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CLINICOEPIDEMIOLOGICAL STUDY OF MEASLES AT SIR RONALD ROSS INSTITUTE OF TROPICAL AND COMMUNICABLE DISEASES: A RETROSPECTIVE STUDY

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ABSTRACT: BACKGROUND: Measles remain a leading vaccine-preventable cause of child mortality worldwide and is still a public health problem. According to the World Health Organization (WHO), more than 20 million people are affected by measles each year with 95% of measles deaths occurring in countries that have weak health infrastructures. Out breaks of Measles are still common in India. **OBJECTIVE:** The main objectives of the present study were to determine the clinical and epidemiological characteristics and to discuss the complicated cases that were diagnosed at around Sir Ronald Ross Institute of Tropical and Communicable Diseases (SRRIT&CD), Nallakunta, Hyderabad. **METHODS:** All cases admitted at SRRIT&CD, Nallakunta, Hyderabad with signs and symptoms of Measles were studied during the period January 2013 to December 2014. This study included a study population of 1427 cases and the results were analyzed. **RESULTS:** A total of 1427 cases of Measles were diagnosed in two year period (2013-2014). The majority of the patients were children with slight male predominance. Most of the patients had history of either partial or non-immunization. Most common clinical feature was fever, generalized weakness and rash. Other symptoms like conjunctivitis, coryza (Runny nose), cough and small spots with white or bluish-white centers on an erythematous base on the buccal mucosa (Koplik spots). Seventeen cases were presented with complications like encephalitis, pneumonia, febrile convulsions and diarrhea etc., **CONCLUSION:** Measles continues to be a leading cause of morbidity and mortality in India. This study provides clinical and epidemiological characteristics to assess the overall burden of the disease as disease outbreaks are very commonly reported despite of various immunization programmes. There are several reasons for continued Measles outbreaks in these countries. There is no organized system of surveillance of Measles cases, and hence reliable data are not available. In this study we sought to find the burden of Measles and awareness of Immunization and also its complications. **KEYWORDS:** Measles, Prevention, Immunization, Epidemic.

INTRODUCTION: Measles is one of the acute contagious viral diseases that affect mostly children. ¹ It starts with prodromal fever, conjunctivitis, coryza (Runny nose), cough and small spots with white or bluish-white centers on an erythematous base on the buccal mucosa (Koplik spots). A rash develops, starting on the face and upper neck and gradually spreading downwards lasting 4 to 7 days and sometimes ends with desquamation. The virus is transmitted via droplets from the nose, mouth or throat of infected persons or direct contact with infected nasal or throat secretions. It can be transmitted by an infected person from 4 days prior to the onset of the rash to 4 days after the rash erupts and can be prevented by immunization.

Forty years after effective vaccines were licensed; measles continues to cause severe disease in children worldwide. Pneumonia, otitis media and encephalitis are common complications of

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measles etc.,. Complication rates are higher in the age group less than five years. Complication rates are increased by immune deficiency disorders, malnutrition, vitamin A deficiency, intense exposures to measles, and lack of previous measles vaccination. Case-fatality rates have decreased with improvements in socioeconomic status in many countries but remain high in developing countries.

OBJECTIVES: To estimate the clinical and epidemiological characteristics of the disease in SRRIT & CD, Nallakunta, and Hyderabad and to suggest preventive and curative measures.

METHODS: This is a 2 years retrospective hospital based study and all cases admitted at SRRIT & CD, Hyderabad during the period of two years (January 2013–December 2014).

Inclusion Criteria: As measles is a clinical diagnosis, all patients with high grade fever, cough, coryza, conjunctivitis with progressive rash with history of immunization.

Exclusion Criteria:

1. Drug rash drug OT.
2. Other exanthematous fevers like Dengue.

Patient data was documented for each case in a prescribed proforma meeting the objectives of the study including the early prodromal symptoms of measles like fever, headache, and general weakness or discomfort. More specific signs and symptoms of Measles like Rash, conjunctivitis, coryza (Runny nose), cough and small spots with white or bluish-white centers on an erythematous base on the buccal mucosa (Koplik spots) were also noted. The details like occupation, locality, and vaccination history were also taken. The patients were clinically examined for the presence of relevant signs of rash, conjunctivitis, coryza (Runny nose), cough and small spots with white or bluish-white centers on an erythematous base on the buccal mucosa (Koplik spots) and sign of malnutrition etc and the results were analyzed using Windows Excel software. In this study, we also identified seventeen Measles cases with complications like encephalitis, pneumonia, febrile complications and diarrhea etc.,. After the provisional clinical diagnosis was made, patients were treated with supportive therapy along with Vitamin A solution according to CDC guidelines.²

Vitamin A is administered once a day for 2 days at the following doses: 50,000 IU for infants aged <6 months; 100,000 IU for infants aged 6–11 months; 200,000 IU for children aged ≥12 months. An additional (Third) age-specific dose of vitamin A should be given 2–4 weeks later to children with clinical signs and symptoms of vitamin A deficiency. Parenteral and oral formulations of vitamin A are available in the United States.

Whenever patient developed systemic complications like pneumonia, encephalitis etc.,. Were transferred to the respective referral centers whenever necessary. The results were statistically analyzed using Microsoft Excel.

RESULTS: In this study, a total of 1427 cases were diagnosed as Measles during the period of two years (2013 -2014). Year wise distribution and variations of incidences of Measles (2013-2014) was seen in Table 1 & Graph 1. Age distribution was described in Table 2 & Graphs 2. Gender distribution was described in Table 3 & Graphs 3. Seasonal variation of the year 2013 and 2014 was

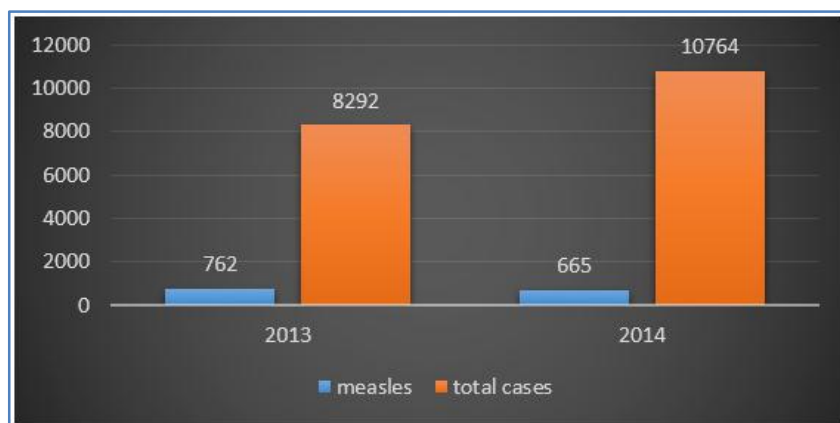
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described in Table 4, 5 & Graphs 4. Immunization status of the measles patients was shown the Table 6. The details of clinical features and clinical summary of complicated measles were shown in Table 7 & 8. Percentage of complicated measles was shown in Graph 5 whereas distribution of complicated measles was shown in graph 6.

This study revealed that the majority of Measles were seen in children below Five year with slight male predominance. Majority of the patients had not taken the complete immunization. An attempt to study the seasonal variation of communicable diseases in the year 2013 revealed a strange seasonal variation with an increase in the number of cases of Measles occurring in the month of April and in October, November and December and plateau in July and August. In the year 2014 seasonal variation of measles were maximally diagnosed in the month of January, February and March and the plateau in November and December. Out of 1427 measles cases reviewed during a period of two years in this study, 17 cases (1.19%) were complicated measles. Among these, majority had the complication of diarrhea (35.3%), followed by pneumonia (23.53%) and febrile convulsions (23.53%). Encephalitis was seen in 3 (17.64%) cases.

Year	Measles		Total No. of admissions
	Number	Percentage	
2013	762	9.1%	8292
2014	665	6.17%	10764

Table 1: Yearwise distribution of Measles cases

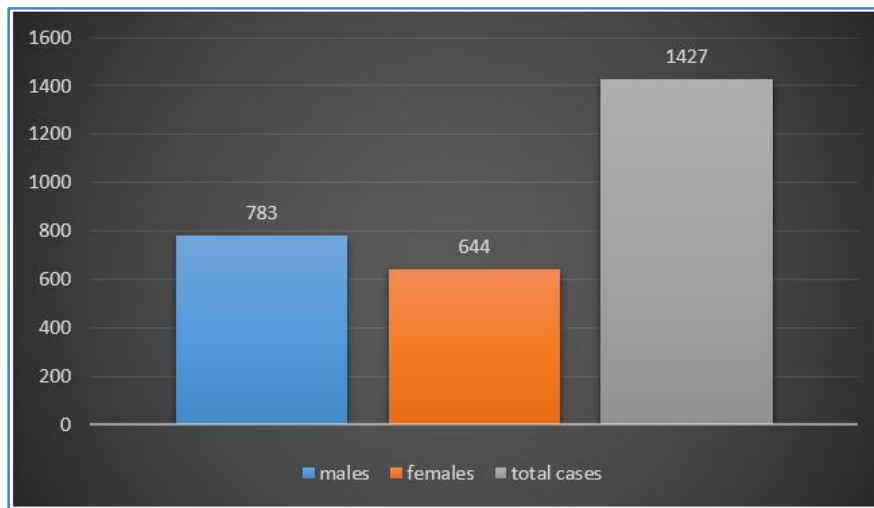


Graph 1: Year wise distribution of Measles

Gender	Number of cases	
	Number	Percentage
Male	783	54.8%
Female	644	45.12%
Total	1427	100.00%

Table 2: Gender wise distribution of Measles cases

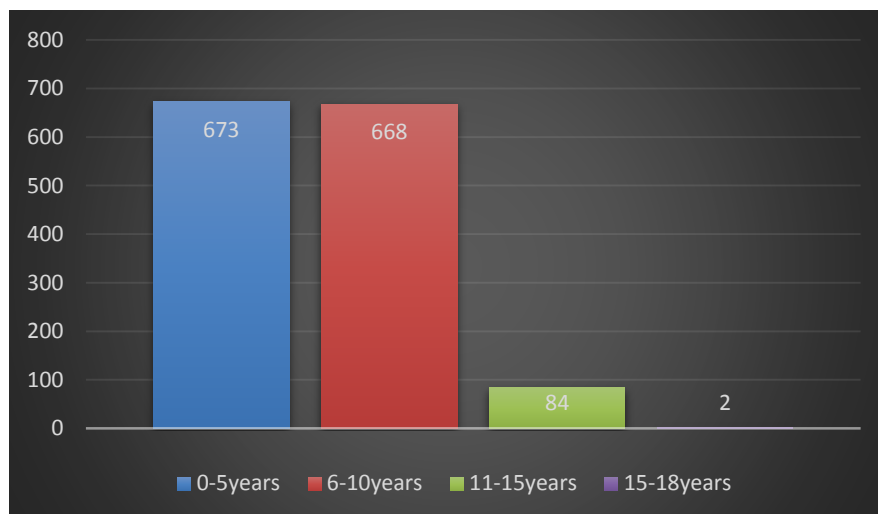
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Graph 2: Gender wise distribution of Measles cases

Age group (years)	Number of cases	
	Number	Percentage
0 – 5	673	47.6%
6 – 10	668	46.8%
11 – 15	84	5.8%
15 -18	2	0.1%
Total	1427	100.00%

Table 3: Age wise distribution of Measles patients



Graph 3: Age wise distribution of Measles patients

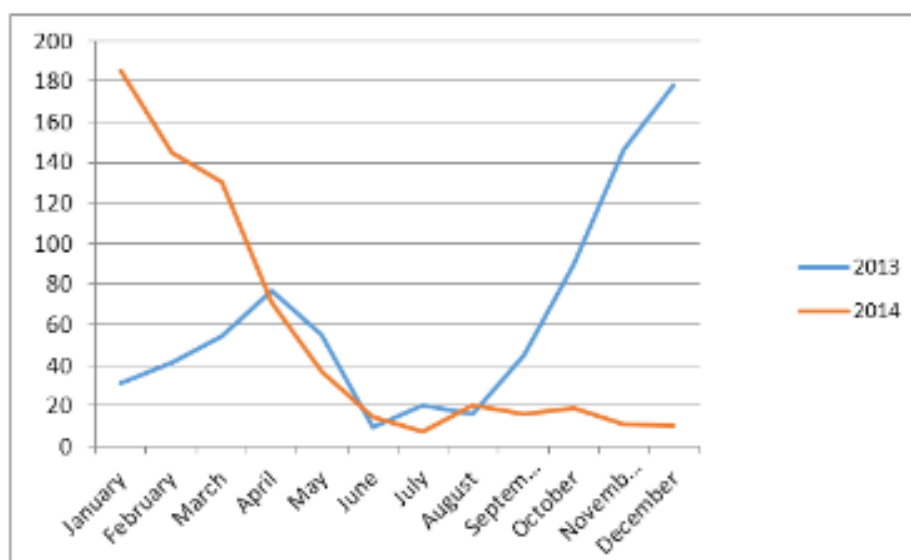
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	Month wise distribution of cases of communicable diseases at SRRITCD for the year 2013 (Number of cases)											
Month	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sept	Oct	Nov	Dec
No. of cases	31	41	54	77	55	9	20	16	45	90	146	178
Percentage	4.06	5.38	7.08	10.1	7.21	1.18	2.62	2.09	5.9	11.81	19.16	23.35

Table 4: Month wise distribution of cases of Measles cases at SRRITCD for the year 2013

	Month wise distribution of cases of communicable diseases at SRRITCD for the year 2014 (Number of cases)											
Month	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
No. of cases	185	145	130	71	37	14	7	20	16	19	11	10
Percentage	27.8	21.8	19.5	10.6	5.5	2.1	1.05	3.00	2.4	2.85	1.65	1.5

Table 5: Month wise distribution of cases of Measles cases at SRRITCD for the year 2014



Graph 4: Seasonal variation of Measles cases at SRRITCD for the year 2013 & 2014

Immunization status	Number of cases	
	Number	Percentage
Completely immunized	172	12.5%
Partially immunized	37	2.5%
Not known	1218	85.35%
Total	1427	100.00%

Table 6: Immunization status of the measles patients (n=1427)

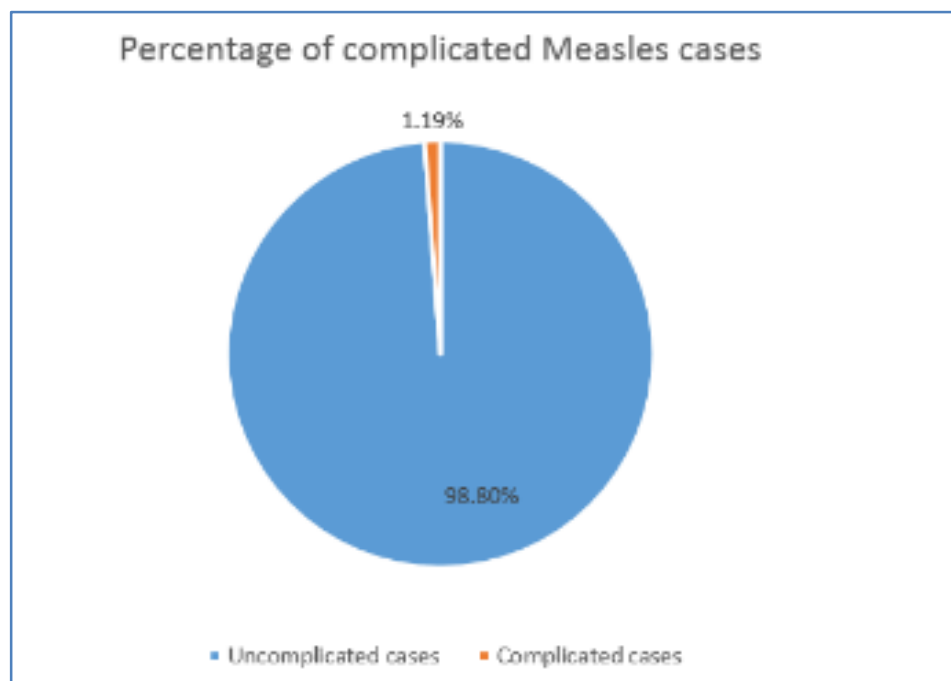
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Symptoms and Signs	No. of Patients	Percentage
Fever	1427	100%
Headache	998	67.79%
Generalised weakness	1427	100%
Rash	1427	100%
Conjunctivitis	1140	79.9%
Coryza	1140	79.8%
Cough	998	69.9%
Koplik spots	425	29.2%

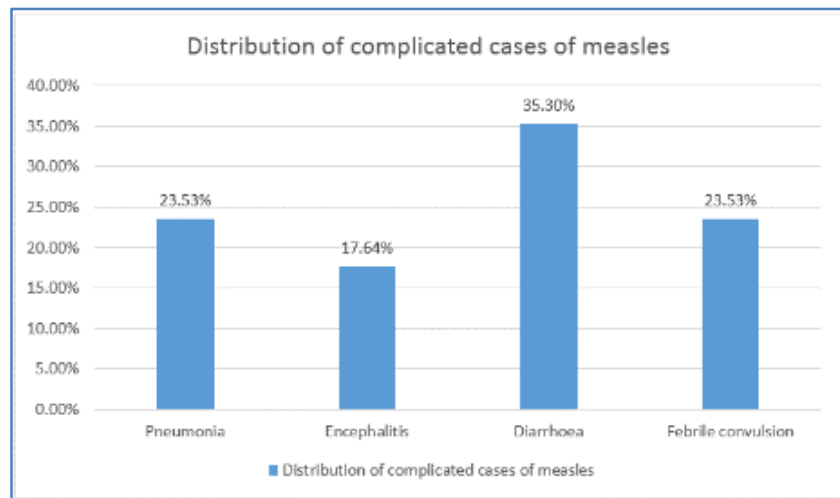
Table 7: Clinical features of Measles patients (n= 1427)

Sl. No.	Clinical Diagnosis	Number of Cases
1	Pneumonia	Four
2	Encephalitis	Three
3	Diarrhea	Six
4	Febrile convulsions	Four

Table 8: Clinical summary of complicated Measles cases



Graph 5: Percentage of complicated Measles cases



Graph 6: Distribution of complicated Measles cases

DISCUSSION: Measles is an acute viral illness and is caused by Morbilliform virus of the Paramyxovirus group. Clinically Measles occurs in three stages-include Nonspecific prodromal, stage of rash and stage of complications. In most cases, Measles is diagnosed primarily on the basis of clinical symptoms and signs. In spite of significant improvement in overall healthcare in this country, prevention and control of measles has been a low priority for the health authorities.

According to this study, the incidence of the disease appears to be constant and epidemics were seen. The majority of measles patients were from the age group less than five years. The case definition used was that proposed by the WHO standard operating procedures.^{3,4,5} The majority had poor and low socioeconomic status. Incomplete (2.5%) and non-immunization (85.35%) were mainly responsible for the outbreaks of measles. Few of the cases had complications like encephalitis, pneumonia and diarrhoea, febrile convulsions in this study.

This reflects gross negligence on the part of both the patients as well as the healthcare system. Majority of measles patients had resorted to different indigenous treatment practices due to the desperate need of treatment of cases with poor prognosis. In addition, it is well known that availability and affordability of measles immunization still needs to improve, and that the facilities and services are poor in various health centers. Simultaneously, extensive public education for both rural and urban community is equally important for reducing measles outbreaks.

An attempt to study the seasonal variation of measles revealed a strange seasonal variation with peaks in the months of January to March and the second peak in November and December. The reason for the observed upsurge of the disease could be probably the transition phase of the seasons which makes the adjustment of the host to the changed weather difficult, thus increasing their susceptibility and also makes the conditions favorable and the survival of the agents of the diseases.

Host behavior is one of the causes for seasonal variation in diseases like measles as well as other childhood infections including mumps, chickenpox, diphtheria and pertussis. The congregation of children during school terms is the most common cause for these infections. In the tropics, measles incidence peaks during the dry season and the association with school terms is not apparent. Instead increased survival of the virus in the dry air may be the key determinant of their dry season peak.

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In order to reduce the morbidity and mortality caused by measles, WHO organized a mass measles vaccination for the children aged 9 months to 14 years. Before then, measles containing vaccine was administered with routine services in health facilities.⁶ There were yearly epidemics reported in various countries. With a vaccination coverage rate of 92% during the measles mass campaign, most of the countries were able to reduce the number of measles cases by 98%.⁷ Despite such a significant progress, measles outbreaks of varying intensity have been reported here and there.⁸ In India, few measles outbreaks were reported with high case fatality.⁹ Most of the developed western Asian countries have been able to reduce Measles deaths to a great extent, but in countries like India, it is still a major problem and report many deaths every year.

The other major factor for increased mortality in measles is the lack of data on the incidence of disease as well as deaths, particularly from the India. Surveillance systems need to be strengthened in the countries like India in order to obtain accurate data before taking appropriate control measures. Epidemiological surveys to estimate the burden of measles and its mortality rate were done in various countries.⁶⁻¹³ This type of hospital based studies can help in developing the new strategies to reduce the number of measles cases and to plan for its elimination. Hence we made an attempt, this kind of study in our hospital mainly to estimate the burden of measles and its epidemicity.

The results were compared to other similar hospital based studies.¹⁴⁻¹⁹ In comparison with other studies, the mean age of occurrence is similar in our study (Goodson et al. 2005). The occurrence in unimmunized or partially immunized population is also comparable with other studies (Valinga J. et al.) The incidence of complications in our study was 1.19% which is less when compared to other studies. However, diarrhea was the most common complication similar to other studies (Ashok Mishra et al).¹³⁻¹⁹ Large scale surveys as well as hospital based studies are needed to provide the valuable data for prevention and control of measles in future.

We have made an attempt to provide a good surveillance system and to understand whether the current focus of Measles prevention is appropriate as well to ascertain the necessary changes to deal this disease more effectively. We also recommend the following measures for prevention and control of Measles:

1. Routine surveillance and quality assurance of the disease by physicians, hospitals and laboratories to detect trend of the disease and as well as the development of strategies, policies, and practices to prevent the spread of diseases and also the outbreaks.
2. It is recommended that all people should receive the life-saving vaccine from the health institutions.
3. Universal Immunization Program (UIP) recommended that all children should receive Measles vaccination even at age of 9 months and the second dose at the age between 15-18 months. It is very important to educate the people about immunization protocol in order to prevent high incidence of Measles. Indian Academy of Pediatrics (IAP) has made latest recommendations (2015) regarding immunization schedule of MMR vaccine. It suggests that children should receive first dose of this vaccine at age of 9 months and the second dose at 15 to 18 months. It also recommends booster dose at 5 years of age mainly to reduce the incidence of measles in adult age group due to waning of immunity.
4. Mission Indradhanush ¹⁹ Mishra A, Mishra S, Lahariya C, Jain P, Bhadoriya RS, Shrivastav D et al. Practical from an Epidemiological Investigation of a Measles Outbreak in a District of India. Indian J Community Med. 2009; 34 (2): 117-121.

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5. Is proposed in India which covers immunization of seven vaccine preventable diseases among the districts where vaccination coverage is less than 50% in a phased manner where measles vaccine is also included.
6. Prevention of the Measles is also possible by elimination of the risk factors causing them. So proper education of the patient is mandatory by public health staff and also the improvement of the public health infrastructure, immunizations, screenings, and as control and prevention of measles.
7. Insight into seasonal disease patterns may be useful. Alerts and timely information about emerging or seasonal trends of the Measles disease are mandatory.
8. Improved coverage of Immunization, control of Measles by intensifying public education about the disease play main role in the reduction of the disease as well as its complications.

CONCLUSIONS:

1. We have reviewed the clinical and epidemiologic characteristics of measles and found it to be occurring predominantly in non-immunized or partially immunized children with a male preponderance.
2. The occurrence of complications in measles only further highlights the importance of vaccination as a tool for eradication for this disease

REFERENCES:

1. World Health Organization. Immunization against diseases of public health importance. 2005 <http://www.who.int/mediacentre/factsheets/fs288/en/>. Accessed on the 6th of January 2011.
2. World Health Organization. Media Centre. Measles. 2009. <http://www.who.int/mediacentre/factsheets/fs286/en/>. Accessed on the 5th of January 2011.
3. Amy Parker Fiebelkorn, James L. Goodson. Infectious Diseases Related to Travel Measles (Rubeola) Chapter 3 (78). <http://wwwnc.cdc.gov/travel/yellowbook/2014/chapter-3-infectious-diseases-related-to-travel/measles-rubeola>.
4. Ministère de la Santé Publique du Cameroun. Normes et Standards du Programme Elargi de Vaccination. 2eme edition. Yaoundé; 2009. Programme Elargi de Vaccination.
5. World Health Organization. Regional Office for Africa. Guidelines for Measles surveillance. 2004 http://www.afro.who.int/fr/downloads/doc_download/3675-guidelines-for-measles-surveillance-revised-december-2004.html. Accessed on the 31st of January 2012.
6. World Health Organization. Health Topics. Measles. <http://www.who.int/topics/measles/en/>. Accessed on the 4th of January 2011.
7. World Health Organization. Immunization against diseases of public health importance. 2005 <http://www.who.int/mediacentre/factsheets/fs288/en/>. Accessed on the 6th of January 2011.
8. World Health Organization. Media Centre. Measles. 2009. <http://www.who.int/mediacentre/factsheets/fs286/en/>. Accessed on the 5th of January 2011.

ORIGINAL ARTICLE

9. Mishra A, Mishra S, Lahariya C, Jain P, Bhadoriya RS, Shrivastav D et al. Practical from an Epidemiological Investigation of a Measles Outbreak in a District of India. Indian J Community Med. 2009; 34 (2): 117-121.
10. World Health Organization. Immunization Profile - Cameroon. 2010
http://apps.who.int/immunization_monitoring/en/globalsummary/countryprofileresult.cfm. Accessed on the 4th of January 2011.
11. Wiysonge SC, Mawo NJ, Ticha MJ, Nomo E, Shey SM. Migration and Measles. Int J Epidemiol. 2005; 34 (6): 1443-1444.
12. Luquero FJ, Pham-Orsetti H, Cummings DAT, Ngaunji PE, Nimpa M, Fermon F et al. A Long-Lasting Measles Epidemic in Maroua, Cameroon 2008 - 2009. J Infect Dis. 2011. Suppl 1: S243-51.
13. Kamugisha C, Cairns KL, Akim C. An Outbreak of Measles in Tanzanian Refugee Camps. J Infect Dis. 2003 May 15; 187 Suppl 1: S58-62.
14. WHO Guidelines for Epidemic Preparedness and Response to Measles Outbreaks Geneva, Switzerland. 1999. WHO/CDS/CSR/ISR/99/1. Accessed on the 15th of September 2011.
15. Goodson JL, Masresha BG, Wannemuehler K, Uzicanin A, Cochi S. Changing Epidemiology of Measles in Africa. J Infect Dis. 2011 Jul; 204 Suppl 1: S205-14.
16. Wallinga J, Heijne Janneke CM, Kretzschmar M. A Measles Epidemic Threshold in a Highly Vaccinated Population. PLoS Med. 2005; 2: e316.
17. Global eradication of measles: report by the Secretariat. Geneva, Switzerland. Sixty-third World Health Assembly. 2010. 63/A63_18-en.pdf. Accessed on the 15th of September 2011.
18. Nandy R, Handzel T, Zaneidou M, Biey J, Cuddy RZ, Robert Perry et al. Case-Fatality Rate during a Measles Outbreak in Eastern Niger in 2003. Clin Infect Dis. 2006 Feb 1; 42 (3): 322-8.
19. National Health Portal, Gateway to authentic health information. Ministry of Health and Family Welfare launches Mission Indradhanush. <http://www.ncp.gov.in>.

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