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Hasan Alwan Baiee

Zainab Hamed Abdel Qader

Zahraa Hossam Abdul Hussein

Ali Mohsen Flih

ORIGINAL STUDY

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Epidemiological and Clinical Characteristics of Children with Measles in Babil Governorate in 2024

Hasan Alwan Baiee [a,*], Zainab Hamed Abdel Qader [b], Zahraa Hossam Abdul Hussein [a], Ali Mohsen Flih [a]

[a] A College of Nursing, Hilla University, Babylon, Iraq
[b] Communicable Diseases Control Center/Public Health Directorate/Ministry of Health, Baghdad, Iraq

Abstract

Background: Measles considered a highly contagious and serious disease affecting mainly children in their early years, with morbidity and mortality. The effective preventive measure against measles is vaccination.

Objective: To identify the epidemiological characteristics of patients with measles admitted to Maternity and Children's Teaching Hospital in Babylon Governorate.

Materials and Methods: A hospital-based cross-sectional study was conducted using structured questionnaire on convenient sample of children infected with the measles virus and hospitalized in Maternity and Children's Teaching Hospital, Babylon Governorate, Iraq. During three-monthperiod from the first of January to 30th of March, 2024. A special semi-structured validated and reliable questionnaire was used for interviewing. It consisted of two parts, the first part included demographic data related to age, sex, place of residence and the history of vaccination, receiving vitamin A, as well as the number of deaths among all diagnosed patients.

Results: About 1,103 cases of children infected with the measles virus were reported in the main referral Maternity and Children's Teaching Hospital in Babylon Governorate. The total deaths due to measles were fifteen patients, indicating a case fatality rate (1.36%). A convenient sample of 204 admitted patients were studied through interviewing their companions. The results revealed that males outnumbered females (58.8%). Most of the samples in this study were infants, followed by children in the age group (1–3) years old. The nutritional status of more than half of the study sample was poor, 106(52%). About one-third of patients had received the vaccine 77 (37.7%), while about two-thirdsof them had not received the measles vaccine 127 (62.3%). While two-thirds (67%) did not receive vitamin A supplements. Respiratory tract infection was the most common complication reported in 125 (61.3%), the case fatality rate was 1.36%. Conclusion: Measles is an epidemic that forms a real public health problem. Males were highly affected, the majority of cases were below one year of age, most of the affected children didn't receive the measles vaccine, and the majority were not receiving Vitamin A. Case fatality was relatively high.

Keywords: Epidemiology, Measles, Hospital based study, Babil, Iraq

1. Introduction

The measles virus causes a contagious serious disease, which has the ability to produce a measles epidemic and can be easily prevented by an available safe vaccine. In developing countries, measles is considered one of the main causes of death in children [1]. There are unprecedentedly high transmission rates of measles throughout the world [2]. In 1997, the countries of the Eastern Mediterranean Region adopted measles elimination as a goal to be achieved by 2010 [3]. Due to delays, the goal was postponed to 2015 [4]. and then to 2020 as part of the Eastern Mediterranean Vaccine Action Plan [5]. The measles virus is considered

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* Corresponding author.
E-mail addresses: hasanbaiee1951@gmail.com (H. A. Baiee), ZZWbh8585@gmail.com (Z. H. Abdel Qader), ZOZahosam7@gmail.com (Z. H. Abdul Hussein), aljubouria00@gmail.com (A. M. Flih).

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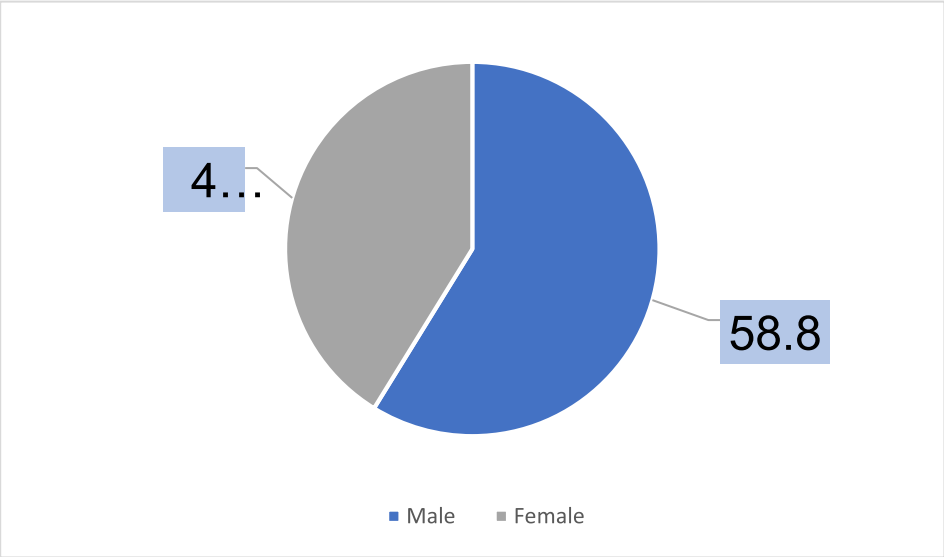

Fig. 1. Distribution of cases by sex.

Table 1. Frequency distribution of the study sample by age groups.

Age	Male	Female	Total
Below 1 year	54(63.5%)	31(36.5%)	85(41.7%)
1–3 years	45(60%)	30(40%)	75(36.8%)
4–6 years	23(52.3%)	21(47.7%)	44(21.5%)

This table shows that majority of the sample are in the age group (Below 1 year) which constitutes about 41,7% of the study sample.

seasonal and it infected the majority in a period before the discovery of the measles vaccine. The vaccine is considered the best way to prevent measles, with its elimination as a current goal [6]. Measles has been considered as preventable infectious disease since 1963 through using an effective vaccine. Serological and epidemiological studies indicate that the effectiveness of the first dose of the measles vaccine is about 85%–90% when given at the age of 9 months, and the effectiveness of the two doses is 99% when the second dose is given at the age of 12–15 months [7]. Humans are the only natural host of the virus with symptoms that usually appears within 10–12 days after exposure to an infected person and usually lasts for 7–10 days, Transmission occurs primarily via airborne respiratory droplets to the mucous membranes of the upper respiratory tract and conjunctiva [8]. The measles virus killed at least 2 million people a year globally before the measles vaccine was introduced [9]. Research has shown that young children who suffer from malnutrition are the group most at risk of contracting measles, and children who suffer from vitamin A deficiency also have a high risk of contracting measles [10]. The measles virus is characterized by an erythematous maculopapular rash, diarrhea, sometimes pneumonia, and central nervous system disturbance. The main complications of measles are: pneumonia, diarrhea, encephalitis, laryngitis, and otitis media. Social factors are among the factors which increased the numbers of measles cases. But with high coverage of vaccination in the local community and vaccination of immigrants among high risk group, the burden and trend of this highly infectious disease can be decreased [11–15]. By the vaccination, the age distribution of measles changes from children to older age groups [16]. According to epidemiological forecasts, if there is no vaccination every 3–5 years due to the accumulation of susceptible people, an epidemic will occur [17, 18]. Despite all efforts to eliminate this the endemic serious disease in Iraq epidemiological studies revealed that Iraq was facing a large measles epidemic during last months (2023–2024), during this time Iraqi Ministry of Health recorded more than 27 000 cases of measles, 96% of which were among the unvaccinated, and 4% were among the vaccinated who did not complete the 2 doses. This report shows that Iraq is among the countries with the most measles cases In the latest list, coming in third, following only Kazakhstan and Azerbaijan. In addition, it was noted that 43 measles deaths have been reported, of which 42 of the fatalities were unvaccinated [19].

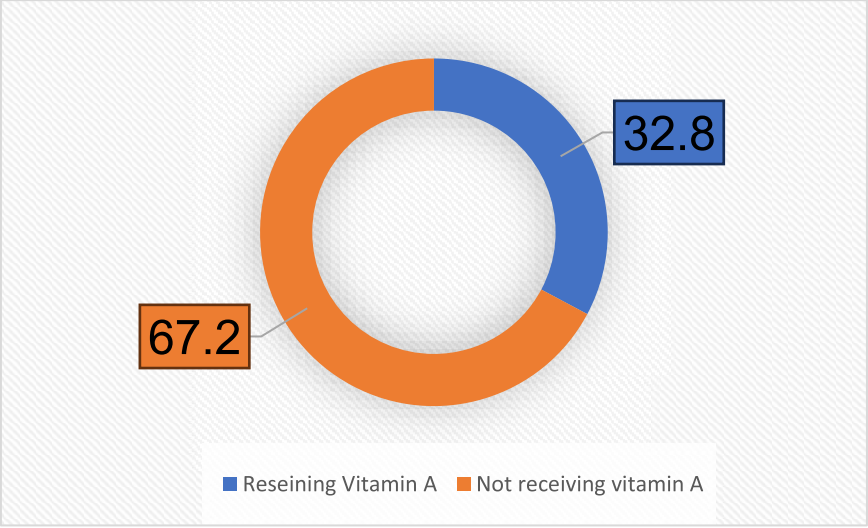

Fig. 2. Distribution of children with measles based on their receipt of vitamin A supplements.

Table 2. Distribution of measles cases by vaccination status.

Vaccination	Yes	No
Below 1 year	20(26%)	65(51.2%)
1–3 years	43(55.8%)	32(25.2%)
3–6 years	14(18.2%)	30(23.6%)
Total	77(37.7%)	127(62.3%)

This table indicates that the majority of the study sample had not previously received the measles vaccine, 127 (62.3%), and more than half of those who did not receive the vaccine were from the age group less than 1 year.

2. Materials and methods

2.1. Patients and study design

A descriptive observational hospitals based cross-sectionalstudy was conducted on non-probability convenient sample of diagnosed children with measles. The diagnosis was made by specialist pediatricians clinically and serologically. Diagnosis of measles was done by the classical history of the prodromal, fever, cough, conjunctivitis followed by the appearance of the classical rash after few days of the prodromal together with blood and serological investigation in (Teaching Hospital for Pediatrics & Gynecology, Babil Governorate) which considered as the main referral pediatric hospital in Babil governorate. Epidemiological description was done using the descriptive epidemiologic approach (person, place, time epidemiological model) to identify the occurrence and distribution of the disease during a three months period from the first of January to 30th of March, 2024.

Data were collected using semi structured and validated questionnaire which includes information related to age, sex, place of residence, time of admission, nutritional status according to the assessment of the medical team, vaccination status, receipt of Vitamin A, clinical presentations and main complications. Data were also obtained checked with patients hospital records and hospital digital registry.

The data collection was conducted by a collaborative group of well-trained nursing students from the Nursing Department at Hilla University College.

2.2. Ethical approval

Ethical approvals were obtained from the health authority of Babylon health directorate, the hospital managerial officers and the ethical research committee in Hilla University College. Verbal consents were also obtained from parents or patients companions after explaining to them the objective of the study. The data were analyzed using SPSS version 24, and the results are also presented in tables and figures.

3. Results

The clinical characteristics of 204 cases of individuals infected with measles were studied from among

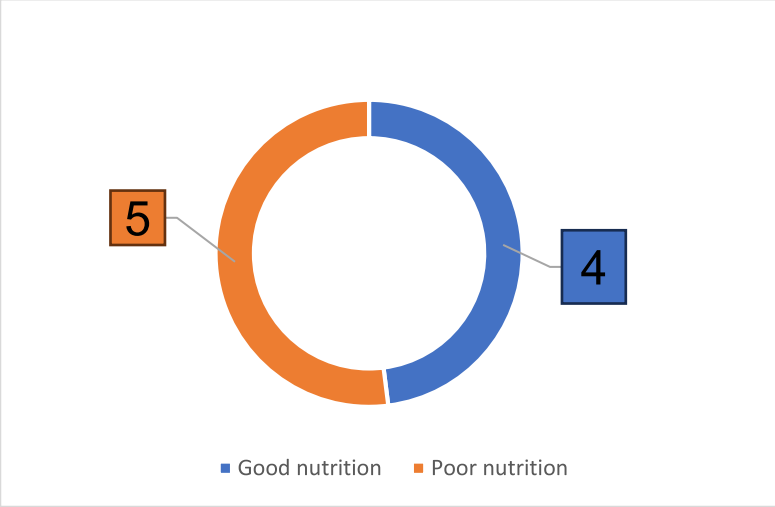

Fig. 3. Distribution of measles cases by nutritional status.

Table 3. Frequency distribution of measles cases by complications.

complication	frequency	Percentage%
Respiratory tract infection	125	61.3%
Pneumonia	96	47.1%
Diarrhea	34	16.7%
Bronchitis	96	47.1%

This table shows that Respiratory tract infection was the most common complication reported in 125 (61.3%) followed by pneumonia and bronchitis, both in 96 (47.1%).

all cases (1103), accounting constitutes (18.5%) from total diagnosed and registered patients, the interview took place in the (Teaching Hospital for Pediatrics & Gynecology, Babil Governorate) during the measles outbreak period. The majority of individuals sampled in this study are males 120 (58.8%), and it was found that the high proportion of them fall in the age group less than one year. Less than half of the study sample received the measles vaccine 77 (37.7%), while most of them did not receive the vaccine 127 (62.3%). Also, two-thirds of the study sample of this study had not previously taken vitamin A supplements. Results also showed that about seventy percent of the patients were from rural and sub-district areas as depicted in (Tables 1 to 4) and (Figs. 1 to 4).

4. Discussion

Findings of The present study reveal that measles affected more infants, among all admitted children, to Babil referral teaching pediatric hospital with a higher frequency occurrence in males when compared to females. This result is similar to many previous descriptive studies which were done inside and outside Iraq [20–23]. This finding is consistent with local studies that have identified young children mainly infants among early years as being at a higher risk of developing measles, and males have a higher incidence of measles. the increase in the incidence of measles mainly due to lack of measles vaccine coverage due to Covid 19 outbreak affecting Iraq during the years2020–2021 where most of health care resources were used to address Covid 19 epidemic.

In contrast, other studies found that most cases of measles were highly distributed during the second year of age [24, 25]. Compel *et al.* [26] and McLean *et al.* [27] reported that the peak age incidence of measles in the age group 5–10 years and preschool children. But Jahan *et al.* [28] found peak age incidence is in 6–11 months of age, which agrees to present study. This finding is similar with that reported by other recent studies [29–32].In this study two-thirds of affected children were unvaccinated, this goes in line with other studies [12, 13, 33], this viral disease occurred more among children who did not up take vaccination, this finding is supported by the findings of other reporters, the highly unvaccinated children in the current study may be due to Covid 19. Epidemic during the last three years or may be due to low level of awareness and misbelieve of mothers

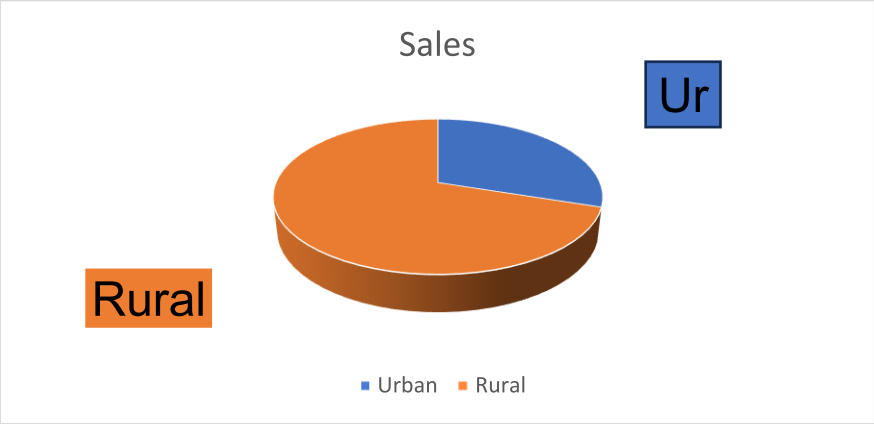

Fig. 4. Distribution of patients by place of residence.

Table 4. Distribution according to those infected with measles during the first 3 months of the year 2024.

Cases	Infected	Cured cases	Mortality rate
January	375(34%)	370(98.7%)	5(1.3%)
February	415(37.6%)	412(99.3%)	3(0.7%)
March	313(28.4%)	306(97.7%)	7(2.3%)
Total	1103(100%)	1088(98,7%)	15(1.3%)

This table shows that the total number of cases diagnosed with measles among children hospitalized in Babil Teaching Hospital for Women and Children was 1,103 measles cases children during the months (January, February, and March) (2024). Most of these cases recovered, while the number of deaths was 15 making the case fatality rate of (1.3%).

about the safety of measles vaccine, poor primary health care services, especially in the rural where more cases occur beside to inadequate surveillance as coupled with low vaccine coverage, non-effective health education and not giving Vitamin A as part of maternal and child health care [34].

Mal nutrition in this study is associated factors that can increase the infection rate by measles virus in the early years, this finding is in agreement with other reporters [12, 13, 33]. Local reporter explained that breast fed children were reducing during last years in our society, the exclusive bottle feedings (usually linked to malnutrition) has marked negative effects by (33%)on immunity of children under-fives especially infants [35, 37].

Most of cases were living in rural and suburban dwellers this finding is consistent with the finding of recent retrospective local study [34]. study also reported no death in contrast to our finding that shows the case fatality rate of (1.35%) which indicate the severity and high rate of complications especially respiratory infection where the epidemic took place in winter time. It was emphasized that analysis of epidemiological data to identify significant changes in measles epidemiologic profile early detection of changes is crucial for timely prevention, and control of measles and limit disease spread and reduce serious impact [34–37].

5. Conclusion

Measles is a priority public health issue for children in Babil governorate, males were highly affected, with the majority of cases being below one year of age. Approximately two-thirds of affected children did not receive the measles vaccine and the majority were not receiving Vitamin A. Case fatality rate was relatively high compared to other countries.

Strengthening routine immunization programs, ensuring effective vaccination program should be monitored, and improving epidemiologic surveillance are strongly requested in order to eliminate this deadly endemic disease with potential subsequent outbreaks from Iraq. Further comprehensive analytic studies are needed to identify risk factors and the causal association relationship between measles and other correlates.

6. Limitations of the study

Some limitations of this study should be considered. The hospital-based approach and the convenient sample size of the current study affect the generalizability of this study. Some variables have not been studied. In cross sectional study design the causality cannot be determined since there is lack of temporality and follow-up.

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Conflict of interest

None.

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