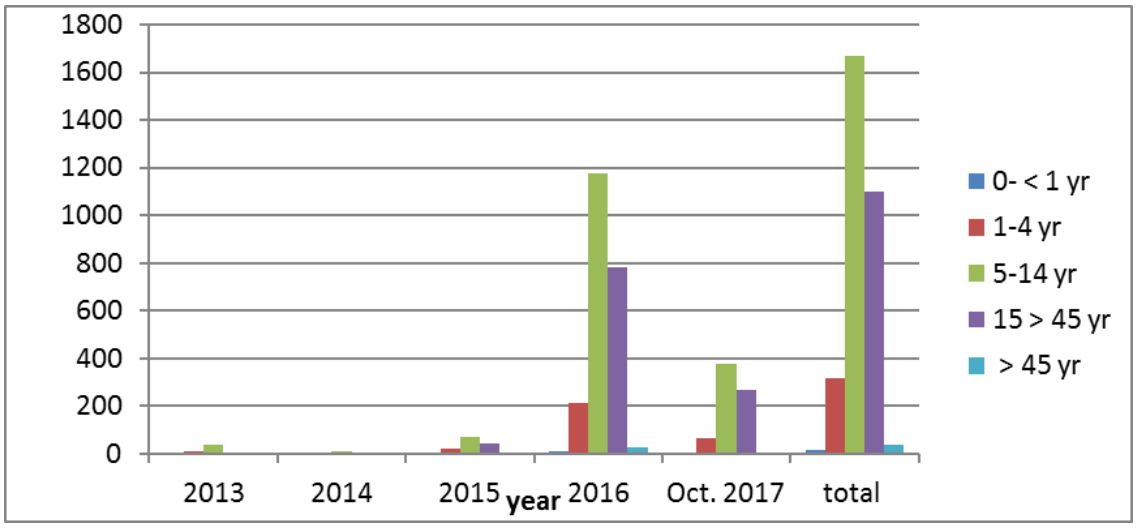

Figure 3: Mumps cases distributed according to age groups and reported years

The study revealed that 65% of cases lived in urban area in all reporting years, as displayed in Figure 4.

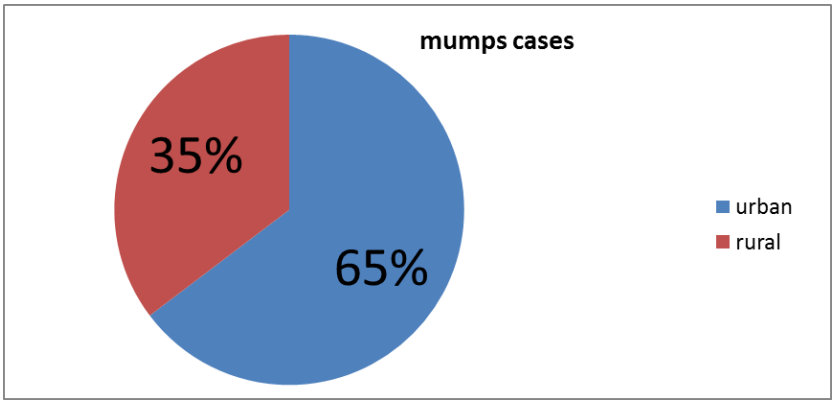

Figure 4: Mumps cases distributed according to the residence of cases

Regarding the 2016 outbreak situation, the study found that most of cases were reported from January to June, 2016 with a peak in March. Then, it slightly declined with 5% of cases that the reported complications (according to severity and hospitalization) during April-July, as demonstrated in Figure 5.

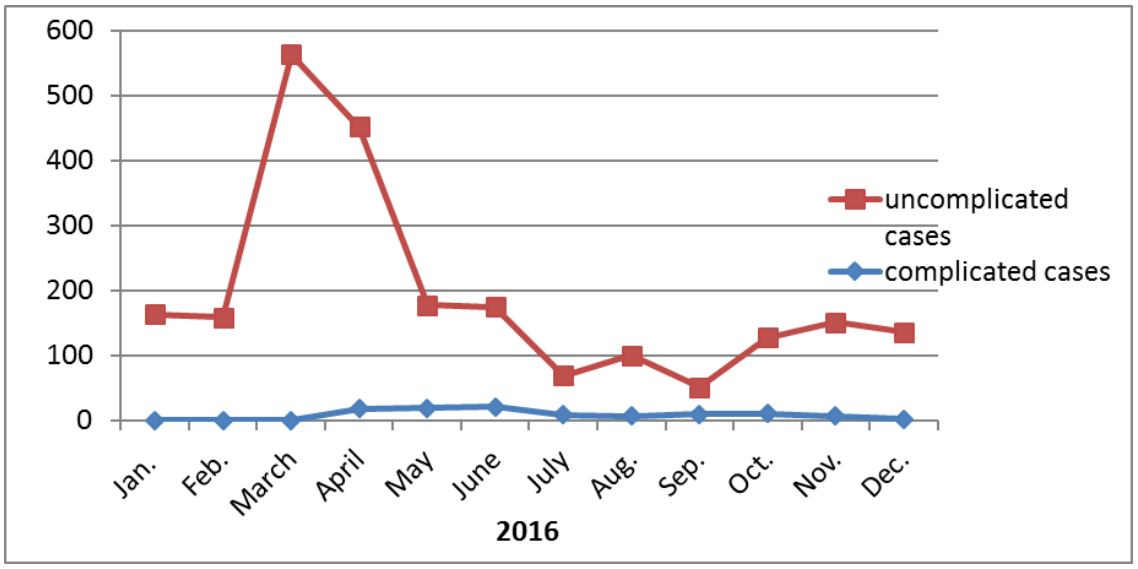

Figure 5: Distribution of mumps cases and complication according to month, 2016

The complicated cases were distributed as severe case, orchitis, meningitis, pancreatitis myocarditis, and anemia and the high incidence represented 63.5% which was a severe case, as reported in Table 1.

Table 1: Mumps complication cases based on the 2016 outbreak

Item	Mumps complication types	
	No.	%
Severe case	68	63.5
Orchitis	21	19.6
Meningitis	12	11.2
Pancreatitis	4	3.7
Myocarditis	1	0.9
Anemia	1	0.9
Total	107	100

The current study found that the most affected cases were males (66.1%) who had a high rate of complications as 81.3% with a high statistical significance, as indicated in Table 2. although most cases (55%) reported in the age group of 5-14 years old, 90% of complicated cases were significantly noticeable in the age group of 15-45 years old, and the study found a high rate of complication in urban area (Table 2).

Table2: Some characteristics of mumps outbreak, 2016

		Mumps cases						
		Complicated		Not complicated		Total		P-value
		No.	%	No.	%	No.	%	
Gender	Male	87	81.3	1396	66.1	1483	66.8	0.001
	Female	20	18.7	717	33.9	737	33.2	
Age group	1-4 yr	2	1.86	225	10.8	227	10.24	0.001
	5-14 yr	7	6.5	1172	55.4	1179	53.1	
	15 - 45 yr	97	90.6	687	32.5	784	35.3	
	> 45 yr	1	0.93	29	1.3	30	1.3	
	Total	107	100	2113	100	2220	100	
Address	Urban	65	60.8	1302	61.6	1367	61.5	0.8
	Rural	42	39.2	811	38.4	853	38.5	
	Total	107	100	2113	100	2220	100	

Discussion

The mumps infection is still one of the important global problems of public health depending on epidemiological evidences. Mumps is a moderate to high infectious viral disease occur through nasal or upper respiratory tract mucosa [25, 26].

The result of the current study revealed that a high incidence of mumps infection was reported in 2016 (70.7%) which was detected as mumps outbreak by reviewing of data of previous years, and indicated that there is less reported cases of mumps not demonstrated as outbreak, while mumps outbreak was notable in other countries at same years [27, 28]. The study found that most mumps cases were males during annual data collection or during outbreak notification, this may be explained by the fact that males are more mobile (in outdoor environment) than females, so they are exposed to mumps. In other studies, mump incidence of annual report was higher in males than in females, such as the mumps outbreak or incidence in the United States as indicated a higher attack rate (64%) among females than males [15], while in Guam, it was the same in both genders with male to female ratio as 1:1 [29].

Regarding the age groups, the incidence was high in the age group of 5-14 and 15-45 years old (53.1% vs. 35%) and less among the age groups less than 1 year old and above 45 years old. By increasing the age, the mumps incidence was decreased with an incidence peak in the age of 5 to 14 years old. Although the vaccination program against mumps targeted this age group, this may be due to the fact that this age group is pre-school and school-aged, and they are active than other ages, so they may get more infection. Those studies conducted in other countries [27], [28], and [30], found a similar result.

The study found that 65% of mumps cases occurred in urban area, which may be due to a high population density in urban than rural areas, and the other studies found the same result [27,30].

Regarding the 2016 outbreak situation, the study found that most cases were reported during January to June, 2016 with a peak in March, and then it was slightly declined. In other word, the incidence peak occurred in winter and spring, which means that there is a seasonal variation in outbreak or annual report.

Like many viral infectious diseases, many reported cases of mumps indicate a seasonal variation, which has been recognized in different areas and countries. For instance, in the USA, a seasonal variation was detected, and the occurrence peak was in April. In other countries, the same variation was noticed such as the incidence peak in the early-summer, spring,

autumn, and winter in China, Jordan, and Ireland, respectively [1,8-10,11,12]. The seasonal variation of mumps incidence gives evidence that meteorological factors have an important role in outbreak occurrence [13].

The present study revealed that 5% of cases were reported as complicated according to severity and hospitalization. The complication were distributed as orchitis, meningitis, pancreatitis myocarditis, and anemia which represented 19.6%, 11.2%, 3.7%, 0.9%, and 0.9%, respectively. Most of these complications occurred in males rather females and in age above 15 years old who lived in urban areas with a statistical significance. This may be explained by the fact that most complications are orchitis which occur in males. These results were similar to the findings of a research that was done in an another country [30], which reported that the complication rate of mumps cases was 3.8% which was more in males above 12 years old (mainly orchitis and meningoencephalitis) and the complication outbreak rates in New York, England, Wales were 7%, 6.1%, and 0.3%, respectively [27,31].

Conclusion

The current study concluded that a high incidence rate of mumps in 2016 was indicated as an outbreak, and most of cases were males in the age group of 5-45 years old who lived in urban areas mn bb their complications rate was 5%.

Recommendation

The study recommended strengthening the identification, notification, and health promotion programs of mumps to the early detection and diagnosis of mumps.

Acknowledgment

The authors appreciate the cooperation of the medical and paramedical staff of Fever Maysan Hospital.

Funding

The research has received no funding.

Authors' contributions

All authors conceived, designed, and implemented the data analysis, and then they drafted and revised the manuscript.

Conflict of Interest

The authors reported no conflict of interest.

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HOW TO CITE THIS ARTICLE

Sadiq Musa Ahmed, Hmood Madhi Hasan. Characteristics of Last Lumps Outbreak in Maysan: Incidence, Demographic Factors, and Mumps-Related Complication. *J. Med. Chem. Sci.*, 2022, 5(7) 1183-1190

https://doi.org/10.26655/JMCHEMSCI.2022.7.6

URL: http://www.jmchemsci.com/article_153338.html