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Research Article

REVIEW ANALYSIS OF ADMITTED MEASLES PATIENTS IN A SPECIALIZED REFERRAL HOSPITAL FOR INFECTIOUS DISEASES IN KOLKATA

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A B S T R A C T

Background & Objectives: Despite of the global effort to enhance measles immunization coverage, measles outbreaks still occur; ranking measles at the top among all vaccine preventable diseases. Measles causes high morbidity and mortality especially when clinical cases are not properly managed and complications developed.[1] A hospital based case series study of suspected Measles patients was carried out with the objectives of assessing the current burden of Measles at this institution, seasonality, immunization status and laboratory confirmation of cases. **Methodology:** The study was conducted among 306 admitted Measles/ Rubella patients at an Infectious Disease Hospital of Kolkata from January to December'2019. Interview of patients and care-givers were conducted along with review of follow-up of investigation reports. **Results:** Study revealed that majority of the patients (61.1%) were above 15 years age group and 10.1% cases occurred among children of 0-9 months age group. Majority were males (57.8%), belonged to urban areas (70.6%), only 19.9% patients had definite history of vaccination. Seasonal variation was found with 2 peaks; one in March-April and another in October- November months. Significant difference was observed in vaccination status of patients' upto 15 years and above 15 years age groups. Out of the total 306 study subjects, laboratory confirmed Measles were 61.4% and Rubella 4.2%. **Interpretation and Conclusion:** Adolescents and adults constitutes majority of study subjects. Strengthening of childhood vaccination coverage along with provision for adult vaccination is needed.

INTRODUCTION

Measles is highly contagious (90% of exposed susceptible develop measles), endemic in developing countries with peak transmission during October-March.[1,2] Globally 7 million people were affected in 2016.[2]

Single dose Measles vaccine confers life-long immunity in 85% children.[1] Though measles occur in children below 15 years, age distribution had recently shifted to adults. Interrupting transmission requires an effort to achieve 95% population immunity.[1] But, coverage (89.1%) is less in India, rendering number of susceptible children, who acts as potential source for measles outbreak.[3]

In this perspective, present study was conducted with the objectives of assessing current burden, seasonality, immunization status and laboratory confirmation of Measles cases at a specialized referral hospital for infectious diseases.

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MATERIALS AND METHODS

Present study included all the 334 patients admitted with clinical features of Measles/ Rubella, during January-December '2019 in a tertiary level infectious disease hospital as study sample. After explaining the purpose of the study to the patients, verbal consent to participate in the study was obtained from 306 patients, thus the sample size came to 306. After obtaining necessary permission from Institutional Ethics Committee data were collected by researchers and trained junior doctors in a pre-designed and pre-tested interview schedule. Three techniques were followed: (1) Interview of patients or care-givers - to collect information about patients' demographics- age, gender, religion, area of residence etc. (2) Record review- patients bed head tickets (BHTs) to determine about clinical diagnosis, timing of admission, history of immunization with Measles containing vaccine (MCV) (as declared by patient or care-provider, also cross-checked from immunization cards, if available). (3) Reviewing laboratory investigation reports- for confirmation of diagnosis.

The laboratory confirmed Measles/ Rubella when a blood sample taken from a suspected case within 28 days of onset of

rash showed Measles/ Rubella specific IgM antibodies. As Measles vaccination and infection both results in raised IgM; so, presence of Measles IgM in those vaccinated within 30 days prior to sample collection did not imply disease. Throat swab samples were also collected, if patients reported within 7 days of onset of rash, for detection of Measles/ Rubella viral RNA. Serum and throat swab samples were collected from suspected Measles cases and send to designated WHO accredited laboratory for testing under 'Measles, Rubella Surveillance' Programme.

Collected data were entered in MS Excel and analysed using software IBM SPSS 16. Data were presented in the form of proportions, line diagram etc; standard statistical test (chi square test) was applied to analyse data.

RESULTS

Out of the total 306 Measles patients, 31 (10.1%) patients were in age group between 0 to 9 months, followed by 88 (28.8%) and 187 (61.1%) patients in the age group of above 9 months to 15 years and above 15 years age groups respectively. Most of the reported Measles cases were males (57.8%) as shown in table.1.

Majority of the patients were Hindu by religion (75.2%) and rest 24.8% were Muslims.

Majority of the study population belonged to urban area (70.6%) as compared to rural area (29.4%). Out of total urban measles cases, 56.2% resides in non-slum area and 14.4% in slum area.

Only 61 (19.9%) patients had definite history of vaccination with a dose of MCV or showed immunization card. Almost 22.9% were un-immunized and 57.2% were of unknown vaccination status. Among the patients aged upto 15 years 30.2% were vaccinated, whereas the proportion of immunized was only 13.4% in above 15 years age category. Among the Measles patients belonging to urban area 20.8% were vaccinated, but the vaccinated proportion was slightly less (17.8%) in rural Measles cases.

Table. 2 showed that there were statistically significant difference ($p<0.05$) in vaccination status among measles patients aged upto15 years and above 15 years age group. No significant difference was observed regarding gender, religion and residence of the vaccinated patients as compared to non-vaccinated cases.

Figure. 1 showed the geographical distribution of occurrence of the Measles cases. Majority of the cases (38.9%) were reported from North-24-Parganas district, probably due to the location of this hospital, followed by Kolkata (19.9%), South-24-Parganas (19.3%), Howrah (7.2%), Hooghly (4.9%), Nadia (3.3%), Purba Medinipur (2.9%) etc. Also, 1 case (0.3%) was reported from Begusarai district of Bihar.

It was revealed from table.3, that serological testing of serum samples for Measles specific IgM was done in a sub-sample of 273 patients, of which 188 (61.4%) were positive. The 85 Measles negative samples were further tested for Rubella specific IgM and only 7 (2.3%) showed Rubella positivity. Out of clinically suspected 306 measles patients, throat swab culture for virus isolation was performed in a sub-sample of only 60 (19.6%) cases. Among the culture reports 25 were negative for both Measles and Rubella virus; 35 were positive, of which 27 (8.8%) showed Measles positivity and only 8 (2.6%) were positive for Rubella virus.

Out of clinically suspected 306 patients admitted, laboratory confirmed Measles cases were 188 (61.4%) and Rubella were 13 (4.2%). Rest of the cases (34.4%) was clinically compatible.

Month-wise distribution of the admission of Measles patients is shown in figure.2. Measles cases were admitted in this hospital throughout the year in 2019; the line diagram did not touch the baseline. Admission of measles cases showed 2 peaks during 2019; one during March- April (spring) and another in October- November (pre-winter). Lowest number of cases reported during June- September; April onwards incidence of measles declined, plateau maintained during rainy season (July-August).

Patients presented with fever, macula-papular rash, cough, coryza, conjunctivitis, sore throat etc. Some of the study participants developed minor complications eg. diarrhoea, vomiting, sub-conjunctival hemorrhage, ear problems, bronchitis etc. All the cases were treated symptomatically and age appropriate doses of vit-A was administered on 2 consecutive days following admission. There was death of 1 male and 2 female measles patients due to Measles related complications. Thus the cases fatality rate was 0.98% among the total 306 admitted cases during 2019.

Table 1 Age and gender wise distribution of Measles patients (N=306)

Age groups	Gender		Total	χ^2, p value, df
	Male	Female		
	No. (%)	No. (%)	No. (%)	
0-9 months	21(6.8)	10 (3.3)	31 (10.1)	
>9 months- 15 years	53 (17.3)	35 (11.4)	88 (28.8)	2.036, >0.05, 2
>15 years	103 (33.7)	84 (27.5)	187 (61.1)	
Total	177 (57.8)	129 (42.2)	306 (100.0)	

Table 2 Vaccination status of measles patients in relation to other variables (N=306)

Variables		Vaccination status		χ^2, p value, df
		Vaccinated	Un-vaccinated / unknown	
Age groups	0-15 years	36	83	12.987,
	>15 years	25	162	**<0.05**, 1
Gender	Male	37	140	0.247,
	Female	24	105	>0.05, 1
Religion	Hindu	51	179	2.909,
	Muslim	10	66	>0.05, 1
Residence	Urban	45	171	0.372,
	Rural	16	74	>0.05, 1

Table 3 Distribution of measles cases according to laboratory investigation results (N=306)

Laboratory investigations		Measles	Rubella
		No. (%)	No. (%)
IgM antibody detection	Detected	188 (61.4)	7 (2.3)
	Not detected	85 (27.8)	78 (25.5)
	Not tested	33 (10.8)	221 (72.2)
Throat swab for virus isolation	Detected	27 (8.8)	8 (2.6)
	Not detected	33 (10.8)	52 (17.0)
	Not tested	246 (80.4)	246 (80.4)

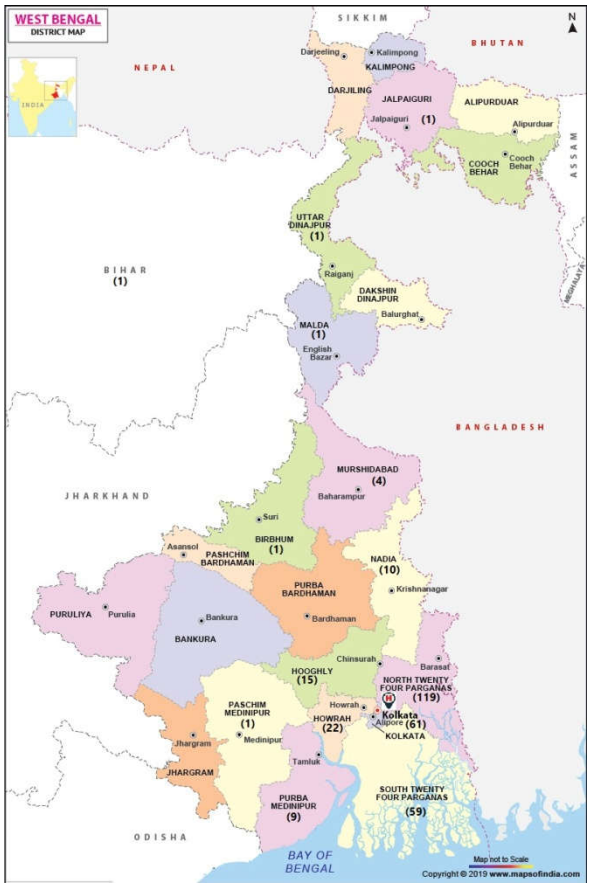

Figure 1 District wise map of West Bengal showing geographical distribution of patients according to residence (N=306)

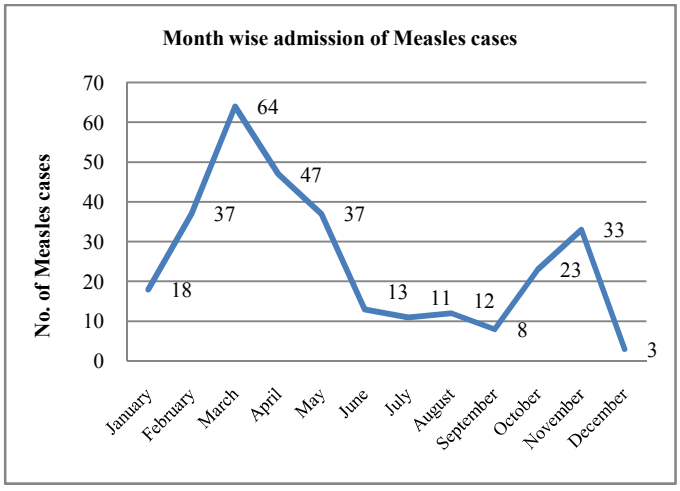

Figure 2 Line diagram showing month-wise distribution of admitted Measles cases during 2019 (N=306).

DISCUSSION

The present study indicated that 10.1% admitted Measles cases were children aged 0-9 months, whereas Aaby P.[4] reported, 20-45% Measles cases occur under 9 months children in urban Africa. This variation might be due to the present one was an institution based study. This is a matter of concern and indicates lack of maternal immunity or a higher infectious pool among the herd members and/or lower herd immunity. Though there is provision of Measles vaccination at an earlier age during epidemics and outbreaks, considering the occurrence of huge number of cases within 9 months of age, the question of preponement of the age of vaccination may be justifiable.

Present study found majority (61.1%) of the Measles cases were aged >15 years age group, this might be due to- waning of immunity with age, immunization failure or a true un-immunized cohort of older patients. This finding did not corroborate with Vaidya S.R.[5] in Maharashtra, where majority were grouped in 0-15 year (97.5%) probably due to difference in study settings and vaccination coverage.

Present study revealed that majority of the reported Measles cases were males (57.8%), similar finding was observed by the earlier studies of Vaidya S.R.[5] (51.5%), Lawrence T.[6] in Kerala, where male preponderance was 57.5% in 2007 and 49.8% in 2008.

Majority of the admitted measles cases belonged to urban area (70.6%) as compared to rural areas (29.4%). Out of total urban measles cases majority (56.2%) resides in non-slum area, rest 14.4% were belonged to slum area. This variation might be due to under-reporting of cases from slum areas due to lack of awareness.

Present study revealed that, 19.9% patients developed Measles despite being vaccinated, 22.9% cases were un-vaccinated and 57.2% patients were of unknown vaccination status. Findings of the present study did not corroborated with the findings of Lawrence T.[6]where the reported proportions were 28.6%, 54.3% and 17.1 % respectively. Similar observation regarding occurrence of Measles among vaccinated persons was found in earlier studies conducted by Ray S.K.[8] and Vaidya S.R.[5]where it was 20% and 25.7% respectively. While, Bajaj S.[7] showed 40% confirmed Measles cases among vaccinated persons.

It was observed by the present study that among the urban Measles cases 20.8% were vaccinated, whereas only 17.8% of rural Measles cases were vaccinated. This finding did not corroborate with the findings of an earlier study by Ray S.K.[9]where Measles vaccination coverage was 58.9% in urban area and 48.9% in rural area of this state. This variation may be due to the fact that recent study was an institution based and the earlier one was a community based study.

The present study revealed 2 peaks of Measles during 2019; March- April and October- November. Almost similar seasonal distribution of Measles was reported by an earlier study done by Vaidya S.R.[5]in Maharashtra during 2013 (February- May and September- December). But present study finding did not corroborate with the findings of Lawrence T.[6] in Kerala (April- June in 2007 and August-October in 2008).
The current study showed that among the suspected Measles cases laboratory confirmed Measles were 61.4%, Rubella were 4.2%. Similar findings were depicted in previous study done by Vaidya S.R.[5]where 64.7% of suspected cases were confirmed for Measles IgM, 15.5% for Rubella.

Several study findings had already indicated regarding the significance of Measles age shifting due to waning of immunity over a period after receiving a single dose of measles vaccine. Campaign may be required to vaccinate adolescents and adults besides measures to maintain high routine immunization coverage. India had introduced 2nd dose of Measles vaccine to immunize all under-5 children in May'2010 and replaced it with Measles- Rubella (MR) vaccine in 2017; when member States of WHO-SEAR committed to eliminate measles and control rubella by 2020.[3] WHO had

strengthened "Measles case based surveillance," to identify high risk areas and vulnerable age groups.[1]

CONCLUSION

Adolescents and adults constitute the majority of Measles sufferer, probably due to waning of immunity with advancement of age or lack of childhood vaccination. Overall vaccination coverage was also found to be poor among the Measles affected. Further research is needed for better understanding of the changing measles epidemiology considering the contribution of young infants and older age groups in overall disease burden.

Recommendation

1. Strengthening of IEC activities is needed for increasing immunization coverage.
2. Vaccination or booster doses of MCV for adolescents and adults are the need of the hour to tackle the age shifting in occurrence of Measles.
3. Measles vaccination coverage requires better documentation, through measures to increase card retention and regular validation.
4. Virological and immunological research related to Measles.

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References

1. Saleh J.A., 2016, 'Trends of measles in Nigeria: A systematic review', DOI: 10.4103/1118-8561.181887, Sahel Medical Journal / January-March 2016 / Vol 19 | Issue 1, http://www.smjonline.org/temp/SahelMedJ1915-2487028_065430.pdf, last assessed on 15.02.20
2. Ristić M., Milosević V., Medić S., Malbasa J.D., Rajčević S., Boban J. *et. al*, 2019, 'Sero-epidemiological study in prediction of the risk groups for measles outbreaks in Vojvodina, Serbia', PLOS ONE | https://doi.org/10.1371/journal.pone.0216219 May 9, 2019, https://journals.plos.org/plosone/article/file?id=10.1371/journal. pone.0216219&type=printable, last assessed on 15.02.20
3. Shrivastava S.R.B.L., Measles in India: Challenges & recent developments, 2015, WHO Collaborating Centre for Reference and Research on Influenza, Australia, Infection Ecology & Epidemiology 2015, 5:27784, http://dx.doi.org/10.3402/iee.v5.27784, https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4444763/pdf/IEE-5-27784.pdf, last assessed on 05.02.20
4. Aaby P., Clements C.J. ,'Measles immunization research: a review', 1989, Bulletin of the World Health Organization, 67 (4): 443-448 (1989), https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2491276/pdf/bullwho00062-0097.pdf, last assessed on 05.02.20
5. Vaidya S.R., Kamble M.B., Chowdhury D.T., Kumbhar N.S., 2016, 'Measles & rubella outbreaks in Maharashtra State, India', Indian J Med Res 143, February 2016, pp 227-231, DOI:10.4103/0971-5916.180214, https://www.researchgate.net/publication/287197975_Measles_and_Rubella_Outbreaks_in_Maharashtra_State_India/link/57106e3908aefb6cadaaaa7f/download, last assessed on 07.02.20
6. Lawrence T., Anish T.S.N., Vijayakumar K., Ramachandran R., Suchithra E.T., Rajasi R.S., 2012, Epidemiology of Measles outbreak in Kerala, India, during 2007-2008, Annals of Tropical Medicine & Public Health, 2012, vol-5, issue.2, page 89-93,http://www.atmph.org/article.asp?issn=1755-6783;year=2012;volume=5; issue=2; spage=89;epage=93;aulast=Lawrence, last assessed on 11.02.20
7. Bajaj S., Bobdey P., Singh N., 2017, 'Measles Outbreak in Adults: A Changing Epidemiological Pattern', 2017 Medical Journal of Dr. D.Y. Patil University, DOI: 10.4103/MJDRDYPU.MJDRDYPU_43_17, http://www.mjdrdypu.org/temp/MedJDYPatilUniv105447-5635175_153911.pdf, last assessed on 14.02.20
8. Ray S.K., Mallick S., Prasad M.S., Pankaj M., Satish K., 2018, 'An epidemiological study on incidence, symptoms and complications of measles in bordering districts of West Bengal', , J Commun Dis, 2018 Mar, 40(1):59-64, https://www.ncbi.nlm.nih.gov/pubmed/19127671, last assessed on 12.02.20
9. Ray S.K., Haldar A., Biswas B., Chatterjee T., Misra R.N., Bagchi S. *et. al*, 1998, A comparative study of immunisation status of children in West Bengal, J. Commun. Dis. 1998 April, 30(3) 205-8
10. Manual for the Laboratory-based Surviellance of Measles, Rubella and Congenital Rubella Syndrome, WHO, https://www.who.int/immunization/monitoring_surveillance/burden/laboratory/manual_section, last assessed on 15.02.20
11. Lochlainn L.M.N., Gier B., Maas N., Binnendijk R., Strebel P.M., Goodman T.*et. al*, 2019, 'Effect of measles vaccination in infants younger than 9 months on the immune response to subsequent measles vaccine doses: a systematic review and meta-analysis', www.thelancet.com/infection, Vol 19| November 2019, https://www.thelancet.com/action/showPdf?pii=S1473-3099%2819%2930396-2, last assessed on 11.02.20
12. Desai V.K., Kapadia S.J., Kumar P., Nirupam S., 2003, 'Study of measles incidence and vaccination coverage in slums of Surat city', *Indian Journal of Community Medicine* Vol. XXVIII, No.1, Jan.-Mar., 2003, https://www.researchgate.net/publication/45261764_Study_of_Measles_Incidence_and_Vaccination_Coverage_in_Slums_of_Surat_City/link/554847f50cf2b0cf7aceb885/download, last assessed on 13.02.20
13. Murhekar M.V., Hutin Y.J., Ramakrishnan R., Ramachandran V., Biswas A.K., Das P.K. *et. al*, 2011, 'The Heterogeneity of Measles Epidemiology in India: Implications for Improving Control Measures', *The Journal of Infectious Diseases,* Volume 204, Issue suppl_1, July 2011, Pages S421–S426, https://doi.org/10.1093/infdis/jir061, https://academic.oup.com/jid/article/204/suppl_1/S421/2192182, last assessed on 17.02.20