The Characters of Measles Patients Admitted to Tikrit Teaching Hospital

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Abstract

Measles is a highly contagious viral infection and 90% of non immunized persons who come into direct contact with the virus will develop infection.

A cross sectional study conducted in Tikrit Teaching Hospital to highlight the Outbreak of measles and its effect on patient's health during period of 3 months from 1st of January 2008 to the 1st of April 2008. A total of 100 cases included in the study from different age groups and from both genders without any exclusion.

The study showed that the most common affected age 54% were between 1-5 year and 4% of cases were below 6 month. Male gender 56% affected more than female gender, 44 % and 91% of cases have history of contact with infected persons . In the present study 17% of cases have history of vaccination with measles , 13% have history of vaccination with Measles, Mumps, Rubella (MMR) and only 9% have history of vaccination with both. Nutritional assessment done for every cases and it shows that 51% of them have normal nutritional state, 35% have mild malnutrition, 12% have moderate malnutrition, and 2% of cases have severe malnutrition. The relation between nutritional state and development of complications were not significant in this study except that which is related to otitis media (O.M). The study showed that 3% developed central nervous system complications, 30% developed O.M, 48% of cases developed gastrointestinal tract (GIT) complications and that all the cases have respiratory tract complications which was the main cause of admission to the hospital. Hb, PCV, total WBC, WBC differential count and blood film morphology was done for every patient and it showed that 63% of cases have anemia, 20% have normal finding, 22% have

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only lymphocytosis, 20% have neutrophillia, 7% of cases have hypochromic microcytic picture with neutrophilia, 13% have hypochromic microcytic picture with lymphocytosis, and 18% have only hypochromic microcytic picture.

The current study shows that with presence of specific risk factors the development of O.M are more as a complication of measles.

Introduction

Measles is a highly communicable acute disease. It is also known as rubeola and is marked by prodromal fever, cough, coryza, conjunctivitis, and pathognomonic enanthem (ie, Koplik spots), followed by an erythematous maculopapular rash on the third to seventh day. Infection confers life-long immunity [1]

A generalized immunosuppression that follows acute measles frequently predisposes patients to bacterial otitis media and bronchopneumonia. In approximately 0.1% of cases, measles causes acute encephalitis. Subacute sclerosing panencephalitis (SSPE) is a rare chronic degenerative disease that occurs several years after measles infection. Because of a failure to deliver at least one dose of measles vaccine to all infants in certain industrialized and developing nations, measles remains a common disease in certain regions and continues to account for nearly 50% of the 1.6 million deaths caused each year by vaccine-preventable childhood diseases [2].

Unsubstantiated claims that suggest an association between the measles vaccine and autism have resulted in reduced vaccine use and a recent resurgence of measles in countries where immunization rates have fallen to below the level needed to maintain herd immunity [3].

Vaccination programs interrupted the transmission of indigenous MV in the United States by 1993 and reduced the incidence of measles to an historic low (<0.5 cases per million persons) by 1997-1999. Since November 2002, measles has not been considered an endemic disease in the United State [4].

Despite the highest recorded immunization rates in history, young children who are not appropriately vaccinated may experience more than 60-fold increase in risk of disease due to exposure to imported measles cases from countries that have not yet eliminated the disease [5]. In 1998, the cases of measles per 100,000 total population reported to the World Health

Organization was 1.6 in the Americas, 8.2 in Europe, 11.1 in the Eastern Mediterranean region, 4.2 in South East Asia, 5.0 in the Western Pacific region, and 61.7 in Africa [6].

Age-specific attack rates may be highest in susceptible infants younger than 12 months, school-aged children, or young adults, depending on local immunization practices and incidence of the disease. Complications such as otitis media, bronchopneumonia, laryngotracheobronchitis (i.e. Croup), and diarrhea can be noticed [7].

Prior to 1963, almost everyone got **measles**; it was an expected life event. Each year in the United States, there were approximately 3 to 4 million cases, and an average of 450 deaths. Epidemic cycles occurred every 2 to 3 years. More than half the population had measles by the time they were 6 years old, and 90 percent had the disease by the time they were 15 years old.

However, after the measles vaccine became available, the number of measles cases dropped by 99 percent, and the epidemic cycles diminished drastically. Therefore, the best prevention of measles is the measles vaccine .

Prevention of measles begins with the measles vaccine (contained in MMR, MR, and measles vaccines)[8].

A second dose of the vaccine is recommended to protect the 5 percent who did not develop immunity in the first dose, and to give "booster" effect to those who did develop an immune response [9].

Aim of study: This study aims at highlighting the Outbreak of Measles in regards to age distribution, vaccination status, nutrition status , the hematological changes ,the feeding pattern in relation to measles complications.

Patients and methods:

A cross sectional study carried out in Tikrit Teaching Hospital extending from January 2008 to march 2008. A total of 100 children were included from different age groups and from both genders. All patients with measles are included during the period of study without any exclusion. A specially designed questionnaire was used to gather information from patient through personal interview with the patients relatives ,usually the mother .All patients were examined thoroughly to confirm the diagnosis of measles and to look for signs of complications .Weight for height (length) chart are used to assess the nutritional status of the patients. Patients with malnutrition were classified according to WHO classification into

Mild(75%-90%), Moderate(60%-75%) and severe (<60%) type of malnutrition [10] .A sample of (2 ml) was aspirated from each patient to estimate WBC and differential count, Hb and PCV was estimated and those patients with Hemoglobin level <11g/dl and PCV <33% are considered to be anemic [11] Blood films stained by lieshman stain were evaluated for each patient.

Statistical Analysis of the results in the study were done by using SPSS version 7.5 computer software .Chi - square are used to test the results .P value less than 0.05 was considered to be significant.

Results

A total of 100 cases from different age group and from both genders were included in this cross sectional study. The cases are diagnosed clinically as having Measles.

Figure.1. reveal that the higher rate of distribution were between 12.1 – 60 month 54% (54 cases), 27% (27 case) were between 6.1–12month.

There is slight male predominance with 56% (56 case) in compare to female gender with 44% (44 case), 91%(91 case) have history of contact with infected persons while 9%(9 cases) have no history of contact with infected person, 47% (47cases)were on normal family diet, 12% (12 case)were on bottle feeding , 16%(16 case) were on breast feeding and additional food and 11%(11 case) were on bottle feeding and additional food.

Figure.2.shows that 17% (17 case) and 13% (13 case) of patients respectively were vaccinated with measles and MMR vaccine respectively while 83% (83 case) of patients not vaccinated and 87% (83 case) of patients have no MMR vaccine.

Among those vaccinated only 9% (9 case) have both measles and MMR vaccine.

Figure-3- shows that 51% (51 cases) of patients have normal nutritional state , 35% (35 case) have mild malnutrition ,12% (12 case) have moderate malnutrition and only 2% (2 cases) have severe malnutrition.

Concerning the complications about 99%(99 case) of patients have pneumonia and 1% (1 case) have both pneumonia and laryngotracheobronchitis, 30%(30 cases) developed otitis media as a complication of measles while 70%(70 cases) had no otitis media, 52%(52 cases) had no diarrhea , 30%(30 cases) have diarrhea ,while 18%(18 cases) have bloody diarrhea, 1% (1 case)of patients have

drowsiness, 1%(1 case) have convulsion, and 1%(1 case) have unconsciousness while 97%(97 cases) have no clinical manifestations of CNS complications.

Figure.4. shows the results of WBC differential count and blood film among study sample and it indicates that 20%(20 case) of patients have normal blood film and differential count , 22%(22 case) have normal blood film with lymphocytosis , 20%(20 case) of patients have normal blood film with neutrophilia , 7%(7 cases) have microcytic hypochromic picture with neutrophilia , 13%(13 case) have microcytic hypochromic picture with lymphocytosis , and finally 18%(18 case) have normal differential count with microcytic hypochromic picture .

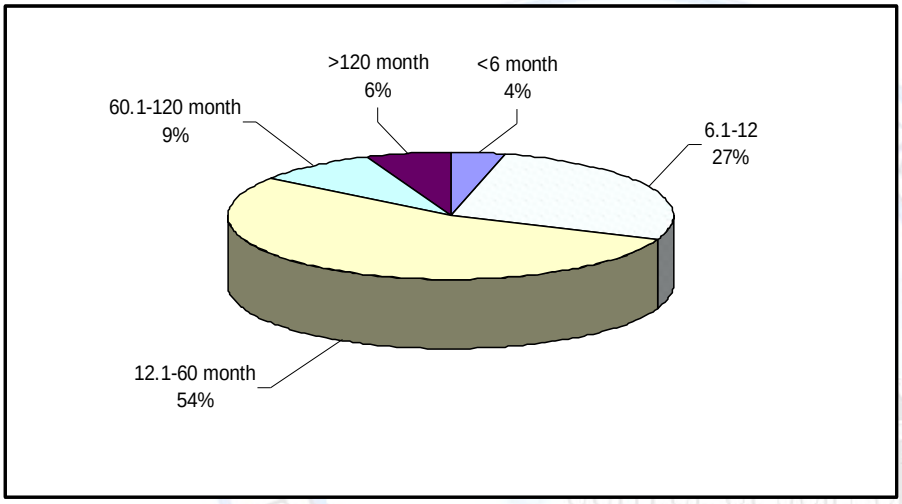

Figure (1): The age distribution of the sample

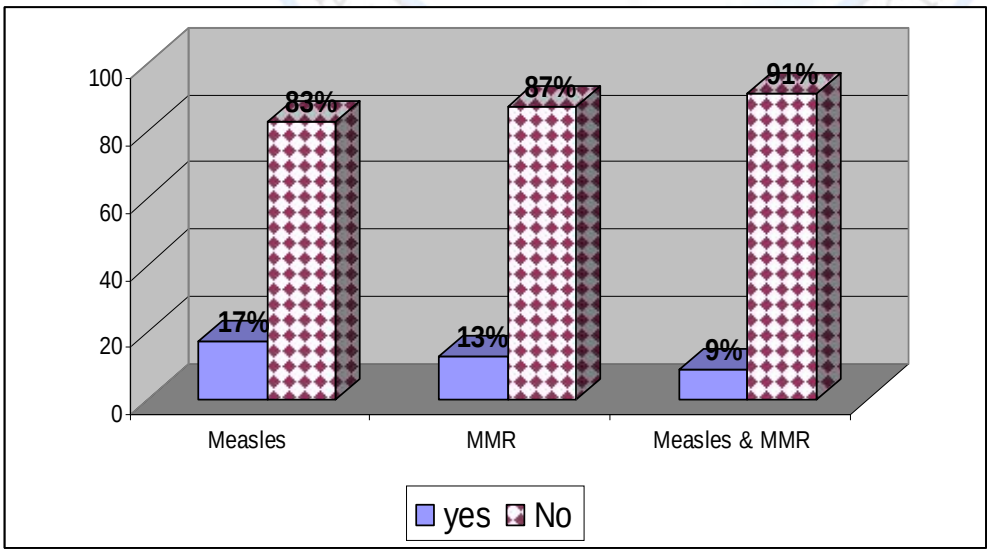

Figure (2): The history of measles and MMR vaccination of the patient

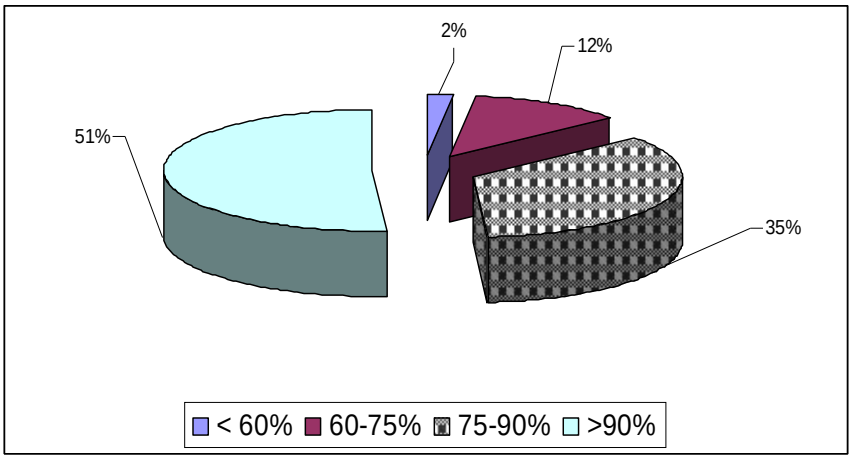

Figure (3): The nutritional state of sample.

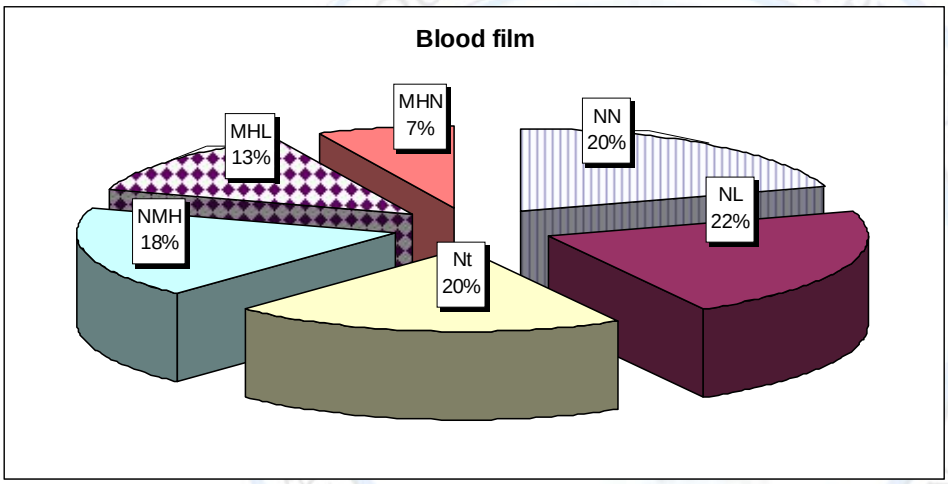

Figure (4): Blood film results among measles patients

(NN = normal, NL =normochromic normocytic with lymphocytosis, Nt= neutrophilia, NMH = normal differential + microcytic hypochromic, MHN = microcytic hypochromic + neutrophilia, MHL = microcytic hypochromic + lymphocytosis)

Table(1): The relation of age distribution to vaccination state.

Age	Measles vaccination		MMR vaccination	
	Yes NO.(%)	No NO.(%)	Yes NO.(%)	No NO.(%)
≤ 6 month	0(0%)	4(4.8%)	0(0%)	4(4.6%)
6.1-12 month	4(23.5%)	23(27.7%)	0(0%)	27(31.0%)
12.1-60 month	8(47.1%)	46(55.4%)	7(53.8%)	47(54.0%)

	60.1-120 month	2(11.8%)	7(8.4%)	3(23.1%)	6(6.9%)
	>120 month	3(17.6%)	3(3.6%)	3(23.1%)	3(3.4%)
	Total	17(100%)	83(100%)	13(100%)	87(100%)
	P value(df)	>0.05 (4) (Not significant)		<0.05 (4) (significant)	

Relation of results presence of respiratory complications.

Table (2): blood film with O.M and

Blood film	otitis media				Respiratory complications				Total	
	absent		present		pneumonia		Croup			
	No	%	No	%	No	%	No	%	No	%
normal	13	18.6	7	23.3	20	20	00	0	20	20
Normchromic+lymphocytosis	17	24.3	5	16.7	22	22	0	0	22	22
Normchromic+neutriphilia	16	22.9	4	13.3	20	20	0	0	20	20
Microcytic hypochromic	13	18.6	5	16.7	17	17	1	100	18	18
microcytic hypochromic+lymphocytosis	7	10	6	20	13	13	0	0	13	13
microcytic hypochromic+neutrophilia	4	5.71	3	10	7	7.1	0	0	7	7
Total	70	100	30	100	99	100	1	100	100	100
P value(df)	P value>0.05(5) (Not significant)				P value>0.05(5) (Not significant)					

Table (3): Relation of blood film results with CNS and GIT complications.

Blood film	CNS				GIT				Total	
	normal		complication		No diarrhea		diarrhea			
	No	%	No	%	No	%	No	%	No	%

Normal	20	20.6	0	0	9	17.3	11	22.9	20	20
Normchromic +lymphocytosis	20	20.6	2	66.7	13	25	9	18.8	22	22
Normchromic +neutriphilia	20	20.6	0	0	11	21.2	9	18.8	20	20
Microcytic hypochromic	17	17.5	1	33.3	9	17.3	9	18.8	18	18
Microcytic hypochromic +lymphocytosis	13	13.4	0	0	8	15.4	5	10.4	13	13
microcytic hypochromic +neutrophilia	7	7.2	0	0	2	3.8	5	10.4	7	7
Total	97	100	3	100	52	100	48	100	100	100
P value	P value>0.05(5) (Not significant)				P value>0.05(5) (Not significant)					

Table (4): Relation of the nutritional state and complications of measles

Complication	<60	60-75	75-90	>90	Total	P(df)
	No.(%)	No.(%)	No.(%)	No.(%)	No.(%)	
GIT						
Diarrhea	1(50%)	6(50%)	20(57.1%)	21(41.2%)	48(48%)	>0.05(3) (Not significant)
No diarrhea	1(50%)	6(50%)	15(42.9%)	30(58.8%)	52(52%)	
Respiratory						
Respiratory complication	2(2%)	12(12%)	35(35%)	51(51%)	100(100%)	
No complication	0(0%)	0(0%)	0(0%)	0(0%)	0(0%)	
CNS complication	0(0%)	1(8.3%)	2(5.7%)	0(0%)	3(3%)	>0.05(3) (Not significant)
Normal	2(100%)	11(91.7%)	33(94.3%)	51(100%)	97(97%)	

Total	2(100%)	12(100%)	35(100%)	51(100%)	100(100%)	

Table (5) : Relation of complications with type of feeding.

System Complication		Feeding pattern					Total	P (df)
		Bottle-feed And additional food	Breastfeed and additional food	Breast feed	Bottle feed	Normal family diet		
		No.(%)	No.(%)	No.(%)	No.(%)	No.(%)	No.(%)	
GIT	diarrhea	6 (54.5%)	8 (57.1%)	9 (56.3%)	7 (58.3%)	18 (38.3%)	48 (48%)	>0.05(4) (Not significant)
	Non diarrhea	5 (45.5%)	6 (42.9%)	7 (43.8%)	5 (41.7%)	29 (61.7%)	52 (52%)	
Respiratory	Respiratory complication	11 (11%)	14 (14%)	16 (16%)	12 (12%)	47 (47%)	100 (100%)	
	No complication	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	
CNS	CNS complication	1 (9.1%)		2 (12.5%)			3 (3%)	>0.05(4) (Not significant)
	Normal	10 (90.9%)	14 (100%)	14 (87.5%)	12 (100%)	47 (100%)	97 (97%)	
Total		11 (100%)	14 (100%)	16 (100%)	12 (100%)	47 (100%)	100 (100%)	

Table(6): Relation of complications with anemia.

(OM= otitis media)

complication		Anemia		No anemia		Total		p(df)
		No.	%	No.	%	No.	%	
GIT	diarrhea	28	44.444	20	54.1	48	48	>0.05(1) (Not significant)
	Non diarrhea	35	55.556	17	45.9	52	52	
Respiratory complication	Respiratory complication	63	100	37	100	100	100	
	no complication	0	0	0	0	0	0	
CNS complication	CNS complication	2	3.2	1	2.7	3	3	>0.05(1) (Not significant)
	normal	61	96.8	36	97.3	97	97	
otitis media	normal	45	71.429	25	67.6	70	70	>0.05(1) (Not significant)
	OM	18	28.571	12	32.4	30	30	
Total		63	100	37	100	100	100	

Table (7):Relation of the Risk Factors to OM.

Risk factor for OM	Normal		OM		Total	
	No.	%	No.	%	No.	%
yes	33	47.1	21	70	54	54
No	37	52.9	9	30	46	46
Total	70	100	30	100	100	100

P value < 0.05 , df =1 (significant)

Table (8): Relation of OM with nutritional state.

Nutritional state	Otitis media			Total
	normal	bulging + red	rupture + pus	
<60	1(1.4%)	0(0%)	1(33,3%)	2(2%)
60-75	7(10%)	5(18.52%)	0(0%)	12(12%)
75-90	23(32.9%)	10(37%)	2(66,6%)	35(35%)
>90	39(55.7%)	12(44.44%)	0(0%)	51(51%)
Total	70(100%)	27(100%)	3(100%)	100(100%)

Df=9, p value<0.05(significant)

Table (1) Shows that among the 17%(17 case) who recieved measles vaccine non below 6 month of age, 23.5%(4 cases) were between 6.1-12 month of age,47.1%(8 cases) were between 12.1-60 month of age, 11.8%(2 cases) were between 60.1-120 month of age, and 17.6%(3 cases) were >120 month of age. The result is not significant, While among 13%(13 case) of patients who received MMR vaccine no case were below 12 month of age, 53.8%(7 cases) were between 21.1-60 month of age, 23.1%(3 cases) were between 60.1-120 month of age, and 23.1%(3 cases) were >120 month of age. The result is not significant.

Table (2) Shows that among those patients who have O.M 23.3% have normal blood film, 16.7% have normochromic picture with lymphocytosis, 13.3% have normochromic picture with neutrophilia, 16.7% have microcytic hypochromic picture, 20% have microcytic hypochromic picture with lymphocytosis, and 10% have microcytic hypochromic picture with neutrophilia. The results are not significant.

Among patients who have pneumonia 20.2% have normal blood film, 22.2% have normochromic picture with lymphocytosis, 20.2% have normochromic picture with neutrophilia, 17.2% have microcytic hypochromic picture, 13.1% have microcytic hypochromic picture with lymphocytosis, and 7.07% have microcytic hypochromic picture with neutrophilia. Although that P value >0.05 but those patients who have normal blood film with pneumonia are less than those patients who have abnormal blood film with predominance of lymphocytosis and neutrophilia respectively. This table shows that only one case have croup with pneumonia.

Table (3) Shows that among 3% of cases who have CNS complications 66.7%(2 cases) were have normochromic picture with lymphocytosis, 33.3%(1 case) were have microcytic hypochromic picture while no any case were have normal blood film. This table also shows that among 48% of cases who have diarrhea 22.9%(11 case) were have normal blood picture, while cases who have normochromic picture with lymphocytosis, normochromic picture with neutriphilia, and microcytic hypochromic picture respectively were equally forming 18.8%(9 cases) of patients.

This table shows that among those 48% of cases who have diarhrea 10.4% had microcytic hypochromic picture with lymphocytosis and another 10.4% had microcytic hypochromic picture with neutrophilia.

Table (4) Shows the relation of nutritional state and complications of measles (GIT, OM , respiratory and CNS complication) .Although the results are not significant but it is shown that 48%(48 case) of patients have diarrhea and most of them have abnormal nutritional state, All the patients 100% experienced respiratory complications which affect mainly patients with normal nutritional state which 51% (51 case) and only 3%(3 cases) of patients have CNS complications in which all of them have abnormal nutritional state(mild and moderate) type.

Table (5) shows that among patients on bottle feeding alone and bottle feeding with additional food 58.3%(7 cases) and 54.5%(6 cases) respectively developed diarrhea, 12%(12 case) and 11%(11 case) respectively developed respiratory complications and 9.1%(1 case) of patients on bottle feeding with additional food developed CNS complications while no patient on bottle feeding alone developed CNS complications. Among patients on breast feeding and breast feeding with additional food 56.3%(9 cases) and 57.1%(8 cases) respectively developed diarrhea, 16%(16 case) and 14%(14 cases) developed respiratory complications and 12.5%(2 cases) of patients on breast feeding alone developed CNS complications while no patient on breast feeding and additional food developed CNS complications.

About 38.3 %(18 cases) of patients on normal family diet developed diarrhea, 47 %(47 cases) developed respiratory complications and no patient from this group developed CNS complications. The results in this table are not significant.

Table (6) Shows that among cases who were anemic 44.4%(28 case) had diarrhea while 55.5%(35 case) had no diarrhea, 100%(63 case) have respiratory complications whereas 3.2%(2 cases) have CNS complications, 28.5%(18 case) of those cases were presented with O.M.

Between patients who have no anemia 54.1%(20 case) presented with diarrhea while 100% of them (37 case) presented with respiratory complications, 2.7%(1 case) of them presented with CNS complications, and 32.4%(12 case) were presented with O,M.

The total number of cases who have anemia are 63 cases(63%) and the total number of cases who have no anemia are 37 case (37%).The relation between anemia and complications of measles are not significant.

Table (7) shows that 47.1 %(33 case) of patients with no O.M have positive risk factors for O.M and 57.9 %(37 case) of patients have neither O.M nor risk factors for O.M. Among

patients who developed O.M 70 %(21 case) of patients have risk factors for O.M and only 30 %(9 cases) have no risk .The relations are significant.

Table (8) Shows that among patients with no O.M 1.4%(1 case) had severe malnutrition, 10%(7 cases) had moderate malnutrition, 32.9%(23 case) had mild malnutrition, and 55.7%(39 case) had normal nutritional state. Among patients with bulging and red tympanic membrane no any case have severe malnutrition, 18.52 %(5 cases) have moderate malnutrition, 37 %(10 cases) have mild malnutrition and 44.44 %(12 case) have normal nutritional state. Among those cases with ruptured tympanic membrane and pus discharge 33.3 %(1 case) had severe malnutrition and 66.7 %(2 cases) had mild malnutrition while no patient among this group had moderate or normal nutritional state. The results are significant.

Discussion

Measles (rubeola) is a highly contagious viral infection; however, it still occurs sporadically and in mini-epidemics as well as epidemics in developing nations [12]. The most common affected age group was between 1-5 year (54%). While a study done in Iraq at 1990 after the first Gulf war ; revealed that >2/3 of cases were aged 5 year or more and a community based study done in Columbia ; showed that measles most often affects school- age children [13,14].

The causes for the infection below six months of age are early weaning of maternal antibodies which may be due to low antibody level among mothers, decreased efficiency of trancplacental transfer of measles IgG, increase catabolism of passive Ab because of frequent infections in infancy and loss of Ab into the intestinal lumen during diarrheal illness [15].

During 1999–2004, a strategy led by the WHO and UNICEF led to improvements in measles vaccination coverage that averted an estimated 1.4 million measles deaths worldwide [16]. The current study reveals that some of patients were vaccinated for measles and MMR which indicates vaccine failure or incomplete vaccination that give partial protection. A hospital based study done in India shows that 9% of measles cases developed pneumonia, 47% developed diarrhea, 6% developed O.M and 1-2% developed CNS complications (menengoencephalitis, convulsion). While a study done in industrialized countries shows that most common cited complication which associated with measles infection are O.M(9%) and pneumonia(6%) while diarrhea occurred in 3% of cases and CNS complications were occurred in only 1% of cases [17] .

A study done in Ethiopia shows significant relation between type of feeding and measles complications in which 10% of infants on breast feeding with or without additional food developed complications when they get measles ;while 25% of infants on bottle feeding with or without additional food developed complications when they get measles infection [18].

In the current study there was significant relation between nutritional status and presence of O.M among measles cases ,This result meets with a study done in Bangladesh which shows that incidence of early onset O.M and repeated episodes of O.M are more among children with malnutrition than those with normal nutritional state [19].Moreover, a hospital based study in Brazil shows that 35%, 50%, and 70% of measles cases with mild, moderate, severe malnutrition ,respectively, developed complications in comparison with only 20% of complicated cases with normal nutritional state. In the current study the relation between the nutritional state and development of complications (GIT, CNS, and Respiratory) among measles cases were not significant which did not agree with the previous study [20].

In the current study 27% of cases presented with neutrophilia, 35% presented with lymphocytosis, since the cases were presented late in illness so we can conclude that neutrophilia is due to secondary bacterial infection, yet the use of antibiotics was 100% among patients. A hospital based study done in South Africa shows that children with anemia(thalassemia were excluded) are more prone to develop severe complicated infections than those without anemia indicating that anemia may decrease resistance to infections [21].

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