

Epidemiological characteristics of Under Five Measles cases, Al Najaf Al Ashraf Province, Iraq, 2006-2018

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ABSTRACT

Background: Measles is a highly contagious disease and it is one of leading causes of death among young children. In Iraq, extensive efforts are in place to achieve measles elimination but still sporadic cases and limited outbreaks continued to occur.

Objectives: The study aims to describe epidemiological characteristics of under five years measles cases and determine the risk factors of

الخلاصة:

خلفية البحث: الحصبة مرض شديد العدوى وهو واحد من الاسباب التي تؤدي الى الوفاة في الاطفال الصغار. في العراق، جهود كبيرة بذلت للوصول الى التخلص من مرض الحصبة لكن حالات متفرقة و تفشيات محدودة من مرض الحصبة استمرت بالحدوث.

الهدف: لوصف الخصائص الوبائية لحالات الحصبة للأطفال الاقل من خمس سنوات المصابين بمرض الحصبة في النجف الاشرف العراق 2006-2018.

المنهجية: اتبعت هذه الدراسة تصميم وصفي رجعي وقد اجريت في الفترة من 1 / كانون الثاني / 2006 الى 1 / كانون الأول / 2018، حيث تم مراجعة سجلات الرصد الوبائي لجميع حالات الحصبة المشتبه بها المسجلة في دائرة صحة النجف الاشرف اعتباراً من 2006 - 2018. وتم طلب جميع البيانات الديمغرافية الاساسية، الحالة التلقيحية و النتائج المختبرية لجميع الحالات.

النتائج: العدد الكلي لحالات الحصبة المشتبه بها خلال تلك الفترة كانت 418، 196 (%47) كانوا ذكور، وسيط العمر كان 24 شهر، و 219 (%52) يعيشون في المناطق الحضرية. فقط 201 (%48) لديهم على الاقل جرعة واحدة من لقاح الحصبة، 112 (%56) من الاطفال الملقحين يعيشون في المناطق الحضرية. النتائج المختبرية متوفرة لجميع الحالات، 105 (%52) يعيشون في المناطق الريفية و 158 (%78) سجلت خلال سنة 2009. بالمقارنة بين الحالات المؤكدة مختبرياً مع الحالات الاخرى، عدم التلقيح بلقاح الحصبة كان عامل الخطورة الوحيد الذي له اهمية احصائية. (; P=0.001; odds ratio=1.87; 95% CI: 1.27- 2.75).

الاستنتاجات: بالرغم من ان هذه الدراسة هي ليست مسح لتغطية اللقاحات لكن وجدنا ان معدل التلقيح هو قليل جدا والذي يزيد من خطورة التفشي الوبائي.
التوصيات: نوصي بتحسين التغطية الروتينية للتلقيح و تنفيذ الحملات التلقيحية بلقاح الحصبة.

measles in Al Najaf Al Ashraf province, Iraq, 2006-2018.

Methodology: This study follows a retrospective descriptive design, which was conducted in the period from 1 January, 2006 to 31 of December of 2018, Review of surveillance records of all suspected measles cases reported to Al Najaf Ashraf Directorate of Health from 2006 to 2018. Basic demographic data, vaccination status and lab results were sought.

Results: Total suspected measles cases during this period was 418; 196(47%) were males; median age was 24 months; and 219 (52%) live in urban areas. Only 201 (48%) had at least one dose of measles vaccine; 112 (56%) of vaccinated children live in urban area. Lab results were available for all the cases, 202(48%) were measles IgM positive. Of the lab confirmed cases, 105 (52%) lived in rural area

and 158(78%) reported in 2009. Comparing lab confirmed cases with others, un-vaccination to measles vaccine was the only statistically significant risk factor ($P=0.001$; odds ratio=1.87; 95% CI: 1.27-2.75).

Conclusion: Although this is not a vaccine coverage survey, but we found that measles vaccine coverage is extremely low that increase risk of outbreaks.

INTRODUCTION

Measles is one of the important causes of death in children in developing countries despite the availability of a safe vaccine (1, 2). More than 20 million people get infection with measles every year and in recent years, 95% of measles deaths occur in developing countries with weak health infrastructures and most of these deaths occurring in children under 5 years old (3, 4). In 2014, an estimated 114,900 deaths were reported worldwide. Measles causes severe complications, particularly among children, and includes pneumonia, encephalitis, keratitis, and otitis media (1, 5, and 6). During 2000–2015, the annual incidence of measles decreased by 75.0% from 146 to 36 cases per million population, similarly the annual estimated measles deaths decreased by 79.0% from 651,600 to 134,200 (1, 7). Recent outbreaks have been reported in North America (1, 8, and 9), South America (1, 10), Europe (11, 12), Africa (1, 13), and Asia (1, 14, 15). In the Eastern Mediterranean Region (EMR), nearly 11000 Measles cases and the same number of Rubella were reported during 2007. In 2004, an estimated case fatality rate of 3% (16). Immunity against measles is acquired by get the infection or by vaccination with measles vaccine and usually lasts throughout life (1, 17). A two-dose vaccination policy was recommended by World Health Organization (WHO) with the first dose administered during the first year of life (1, 18) and to interrupt the disease transmission, the coverage should be maintained at a level of 90–95% (1, 19).

In many countries, measles vaccine is freely available and is included in the program of immunization. Measles is eliminable disease because the reservoir is human, and sensitive and specific diagnostic tests, as well as the availability of safe and effective vaccines (1, 20). During 1980s, Following implementation of a one dose measles vaccine, there was a rapid reduction in the incidence of measles as well as decline in measles related hospitalization and deaths in the United States (21, 22, 23). By the late 1980s, however, measles outbreaks were still occurring among school-aged children who had received a single dose of measles vaccine. In 1989, a second-dose vaccination schedule was recommended by the Advisory Committee on Immunization Practices (ACIP), the American Academy of Pediatrics (AAP), and the American Academy of Family Physicians (AAFP) (22, 23).

In Iraq, during the last 50 years 1,331,021 measles cases were reported with an average 25,114 measles cases and 750-1250 measles related death every year (in an estimated case fatality rate of 3%-5%). extensive efforts are in place to achieve measles elimination but still sporadic cases and limited outbreaks continued to occur. In 2004, the average annual reported measles cases dropped from 9400 cases to 1000 cases annually following implementation of measles Elimination Strategies (24).

AIMS OF THE STUDY

The study aims to describe epidemiological characteristics of under five years measles cases and determine the risk factors of measles in Al Najaf Al Ashraf province, Iraq, 2006-2018.

METHODOLOGY

- Study design and Site Selection

This study follows a retrospective descriptive design and was implemented in Najaf province; the period of study was from 1 January, 2006 to 31 of December of 2018. The target population for the study was all patients who reported to the surveillance unit in Najaf health directorate as suspected measles during the study period. Al Najaf is a religious sacred city presented in the middle of Iraq about 160 KM southwest Baghdad with a population of about 1.4 million people. Rural area represents about 30% of Najaf. Measles is a notifiable disease in Najaf and all health facilities should report all suspected measles cases to the provincial surveillance unit within 24 hours, at the same time, the local health authorities are required to carry out an epidemiological investigation for all notified cases, which includes obtaining specimens for laboratory confirmation. The data was collected and reviewed from the patient's files and surveillance records of all suspected measles cases.

Demographic data include Age, Gender, Residency, vaccination status, history of contact with confirmed case and lab. Results were sought.

- Measles Diagnosis

Diagnoses were based on the clinical case descriptions and laboratory confirmation criteria. A suspect measles case is defined as an illness characterized the following signs: red skin rash; fever of 38°C or higher; with or without cough, upper respiratory catarrhal symptoms, or conjunctivitis; measles spots (Koplik's spots).the following laboratory findings were considered indicative of a measles diagnosis: detection of anti-measles IgM antibodies in the serum (unless live attenuated measles vaccine received within the prior month).

- Data analysis

Data was entered into MS Excel and this was later transferred and analyzed using Epi-info version 7. Frequency, mean, standard deviation and percentages are provided to describe the characteristics of measles case, and the association among groups was tested first by the chi-square test with P- value at 5% of significance level and we calculated odds ratios (ORs) to examine the association between several independent variables (sex, age, contacts and MCV dose 1) and measles case status. The precision of the results was assessed with 95% confidence intervals (CIs).

RESULTS

Table (1): Demographic characteristics of confirmed and suspect Measles, Najaf 2006-2018

Demographic characteristics	Confirmed Measles		Suspected Measles				P-value	
	No.	%	No.	%	No.	%		
Age group								
	≤ 12 months	89	44	94	44	183	44	0.989
	13-59months	113	56	122	56	235	56	
Gender								
	Male	98	49	98	45	196	47	0.519
	Female	104	51	118	55	222	53	
Residency								

	Urban	97	48	122	56	219	52	0.083
	Rural	105	52	94	44	199	48	
Vaccination status								
	un vaccinated	119	62	86	42	205	52	0.000
	vaccinated	72	38	118	58	190	48	
Contact								
	yes	18	9	10	5	28	7	0.080
	No	184	91	206	95	390	93	

Table 1 showed certain demographic characteristics of confirmed measles cases were compared with demographic characteristics of suspected cases.

Table (2): Risk Factors of Measles, Najaf 2006-2018

Risk factors	Odds Ratio	Confidence interval	P - value
Age	1.02	0.69-1.50	0.989
Gender	1.13	0.77-1.66	0.519
Residence	0.71	0.48-1.05	0.083
Un vaccinated child	2.27	1.51- 3.40	0.000
Contacts	2.01	0.90-4.47	0.080

Table 2 showed un-vaccination to measles vaccine was statistically significant risk factor (P=0.000; odds ratio=2.27; 95% CI: 1.51- 3.40) while gender, age group, residency and contacts to confirmed cases were not significant risk factors.

Figure (1): Distribution of Measles cases by Age group. Najaf 2006-2018

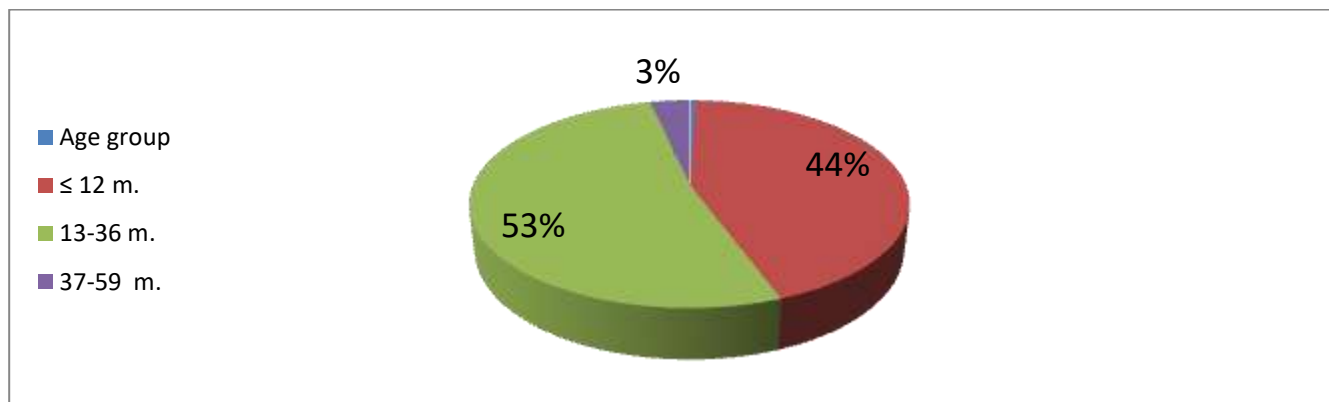


Figure 1 showed that a total of 418 cases of suspected measles were notified from 1 January 2006 to 31 December 2018. Lab results were available for all cases, 202(48%) were measles IgM positive. 47 % (n=196) of Suspected cases were male while 50 % (n=100) of confirmed cases were male with a male to female ratio of 1:1, the age varied widely from 1 month to 59 months, with a median age of 24 months in suspected cases while the age of confirmed cases ranged from 5 month to 59 months, with a median of 24 months and The age group distribution of cases in months shows that those in the 13 to 36 months category had the highest frequency of 52.5% (n=106) and infants < 1 year constitute 44% (n=89) while those in 37 to 59 months' category had the lowest frequency of 6(3%).

Figure (2): Distribution of measles cases by vaccination status Najaf.2006-2018

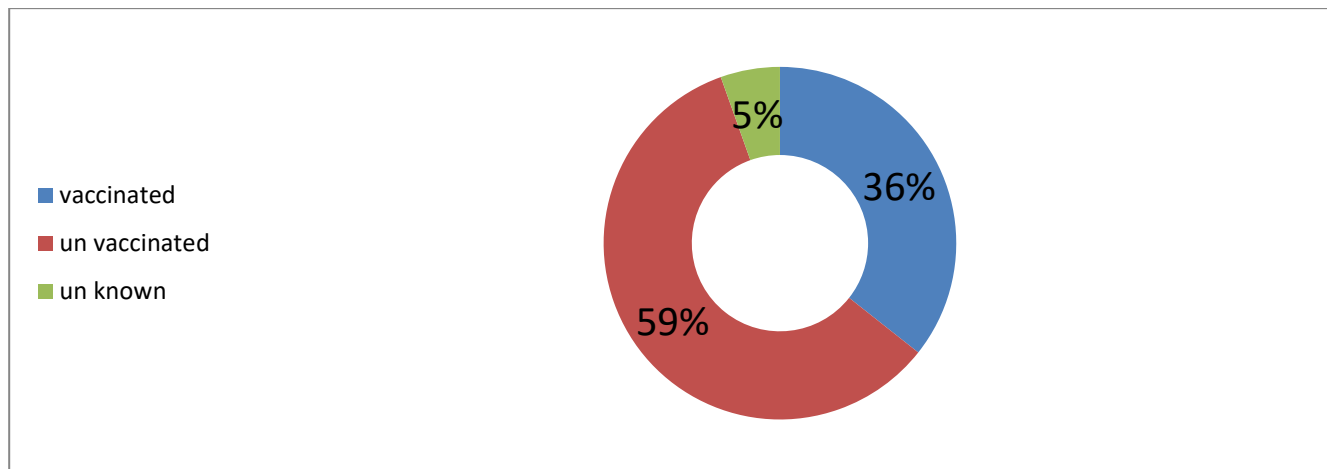


Figure 2 showed regarding residency, 52 % (n=219) of suspected cases live in urban area while 48 % (n=105) of confirmed cases live in urban area. 54.6 % (n= 118) of suspected cases had at least one dose of measles while 35.6 % (n=72) of confirmed cases had one dose of measles vaccine and confirmed cases with unknown vaccination status represent 5 %.

Figure (3): Distribution of Measles cases by Years, Najaf 2006-2018

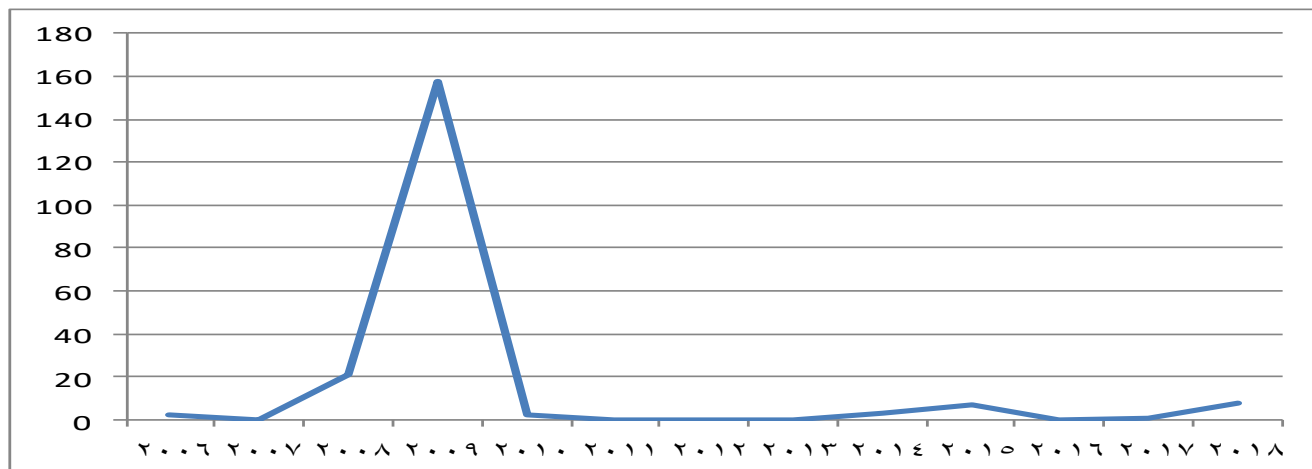


Figure 3 showed No measles-related deaths or serious complications (e.g., blindness, encephalomyelitis, or pneumonia) were reported. 8.9 % (n=18) of confirmed cases had contact with previous measles case while 1.4 % (n=3) of suspect cases had contact with confirmed cases. This study showed that there were an increase in the number of confirmed cases which reported in 2009[78 % (n=158)] and in 2008[10.3 % (n=21)].

DISCUSSION

Our study provides a data base for all measles cases reported during thirteen years in AL Najaf Al Ashraf province. This study shows that infants constitute a remarkable proportion of affected children which represent about more than one third

while more than a half of confirmed cases occur at age group 13-36 months this finding was similar to a study conducted in Baghdad ⁽²⁵⁾ and two studies done in Nigeria ^(26, 27). As a result of this finding, all efforts toward measles prevention should be directed toward

children especially the under-fives. Male to female ratio in this study was 1:1 this agree with a study done in Mongolia ⁽²⁸⁾ while dis agree with studies conducted in Baghdad ^(25, 29) and in Nigeria ⁽²⁶⁾ which showed that males were more than females this may be due to the time and place where the study conducted.

This study shows that about one third of confirmed cases had been vaccinated and the unvaccinated children were at 2.3 -times higher risk of being infected with measles than those in the vaccinated group, the same result was found in studies conducted in Baghdad ⁽²⁵⁾ and Pakistan ⁽³⁰⁾; however this finding as a result of relatively low vaccine coverage was found in other studies ^(31, 32), so we need great efforts towards vaccination of all children during routine immunization and supplementary immunization activities. There were dramatically increased numbers of confirmed measles cases in 2008 and 2009 compared to 2006 as part of outbreak occurred in Iraq ⁽³¹⁾ this might be explained by the accumulation of susceptible children who have low immunity due to lack of vaccination or low-quality vaccines, In general, primary vaccine failure occurs in approximately 15% of children vaccinated at 9 months and 5–10% of children vaccinated at 1 year of age. Many factors can lead to increase the vaccine failure such as in appropriate vaccine handling, failure of cold-chain maintenance, improper administrative procedures, and probably other host and Vaccine-related factors ^(31, 33). However, vaccine effectiveness was 90.03%, representing the proportion of vaccinated children in the entire population who developed protective immunity ^(31, 33 and 34). Vaccination of the susceptible

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children can lead to increase herd immunity and decrease the measles outbreaks ^(1, 35). This study shows that more than a half of confirmed cases lived in rural area, the same finding found in a study conducted in China ⁽³⁾, this may be due to the high density in rural areas increases contacts among inhabitants, making a good condition for disease transmission.

The limitations of the study, First, the information was derived from the reported cases in the surveillance system so the underreported cases could be presented and the accuracy of information was dependent on the accuracy of reports submitted and stored on the surveillance system. Second, the vaccination status of patients was reported based on the patients' response to questions asked by medical doctors at the onset of the disease. Thus, patients' vaccination status cannot be validated. Unfortunately, no adequate data were available for the second dosage of MCV.

CONCLUSION

Although this is not a vaccine coverage survey, but we found that measles vaccine coverage is extremely low that increase risk of outbreaks.

RECOMMENDATIONS

We recommend that

- More efforts are needed to increase the vaccine coverage.
- Increasing population awareness about the benefits of vaccination.
- Conducting future epidemiological studies to determine the risk factors for low measles vaccination coverage.

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