

Original Research Article

Epidemiological Characteristics of Mumps Outbreak in the South Districts of Babylon province During the Years 2016-2017

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Abstract

Mumps virus is a highly infectious pathological agent, despite the use of vaccination, outbreaks continue to occur worldwide and affects all age groups. There is no specific treatment for mumps. The study aimed to investigate the epidemiologic features of a mumps outbreak in two districts located in the southern region of Babylon Governorate.

The study was a cross sectional descriptive epidemiologic survey that included all notified cases of mumps reported by the primary health care authorities in southern region of Babylon Governorate during the year 2016–February 2017, a total of 693 clinically diagnosed mumps cases were studied from the records during this period in 4 primary health care centers (two in Al-Qasim district and two in AL-Showmaly district). Person Place Time epidemiologic model was applied to describe the occurrences of the disease.

The Study results revealed that the male to female ratio of patients was 2:1 and most of the cases 26.4% occurred in January more than two thirds of cases were living in the city district (71%), about half of the patients (56%) were vaccinated against the disease.

In conclusion Mumps occurs more among males and the frequency of this viral disease is high during January. The role of vaccination was limited in protection of patients against this disease, third booster dose of mumps vaccine is recommended after serological monitoring to evaluate the levels of antibodies to prevent future epidemics.

Key Words: Mumps epidemic, epidemiologic characteristics, vaccination, Babylon province.

السمات الوبائية لوباء النكاف في المناطق الجنوبية لمحافظة بابل للمدة ٢٠١٦-٢٠١٧

الخلاصة

النكاف مرض فايروسي شديد العدوى ورغم توفر اللقاح، لكن المرض ينتشر الآن في العالم وخاصة الدول النامية ومنها العراق علما إن المرض يصيب جميع الأعمار ولا يوجد علاج محدد للمرض. تهدف هذه الدراسة إلى وصف السمات الوبائية لوباء النكاف في منطقتين تقعان جنوب محافظة بابل. الدراسة مقطعية وصفية تضمنت دراسة جميع حالات النكاف المخبر عنها والمسجلة لدى قطاعات الرعاية الأولية في المناطق الجنوبية للمحافظة للفترة من كانون ثاني، ٢٠١٦ إلى نهاية شباط، ٢٠١٧. بلغ مجموع الحالات الكلي المشخصة سريريا (٦٩٣) درست من السجلات الخاصة خلال فترة الدراسة في أربعة مراكز رعاية صحية اثنان في ناحية القاسم واثنان في ناحية الشوملي، تم تطبيق النمط الوبائي الوصفي الذي يشتمل على دراسة وقت حصول المرض ومكانه وخصائص الشخص المصاب.

أظهرت نتائج الدراسة ان الذكور أكثر تعرضا للإصابة من الإناث وبمعدل الضعف وان اغلب الإصابات وقعت في شهر كانون الثاني ٢٠١٦ وسجلت أكثر من ثلثي الإصابات في مراكز النواحي (مركز المدينة) تبين ان أكثر من نصف المصابين تم تلقيحهم بلقاح النكاف ونسبة ٥٦٪.

نستنتج من هذه الدراسة ان مرض النكاف يصيب الذكور أكثر من الإناث، ويكثر في موسم الشتاء وان دور اللقاح الوقائي من المرض محدود الفاعلية. توصي الدراسة بأهمية دراسة إعطاء جرعة لقاح منشطة بعد اجراء تحريات مصلية لمعرفة تركيز الأجسام المضادة في دم الملحقين بجرعتين.

الكلمات المفتاحية : وباء النكاف، سمات وبائية، اللقاحات، محافظة بابل.

Introduction

Mumps is an acute infectious viral disease has a predilection for glandular and nervous tissues, clinically the disease is recognized by enlargement of one or both the parotid glands. Other organs may also be affected [1,2]. About one in ten cases of mumps have complications. Orchitis is the most common complication, followed by aseptic meningitis and to less extent encephalitis, rarely inducing deafness. Other complications including oophoritis mastitis as well as other infrequent complications such as arthritis and myocarditis may occur but to a lesser extent, deaths are extremely rare among patients with mumps and usually associated with encephalitis [3].

Mumps is transmitted by droplets spread, through coughing, sneezing, talking and kissing. The incubation period (range 12–25 days) [2–5], human being is the only reservoir of this disease 30-40% of cases contract disease from sub clinical cases [6]. Mumps is a disease affecting children, but it can also occur in young adults leading to more complications [7]. Infection in the absence of immunization mumps is endemic [8].

The extent of this neglected disease is very high in developing countries which do not use routine mumps vaccination, with regular epidemics [9].

This viral disease was nicely described by the father of medicine (Hippocrates) in the 5th century BC [10, 11]. Of late, epidemics of mumps took place even in people using mumps vaccine in their national immunization programs [12-14]. According to several studies resurgence of mumps epidemics have been documented by many investigators during this decade in several European and Scandinavian countries such as (England, Netherland, Denmark, Bavaria, Scotland, Bosnia, Serbia, France and Belgium) in addition to

other countries in Asia, Africa, Middle East and in north America [15-25].

This contagious disease is widely distributed in low and medium income countries like Iraq, mumps is an insignificant and neglected public health problem because of poor documentation of clinical cases and lack of published epidemiologic studies [26]. Studies have confirmed the cost-effectiveness of prevention and control of mumps through the reduction of school- and work-absenteeism and reduction in costs of treatment of complicated cases and the associated hospitalization [27,28]. This study has been conducted to describe the epidemiologic features of mumps epidemic in the southern districts of Babylon province- Iraq.

Materials and Methods

This study was a cross sectional study. The study population included all notified cases of mumps (secondary information) in south region of Babylon Governorate (Al-Qasim and Al-Shomali districts) during January, 2016 through February, 2017. The ethical clearance and the approval of health authorities were obtained. The duration of data collection started from March, 2017 through May, 2017. Definition of cases follow the clinical criteria and the guide line described under the ICD10 code "B26".

Inclusion criteria for mumps case include: patient with typical signs and symptoms of mumps during the period of epidemic.

Exclusion criteria include cases with unclear information.

The data were categorized according to person place time epidemiologic model to demonstrate the pattern of occurrence of mumps cases during mumps epidemic that took place during the year 2016- 2017. Data were obtained from the records of notified cases of infectious diseases in four

primary health care centers in the two districts which included demographic characteristics of patients such as age, gender, history of Measles Mumps and Rubella (MMR) vaccine, place of residence of patients and the time of occurrence of the disease. The data were presented in tables and graphs, Data using the statistical package for social sciences version 22, IBM, US, 2013. Descriptive statistics were presented as frequencies (No.) and proportions (%). Chi square and Fishers exact tests were used, (p. value) was set at ≤ 0.05 to be significant and, <0.001 to be highly significant difference.

Results

Table (1) depicts the occurrence of the 693 patients by age and gender, the majority of cases reported are in the age group 16 to 20 years and 53% of patients of cases are below fifteen years of age.

This table reveals that males are significantly more affected by this disease, the Chi-square is 23.66 df is 4, The p -value is <0.05 . The result is statistically significant.

Table (2) depicts that the disease is significantly more commonly distributed

among district center dwellers (urban sub districts) as compared to villagers (rural sub districts), this difference reaches a significant statistical level, the Chi square value is 124.72, df is 1 the P -value is < 0.05 .

Table (3) reveals the MMR vaccination status of mumps cases, amongst 693 mumps patients 390 (56%) cases give the history of vaccination one or two doses, exposure and non-exposure to vaccination is statistically significant $p < 0.05$, The Chi square value is 11.17, df is 1.

Figure (1) shows the distribution of cases by months of occurrences, most of cases occur in winter season (peaked in December and January).

Table (4) explains the difference in the attack rates of occurrences of the disease between the two studied districts, the attack rate of mumps in Al Qasim district is lower (38 per 10000 population) than the rate in Al-Showmaly district but this difference dose ot the statistical significant level, The Chi square value is 0.75 df is 1 the P -value is 0.386. The result is *not* significant at $p \leq 0.05$

Table 1: Frequency distribution of patients according to age group and gender

Age groups	Male NO. (%)	female NO. (%)	Total (%)
1-5 Years	33 (5)	19 (3)	52 (8)
6-10 Years	79 (11)	59 (9)	(20) 138
11-15 Years	123 (18)	(7) 50	173 (25)
16-20 Years	159 (23)	8) (56	215 (31)
21-25 Years	29 (4)	30 (4)	59 (8)
More than 26	30 (4)	(4) 26	56 (8)
Total	453 65%	35% 240	693 100%

Chi-square statistic is 23.6615. The p -value is .000093. The result is significant at $p < .05$.

Table 2 : Frequency distribution of study sample by place of residence

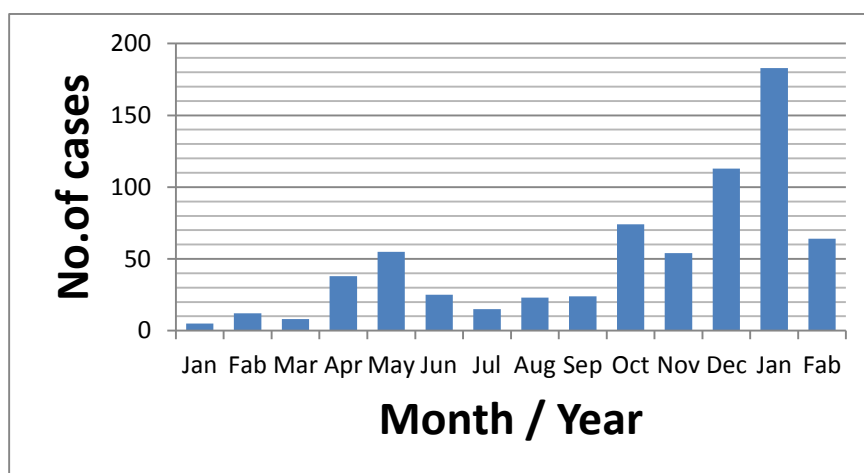
Residence	No.	%
Rural	199	29
Urban	494	71
Total	693	100%

Chi Square value is 124.728. The P-Value is < 0.001 . The result is significant at $p \leq 0.01$.

Table 3: Distribution of study sample by Vaccination status MMR

Vaccination	No.	%
Positive	390	56
Negative	303	44
Total	693	100%

Chi Square value is 11.175. The P-Value is < 0.001 . The result is significant at $p \leq 0.05$.

**Figure 1:** Number of cases of mumps (N=693) in the south region of Babylon province (Al-Qasim and Al-Showmaly distance) by month of onset January 2016-Fabreury 2017**Table 4:** Attack rates of mumps by districts.

District	No: of cases	No: of population	Prevalence for 10000 population
AL-Qassim	485	128222	38
AL-Showmaly	208	44000	47
Total	693	172222	40

Discussion

Going through the literature this descriptive epidemiologic study was the only investigation in the governorate of its kind.

By the end of 2015 around 12957 mumps cases were reported in Iraq, the numbers of incident cases increased dramatically in the year 2016 (73919 case) this was un expectedly very high as compared with numbers in neighboring countries in the same period as documented by WHO update report; Saudi Arabia 14, Syrian Arab Republic 84, Jordan 168, Kuwait 318, and Turkey 344. The estimated attack rate of mumps in Baghdad was 22 per 10000 population [29,30] while attack rate in our study was 40 per 10000 this indicates the explosiveness and the sustained transmission of the disease this may be due to low herd immunity among the studied population. This study explains low coverage rate of routine vaccination, about half of patients were unvaccinated and the vaccinated patients did not remember exactly whether they received one or two doses, this is because of the absence or very weak documentation due to incomplete health file follow-up system.

The effectiveness of immunization against this disease was reported, about 78% for 1 vaccine dose and 88% for 2 the two doses (31). However, vaccination failure and waning of immunity were identified in outbreaks, mainly in overcrowding settings (32-36). Weak B-cell responses induced by the strain in vaccine. A research, was shown that measles virus vaccine induced 3-fold higher levels antibodies- than mumps virus [37].

The MMR vaccine was introduced in Iraq for the first time 1996, in a study conducted in Mosul city by Quasim [38] who found that the seropositivity of vaccinated Iraqi children who received at least single dose of MMR vaccine was much lower than that reported in other

countries [39-41], this may be justified probably by low coverage rate of vaccination or having only single dose of the vaccine or due to the failure of the vaccine to elucidate enough antibody titer [38].

The present study shows very high attack rates of mumps especially in Al-Showmaly district. This high rate may indicate the high susceptibility of the target groups, low level of public awareness about the transmission of the disease and the droplets precautions, overcrowding, un healthy housing and improper behaviors of patients and their families with the disease during epidemics such as the social un healthy habit of kissing which is very common in our society, the occurrence of the epidemic may also contributed to the weak health system management at district level the health services are facing problems and challenges that affecting both passive and active surveillance which is essential health activity to prevent and control contagious diseases epidemics, in Odisha village in India silent epidemic of mumps was unnoticed because of the poor links in the essential public health services within the health-care delivery system in the area [42].

This study depicts that males are at high risk the male to female ratio is 1.88 to 1 this finding is similar to the findings of other researchers [43,44], mumps cases were reported in Shandong province, China with an average male-to-female ratio of 1.94 to 1 [35] which agrees with our finding but in contrast to the finding of other investigators in India who reported high incident cases among females [34]. The current study reveals that the most affected age group is below 15 years of age this finding goes with the findings of other investigators [29].

Mumps in this study occurred mostly in winter but other epidemiological studies reported the occurrence of the disease in spring and summer [45].

We conclude that mumps is an important public health issue in our society that affect

mainly males both children and young adults people living in the district centers, people in AJ Showmaly district were at high risk of the disease, winter is the season of high incident cases of mumps, health care providers should be cautious for mumps in children and young adults presenting with parotitis regardless of immunization history. High quality vaccination should be focused for high risk groups, active serologic and epidemiological surveillance are strongly needed to prevent future epidemics.

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