

Risk Factors and Common Causes of Death Due to Measles in AL-Kadhimiya Teaching Hospital. 2009

Lamia Abdul Karim*, Abdul-KaremJasemAlbahadle*,
Ali Kadhim Al-Husainawi**

ABSTRACT:

BACKGROUND:

Remains a common disease in many parts of the world. According to the World Health Organization (WHO), more than 20 million people worldwide are affected by measles each year. It is the leading cause of vaccine-preventable deaths among young children.

OBJECTIVE:

To find out the epidemiological criteria of died patients because of measles& the main causes of death.

PATIENTS AND METHODS:

Prospective study carried out in the pediatric ward of Al-Kadmyia Teaching Hospital between the 1st of January to the 1st of May 2009, the total number of measles cases admitted were 894 , the number of died cases in the same period due to measles were 52 case , the age of the studied sample (1month- 10 years).

The data collected through a data sheet asked to the parents of the patient including the age ,sex, body weight, feeding history, history of contact, vaccination history , maternal vaccination status and her educational level.

All the patients examined systematically and investigated and followed up till discharged or unfortunately died

RESULTS:

The age of the died cases mostly in the 1st2years(27 case), there is male(31) , female(21) died cases.

The mortality occur more in under weight cases27 , the died cases were either on mixed feeding 17cases, bottle feeding 10, solid feeding 25 cases.

All the died cases had history of contact with measles., there were 49 cases non-vaccinated, the vaccination status of the mothers were 38 mother were not vaccinated. The educational level of the mothers were 29 illiterate,15 primary and 8 secondary school.

The most common causes of death :16 encephalitis, 36 pneumonia.

CONCLUSION:

The death occurs more in infants and toddlers than in other age groups, more in males,underweight, and the non-vaccinated than in the vaccinated patients.

Death is more common among children belong to non-vaccinated, illiterate mothers.

Pneumonia is the most frequent complication of measles and encephalitis is the most lethal complication.

KEY WORDS: measles, vaccination, pneumonia, encephalitis.

INTRODUCTION:

Measles is a disease of childhood and continues to affect children in developing countries. A nationwide indigenous measles outbreak occurred in 1989–1991 resulting in >55,000 cases, 11,000 hospitalizations, and 123 deaths,

demonstrating that the infection had not yet been conquered. The resurgence was attributed to vaccine failure in a small number of school-aged children and low coverage of preschool-aged children and because of more rapid waning of maternal antibodies in infants born to mothers who never experienced wild-type measles infection.⁽¹⁾ In industrialized nations,

*College of medicine. Al- Nahrain University.

**AL-Kadhimiya Teaching Hospital.

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infection is seen in unvaccinated individuals of any age or those with waned immunity. ⁽²⁾

Measles is an endemic disease, meaning that it has been continually present in a community, and many people develop resistance. In populations that have not been exposed to measles, exposure to a new disease can be devastating.

The fatality rate from measles for otherwise healthy people in developed countries is 3 deaths per thousand cases. ⁽³⁾

PATIENTS AND METHODS :

A prospective study was performed from the 1st of January to the 1st of May in the year 2009, in Al-Kadhimiya Teaching Hospital.

A case was considered positive if it meets the clinical case definition and is epidemiologically linked to a measles case.

The data was collected through a data sheet asked directly to the parents, including the age, sex, body weight, feeding history, history of contact, vaccination history, maternal vaccination status and her educational level.

All the patients examined systematically and investigated and followed up till discharged or unfortunately died

The collected data was analyzed using the SPSS version 10 statistical program.

RESULTS:

the total number of measles cases admitted were 894 , the number of died cases in the same period due to measles were 52 case , the age of the studied sample (1month- 10 years).

The majority of cases (842 cases / 94.2 %) had survived and discharged home while 52 cases (5.8 %) had died, most frequently due to pneumonia (36 out of 52 total died cases / 69.2 % of total death) and encephalitis (16 out of 52 total died cases / 30.8% of total death). Death rate within the pneumonia cases was 7.9 % (36 died cases out of 456 total pneumonia cases), while the death rate within the encephalitis cases was 33.3 % (16 died cases out of 48 total encephalitis cases) made encephalitis the most lethal complication of measles. These are shown in table [1].

Table1:Fate of the studied sample.

Discharged home		No. (% From total cases) { Death rate in that group }	842 94.2 { 0 }	
Death	Pneumonia	No. (% From total cases) { Death rate in that group }	36 (4) { 7.9 }	% From total death
	Encephalitis	No. (% From total cases) { Death rate in that group }	16 (1.8) {33.3}	69.2 30.8
	Total death	No. (% From total cases)	52 (5.8)	100

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Mortality had occurred nearly in all age groups, most frequently in infants (16 dead cases out of 52 total death / 30.7 % from total death) and toddlers (14 dead cases out of 52 total death / 26.9 % from total death). A significant death had occurred in those who were ≤ 9

months of age, which is the recommended age of measles vaccination in our country (14 cases out of 52 total death / 26.9% of total death). P value = 0.311. These are all shown in table [2].

Table 2: Outcome of the patients according to the age groups.

Age group	No.	Died			
		No.	%	OTD*	ASFR*
< m- 1 yr	204	16	/	30.7	7.8
> 1 yr – 2 yr	165	14	/	26.9	8.5
> 2 yr – 3 yr	132	6	/	11.6	4.5
> 3 yr – 4 yr	102	4	/	7.8	3.9
> 4 yr – 5 yr	86	3	/	5.8	3.5
> 5 yr – 6 yr	56	2	/	3.8	3.6
> 6 yr – 7 yr	48	3	/	5.8	6.3
> 7 yr – 8 yr	35	1	/	1.9	2.9
> 8 yr – 9 yr	38	2	/	3.8	5.3
> 9 yr – 10 yr	31	1	/	1.9	3.2
Total	894	52	/	100	—

*ASFR: Age – specific case fatality rate.

*OTD: Out of total death.

Mortality was more in males (31 cases out of 52 total death / 59.6 % of total death) than in females (21 cases out of 52 total death / 40.4 % of total death). Death rate within males was 6 % (31 case out of 514 total males) and within

females was 5.5 % (21 cases out of 380 total female cases). Male :female death ratio was (1.1 : 1). P value = 0.121. These are shown in table [3].

Table 3: Outcome of the patients according to the gender

			Discharged home		Dead	
			No.		No.	
Male	No. (% From total)	514 (57.5)	No.	483	No.	31
Female	No. (% From total)	380 (42.5)	No.	359	No.	21
Total	No. (% From total)	894 (100)	No.	842	No.	52

Statistically significant relationship (P value = 0.012) was found between the vaccination status of patients and the mortality from measles, where most of the died cases were non-vaccinated (43

cases out of 52 total death / 82.7 %). The death rate within the non-vaccinated patients was 6.3 % (43 cases out of 685 total non-vaccinated patients) These are all shown in table [4].

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Table 4: Relationship between the vaccination status and the mortality from measles.

	Discharged home		Death		Total No.	
	No. { Survival rate }	200 { 95.7 }	No. { Death rate }	9 { 4.3 }	No.	209
vaccinated	No. { Survival rate }	642 { 93.7 }	No. { Death rate }	43 { 6.3 }	No.	685
Non- vaccinated	No. (% From total)	842 (94.2)	No.	52	No.	894
Total						

Another statistically significant relationship (P value = 0.000) was obtained in this study between the nutritional status and the mortality from measles, where 28 cases out of 150 malnourished cases died, which gave a death rate of (18.7 %)

within the malnourished patients, and only 24 cases out of 744 total normally nourished cases died which gave a death rate of (3.2 %) within the normally nourished patients. These are shown in table [5].

Table 5: Relationship between the nutritional status and the mortality from measles.

	Discharged home		Died	
	No.	744	No.	720
Normal	No.	744	No.	720
	(%)	(83.2)	{ Survival rate }	{ 96.8 }
			{ Death rate }	{ 3.2 }
Malnourished	No.	150	No.	122
	(%)	(16.8)	{ Survival rate }	{ 81.3 }
			{ Death rate }	{ 18.7 }
Total	No.	894	No.	842
	(%)	(100)		

The type of feeding of the 52 died cases was either breast feeding in 4 cases only (7.7 %), bottle feeding in 10 cases (19.2 %), mixed

feeding in 16 cases(30.8 %), and solid food in 22 cases (42.3 %).P = 0.152 . This is shown in table [6].

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Table 6: Relationship between the type of feeding and the mortality from measles.

			Discharged home		Died	
Breast	No. (% From total)	30 (3.4)	No. { Survival rate }	26 { 86.7 }	No. { Death rate }	4 { 13.3 }
Bottle	No. (% From total)	150 (16.8)	No. { Survival rate }	140 { 93.3 }	No. { Death rate }	10 { 6.7 }
Mixed	No. (% From total)	156 (17.4)	No. { Survival rate }	140 { 89.7 }	No. { Death rate }	16 { 10.3 }
Solid food	No. (% From total)	558 (62.4)	No. { Survival rate }	536 { 96.1 }	No. { Death rate }	22 { 3.9 }
Total	No. (% From total)	894 (100)	No.	842	No.	52

All the died cases had history of contact with a measles case (100%).

Most of the mothers of the 52 died cases were non-vaccinated (36 mother / 69.2 %), only 8

mothers (15.4 %) were vaccinated and 8 mothers (15.4 %) didn't know their vaccination status. P value = 0.048 . This is shown in table [7].

Table 7: Relationship between the maternal vaccination status and the mortality from measles.

			Discharged home		Died	
Vaccinated	No. (% From total)	263 (29.4)	No. { Survival rate }	255 { 96.9 }	No. { Death rate }	8 { 3 }
Non-vaccinated	No. (% From total)	427 (47.8)	No. { Survival rate }	391 { 91.6 }	No. { Death rate }	36 { 8.4 }
Do not know	No. (% From total)	204 (22.8)	No. { Survival rate }	196 { 96.1 }	No. { Death rate }	8 { 3.9 }
Total	No. (% From total)	894 (100)	No.	842	No.	52

This study show that the mortality was higher among patients of illiterate mothers (29 case out of total 52 died cases / 55.8 %), while the mothers of 15 cases (28.8 %) were got the

primary education and only 8 mothers (15.4 %) got the secondary school. P value = 0.031. This is shown in table [8].

Table 8: Relationship between the maternal education level and the mortality from measles.

			Discharged home		Died	
Primary school	No. (% From total)	407 (45.5)	No. { Survival rate }	392 { 96.3 }	No. { Death rate }	15 { 3.9 }
Secondary school	No. (% From total)	250 (28)	No. { Survival rate }	242 { 96.8 }	No. { Death rate }	8 { 3.2 }
Illiterate	No. (% From total)	237 (26.5)	No. { Survival rate }	208 { 87.8 }	No. { Death rate }	29 { 12.2 }
Total	No. (% From total)	894 (100)	No.	842	No.	52

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DISCUSSION:

The death from measles was (5.8%) in our study. This still a high incidence attributed mainly to malnutrition and fatal complications especially

in the non-vaccinated patients. Table [9] show the comparable studies.

Table 9: The death rate from measles in some countries in the last 20 years.

Country / year	Death rate (%)
Nigeria / 2005[4]	8.4
Italy / 2002 [5]	6
Niger / 2007 [6]	4.6
Nigeria / 2007 [6]	4
Chad / 2007 [6]	10.8
South Korea / 1993[7]	10
New Guinea / 2000[8]	4
Netherlands / 2000[9]	6
Sudan / 2004[10]	0.9
Jordan / 1995 [11]	10

The most frequent causes of death from measles were pneumonia (69.2%) and encephalitis (30.8%), with the death rate within pneumonia cases was (7.9%) and that within encephalitis cases was (33.3%).

It was pneumonia in 90 % and encephalitis in 10 % as reported by ML CiofidegliAtti, F Fabi, S Salmaso, et al. ⁽⁵⁾Van-Den-Hof,-S; Smit,-C; Van-Steenbergen,-J-E; et al, study showed that pneumonia was responsible for 60 % of the death form a measles outbreak. ⁽⁹⁾

pneumoniawas the commonest cause of death in a study ⁽¹²⁾, which was the same reportedby other studies ^(13,14).

A study reported that death rate within pneumonia cases was15 % and within encephalitis cases was 57.1 %. ⁽¹⁵⁾

The highest mortality had occurred in those patients who were ≤ 5 years of age. It was (30.7%) for ≤ 2 years of age, and (26.9%) for infancy. Similar results were shown by other studies ^(4,5,16,17)

The mortality in males (59.6%) was higher than in females (40.4%) with a male : female death ratio of:1.1:1.This result in agreement with other studies ^(7,15,18,19,20,21)

The mortality was (4.8%) in the non-vaccinated patients. This gave a significant relationship between the vaccination status and the mortality in measles. (P value = 0.012).Other studies show the significant death rate among non-vaccinated cases ^(5,6,9,10,11,17,21,22)

There was a significant relationship between malnutrition and increased mortality from measles in our study, where (3.1%) of the malnourished patients had died and only (2.7%) of the normally nourished patients had died. Other studies reportedthat malnutrition was the commonest cause associated with increased mortality ^(4,6,10,13, 14).

the lower death occur in breast fed infants which indicate the protective role of breast milk through passive immunity and vitamin A content, this is shown in a study doneby DilipLahalanabis⁽²³⁾,Rasaki Ajani Sanusi and AdunniOlatokunboGbadamosi⁽²⁴⁾

The level of mother education was found to be important factor for knowledge and compliance with vaccination schedule mortality was found to higher among children of illiterate mothers ,the same result found in study in Egypt.(25),Nigeria ⁽²⁶⁾, Bangladesh ⁽²⁷⁾,Rasaki Ajani Sanusi and AdunniOlatokunboGbadamosi⁽²⁴⁾,

CONCLUSION:

1. Measles is still a serious disease with high fatality rates. More mortality occurs in infants and toddlers, males, non-vaccinated, and malnourished patients.
2. Death is more common among children belong to non-vaccinated,illiterate mothers.
3. Pneumonia is the most frequent complication of measles and encephalitis is the most lethal complication.

Recommendations:

1. Maintain high two-dose vaccination coverage, since this will interrupt viral circulation in the population, with temporarily lowering the age of measles vaccination to 6 months with subsequent revaccination (using MMR vaccine) at 15 months and 4-6 years of age, and vaccinating all the patient's contacts (excluding those who have contraindications to vaccination) during a measles outbreak, and all efforts should be made to overcome the reasons for non-vaccination.
2. Providing appropriate clinical management, including the availability and of a well-equipped ICUs and well-trained medical staff.
3. Encourage exclusive breast feeding in infants.
4. All required measures should be taken for the availability of laboratory confirmation of all suspicious measles cases, which is necessary for the success of measles surveillance system in our country.
5. Providing the opportunity for a well-trained health care staff for giving the advice and discussing measles infection and vaccination in radio, TV, and hospital setting.

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