

Epidemiologic and Clinical Characteristics of Children with Measles during the Year 2019

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Abstract

Background: Measles remains a major public health problem in many developing countries including Iraq,

Objective: To describe the epidemiological and clinical profiles of measles among children admitted to Babylon Teaching Hospital for Maternity and Children .

Methodology : A descriptive observational cross sectional epidemiologic study was conducted on children diagnosed and admitted to Babylon teaching hospital for Maternity and Children . using the (person, place, time epidemiological model) during the period from 1st of January 2019 to the 1st of September 2019. The total number patients was 157. The independent variables studied include; age, gender, residence, time of admission, nutritional status, vaccination status, any co morbidities, clinical presentations and complications.

Results : One hundred fifty seven clinically and serologically diagnosed measles cases who were admitted to Babylon Teaching Hospital for Maternity and Children . . The male to female ratio was 1.4: 1 the mean age of the patients 35.15±38.5 months(ranging between one month to 11 years). In this study Children under years were most affected. Seventy four percent patients were from rural districts and sub districts. The disease took the profile of epidemic and was seen most often during the hot season, with a peak in July. Majority of cases stayed in the hospital for three days and more. Only one death was reported with a case fatality rate (0.63%).The most common complications in this study was pneumonia.

Conclusion: Measles remains a common, endemic illness mostly due to inadequate vaccination coverage, further analytic studies are strongly requested in Iraq to identify the real potential risk factors of the occurrence of this serious endemic diseases.

Keywords: *Clinical Characteristics, Children, Measles*

Introduction

Measles remains a common disease in many countries , especially in parts of Africa and Asia, People from both developed and developing countries are seen to be targeted from this medical problem. Although the incidence rate of this disease was significantly decreased during the period from 2000 until 2017¹. recent studies conducted in the USA and other countries indicated the level has started to grow up ² . Measles is usually associated with fever and rashes³ that could be more dangerous among children came from developing

countries and potentially leading to increase the mortality rate up to 15 percent⁵ Despite undertaken efforts on the issue of measles elimination in Europe by 2015, the goal was not achieved yet ⁷ In some cases, the patients are urgently admitted to the hospital due to the severe complications ⁸ . In 2017, There were about 110,000 individuals who passed way from measles worldwide and most of the cases were seen to be among children ⁹ The spread of this disease could be reflected by a significant demand of vaccination being used over the countries ¹⁰⁻¹¹.Epidemiological information is necessary to assess progress and document, measles elimination¹²⁻¹³.

Epidemiological studies about this contagious disease in Iraq are limited. This manuscript aims to describe the epidemiological features of measles cases admitted to Babylon maternity and children hospital during the year 2019.

Methodology

A descriptive observational cross sectional hospital based epidemiologic study was conducted on children with measles admitted and diagnosed clinically in Babylon teaching hospital for Maternity and children. This study covered the period from January until of September 2019.

Data were collected retrospectively from Medical case sheets of children aged from 1 month till 11 years.

The independent variables studied include; age, gender, residence, time of admission, nutritional status, vaccination status, any co morbidities, clinical presentations and complications. We approached registered data in the hospital records on measles cases.

The collection of data were made by collaborative group of students of 6th stage of Babylon medical College After obtaining ethical clearance from the health authority. Data were presented in tables and figures , Spss version 21 was used to analyze data, Chi square was performed to assess the significance differences among the categorized variables, P values less than 0.05 were considered significant.

Ethical Considerations: This study was approved by the Research Ethical Committee in Babylon University –Hammurabi College of Medicine.

Results

Table (1) shows that about half of patients are below one year (45.2%).

Table (1) : Distribution of cases by age (years)

| Age | Frequency | Percent |
|----------------|-----------|---------|
| Below 1 year | 71 | (45.2) |
| 1-4 years | 44 | (28.0) |
| 5-10 years | 35 | (22.3) |
| Above 10 years | 7 | (4.5) |
| Total | 157 | 100% |

Only (19.1%) of children above nine months were vaccinated as shown in table(2).

Table (2) : Distribution of measles cases by status of vaccination .

| Vaccination | Frequency | Percent |
|----------------|-----------|---------|
| Yes | 30 | (19.1) |
| No | 48 | (30.6) |
| Below 9 months | 51 | (32.5) |
| Missed | 28 | (17.8) |
| Total | 157 | 100% |

Table (3) reveals that more than half of patients are moderately and severely malnourished.

Table (3) : Distribution of measles cases by nutritional status

| Nutritional status | Frequency | Percent |
|--------------------|-----------|---------|
| Good | 47 | (29.9) |
| Mild | 13 | 8.3)) |
| Moderate | 44 | (28.0) |
| Sever | 53 | 33.8)) |
| Total | 157 | 100% |

While table (4) depicts that 70.1% of participants have no complications but the most common complication (23.6%) is pneumonia.

Table (4): Frequency distribution of measles cases by complications

| Complication | Frequency | Percent |
|-------------------|-----------|---------|
| Pneumonia | 37 | 23.6)) |
| Bronchiolitis | 6 | 3.8)) |
| Diarrhea | 3 | 1.9)) |
| Fit +Encephalitis | 1 | (0.6) |
| No complication | 110 | (70.1) |
| Total | 157 | 100%)) |

Table (5) explains that more than 70% of patients stayed in the hospital more than three days.

Table (5): Frequency distribution of measles cases by duration of hospitalization

| Duration of hospitalization | Frequency | Percent |
|-----------------------------|-----------|---------|
| One day | 15 | (9.6) |
| Two days | 30 | (19.1) |
| Three days | 41 | (26.1)) |
| Four days | 38 | 24.2)) |
| More than four days | 33 | 21)) |
| Total | 157 | 100% |

In table (6) reveals a statistically significant association between the younger age of patients and the long duration of hospital stay. Chi Square = 24.685 ,df= 12,P-value = 0.016.

Table (6) : association between duration of hospitalization and age of patient

| | | Hospitalization | | | | | Total |
|-------|----------------|-----------------|--------|-------|-------|--------|-------|
| | | 1 day | 2 days | 3days | 4days | >4days | |
| Age | Below 1 year | 3 | 12 | 13 | 18 | 24 | 70 |
| | 1-4 years | 5 | 12 | 13 | 12 | 2 | 44 |
| | 5-10 yaers | 6 | 5 | 11 | 7 | 6 | 35 |
| | Above 10 years | 0 | 1 | 4 | 1 | 1 | 7 |
| Total | | 14 | 30 | 41 | 38 | 33 | 156 |

Chi Square = 24.685, Df= 12, P-value = 0.016

Discussion

The current study shows that measles is still recurrent endemic viral disease in our country with evidence of epidemic on the endemic situation. The transmission of the endemic measles could be refereed to the presence of continuous indigenous of measles virus for about 12 months and onwards targeting a specific area. ¹⁴ Despite the fact that measles infection has been significantly reduced over the last decades, measles is still a big contributor for mortality among

children living in low income countries ¹⁵ This study shows that males are infected slightly more than females this finding goes in line with the finding of another local study conducted in Baghdad province by Aziz HA et al ¹³ but disagrees with the results of other studies ^{16,17} About one third of infection occurred before the age of one year this finding is similar to the finding of a local study ¹³ and to the reported result by *Choe YJ* et al. in Republic of Korea ¹⁸, Large proportion of measles cases occurred among unvaccinated children in urban area. Measles is still attacking vaccinated children in our

society this may be to many factors including vaccine failure, this finding is similar to the finding of another studies¹⁹. These findings could be explained due to the vaccine failure. This failure could be caused by several factors like vaccine's dosage being used, cold-chain system being applied. In addition to that, host-specific factors like persistence of maternally acquired immunity could also be accounted for such failure²⁰.

The occurrence of this small epidemic of measles in our province was found to be higher in the beginning of summer months with a peak in July this result is in agreement with Hirfanoglu et al. in Turkey²¹ but disagrees with the results of other study¹³, This difference in timing may be explained by the time of occurrence of epidemics. The present study reveals that more than half of patients are moderately or severely malnourished, this result is higher than the proportion of malnourishments children with measles reported by other similar studies In the present study about half of the study group were malnourished while 32.12% of children were malnourished in a local research¹³, while Ur-Rehman et al. reported 40% as malnourished²². The major complication in the present study is pneumonia and bronchiolitis (about 27%) followed by diarrhea, this finding is similar to the finding reported by Khan I et al.2013 in Peshawar –Pakistan²³. In this study the majority of measles cases (nine in tenth) have typical presentations, studies indicated that both fever, maculopapular (hyper pigmented) rash are among other symptoms that can be effectively used as a monitoring tool for this disease in an epidemic area.. More confirmation could also be established from the titter of anti-measles Ig M.^{24,25} Moreover, few patients showed some less typical features. More than two thirds of measles patients in this study stayed in the hospital more than three days duration of admission there is a significant association between younger age (<one year) and increasing the duration of hospitalization, this finding is in accordance with other study²⁶, In Italy commonest age for admission was below one year²⁷. Measles still threaten the health status of our community, a strategy for control and elimination of measles should be planned to get rid of this serious viral disease similar to countries in the Middle East. In 2019, the regional verification commission for measles and rubella announced that some of Eastern Mediterranean countries like Oman, Bahrain, and Iran are absolutely clear from

both measles and rubella and this big achievement could therefore participate in the global efforts for reducing such diseases worldwide.²⁸

Conclusions

The study shows that measles still endemic in our country with evidence of recurrent epidemics, males are affected slightly more than females and about, affecting young children below five years mainly infants. Large proportion of measles cases occurred among unvaccinated children in urban area. Measles is still attacking vaccinated children in our society, the disease is associated with malnutrition and the vast majority of cases have typical presentation, the majority of patients were hospitalized for three years and more..

Limitations:

1- There may be inaccuracies in the data of the file system.

2- The study did not look at the measles laboratory performance indicators or the quality of serological specimens.

3-The weaknesses in surveillance performance and the gaps in the investigation of cases and outbreaks may conceal the true incidence and epidemiological pattern of measles in the province since it is hospital based, in this cross sectional study design cause and effects associations cannot be determined.

Competing Interest: The authors declare that they have no competing interests

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the University of Babylon and all experiments were carried out in accordance with approved guidelines.

References

1. Dabbagh A, Laws R L, Steulet C. Progress Toward Regional Measles Elimination — Worldwide, 2000–2017. *MMWR Morb Mortal Wkly Rep* 2018;67:1323–1329.

2. Thar A M C, Wai K T, Anthony D H, Show K L, Mon L L, Lin H H. Reported measles cases, measles-related deaths and measles vaccination coverage in Myanmar from 2014 to 2018. *Tropical Medicine and Health*. 2020; 48:1.
3. Husada D, Kusdwijono Puspitasari D. et al. An evaluation of the clinical features of measles virus infection for diagnosis in children within a limited resources setting. *BMC Pediatr*. 2020; 20: 5.
4. Wolfson L J, Grais R F, Luquero F J, Birmingham M E, Strebel P M. Estimates of measles case fatality ratios: a comprehensive review of community-based studies, *International Journal of Epidemiology* February. 2009; 38(1): 192–205.
5. Cherry J D, Lugo D. Measles virus. In: Cherry J D. Harrison G J. Kaplan S L. Steinbach W J. Hotez P J. editors. *Feigin and Cherry’s textbook of pediatric infectious diseases*. 8th ed. Philadelphia: Elsevier. 2019; 1754–70.
6. Hui-Lan C, Ren-Bin T. Measles re-emerges and recommendation of vaccination *Journal of the Chinese Medical Association*: January. 2020; 83 (1): 5-7.
7. World Health Organization. Seventh meeting of the European Regional Verification Commission for Measles and Rubella Elimination, 13-15 June 2018. Copenhagen: WHO 73.Regional Office for Europe. 2018.
8. Baiee H A. Measles among Adolescents and Young Adults Hospitalized in Merjan Teaching Hospital-Babylon during the 2008-2009 Epidemic. *IJCM*. 2013;26(1):7-12.
9. World Health Organization. Measles Fact sheet 29 November 2018. Geneva: WHO. <https://www.who.int/news-room/fact-sheets/detail/measles>. 12 February 2019.
10. Coughlin M M, Beck A S, Bankamp B, Rota P A. Perspectives on global measles epidemiology and control and the role of novel vaccination strategies. *Viruses*. 2017;9:11.
11. Olugbade O T, Adeyemi A S, Adeoti A H, Ilesanmi O S, Gidado S O, Waziri N E, Aworh M K. Measles outbreaks and supplemental immunization activities (SIA): the Gwagwalada experience, Abuja 2015. *Pan African Med J*. 2019;32(Supp1):10.
12. World Health Organization. Guidance for evaluating progress towards elimination of measles and rubella. *Weekly Epidemiol Rec*. 2018;41(93):541-552.
13. Aziz H A, Nadia Nasir N A, Abbas Oleiwe O A. Al-Janabi M K. Clinical Profiles and Outcome of Children Admitted with Measles During 2009 Outbreak. *The Iraqi Post graduate Medical Journal*. 2017;16 (2):191-107.
14. Orenstein W, Hinman A, Nkowane B, Olive J, Reingold A. Measles and rubella global strategic plan 2012–2020 midterm review. *Vaccine*. 2018;36:A1–A34. doi: 10.1016/j.vaccine. 2017;09:026.
15. World Health Organization .Measles vaccines: WHO position paper—April. *Weekly Epidemiological Record*. 2017; 92: 205–227.
16. Farra A, Loumandet T N, Pagonendji M, Manirakiza A, Manengu C, Mbailao R, Ndjapou S, Lefaou A, Gouandjika-Vasilache I. Epidemiologic profile of measles in Central African Republic: A nine year survey, 2007-2015. *PLoS One*. 2019 ;20:14(3):0213735.
17. Joe P, Majgi S M, Vadiraja N, Khan M A. Influence of Sociodemographic Factors in Measles-Rubella Campaign Compared with Routine Immunization at Mysore City. *Indian J Community Med*. doi: 10.4103/ijcm.IJCM_236_18. PMID: 31602104; PMCID: PMC6776951. 2019 Jul-Sep;44(3):209-212.
18. Choe Y J, Park Y J, Eom H S, Kim E S, Bae G R, Lee J K. Jpn. Epidemiological features and surveillance performance of measles in the Republic of Korea, 2002-2011. *J Infect Dis*. 2013; 66(4):290- .
19. Labib J R, Elsebaie E H, Abd El Fatah S A, Shalaby S F, El Khateeb E . Assessment of Routine Measles Vaccine Effectiveness Among Children Referring to Tertiary Fever Hospital in Egypt, *Arch Pediatr Infect Dis*. Online ahead of Print. 2019 ; 7(3):90407.
20. Yermalovich M A, Hubschen J M, Semeiko G V, Samoilovich E O, Muller C P. Human parvovirus B19 surveillance in patients with rash and fever from Belarus. *J Med Virol*. 2012;84(6):973-8.
21. Hirfanoglu T, Tanir G, Karacan C. Gol N. Clinical characteristics, complications and prognosis of seventy-nine measles cases. *Journal of Ankara University Faculty of Medicine*. 2006; 59:98-103.
22. Ur-Rehman A, Saeed T S, Idris M. Clinical outcome in measles patients hospitalized with complications. *J Ayub Med Coll Abbottabad*. 2008; 20:14-16.
23. Khan I, Khattak A, Muhammad A. Complications of Measles in Hospitalized Children . *Khyber*

- Medical University Journal. 2013; 5(1): 27-30.
24. Coughlin M M, Beck A S, Bankamp B, Rota P A. Perspectives on global measles epidemiology and control and the role of novel vaccination strategies. *Viruses*. 2017;9:11.
25. Cunha B A. Measles: more than a rash. *Clev Clin J Med*. 2016;83(8):555.
26. Al-Awady M S. Causes of Measles Outbreak in Al-Sader city. *Tikrit Medical Journal*. 2012;18(1):166-177.
27. Antonietta Fila, Antonio Brenna, Augusto Panà, ...etc. Health burden and economic impact of measlesrelated hospitalizations in Italy in 2002–2003. *BMC Public Health*. 2007;(7):169.
28. Teleb N, Atta H, Hajjeh R. Measles and rubella elimination 45.in the Eastern Mediterranean Region: successes and challenges. *East Mediterr Health J*. 2019 Nov 4;25(10):667-668.