

FREQUENCY OF MEASLES IN INFANTS YOUNGER THAN 9 MONTHS OF AGE

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ABSTRACT

Objective: To determine the frequency of measles in infants younger than 9 months of age.

Material and Methods: This was an observational cross-sectional study conducted in Department of Paediatrics of Khyber Teaching Hospital Peshawar from November 2012 to October 2013. A pre-designed proforma was used to collect data. The data was presented in the form of frequencies and percentages. Two age groups were identified in the data, age < 9 months (Group A) and age ≥ 9 months (Group B).

Results: A total number of 503 cases (n=503) of age 6 months-10 years were enrolled in this study. Out of 503 cases, 89 (17.69%) patients belonged to Group 'A' whereas 414 (82.3%) to Group 'B'. In Group 'A' 60 (67%) were male and 29 (33%) were females. In Group 'B' 245 (59%) were male and 169 (41%) were female. Among 503 patients, 157 (31.2%) were fully vaccinated, 144 (28.6%) were partially vaccinated and 202 (40%) were unvaccinated. Regarding education status of parents, 325 (64%) of the fathers were educated whereas 178 (35%) were uneducated. Mothers of the patients, 160 (32%) were educated whereas 343 (68%) were uneducated. A total of 141 (28%) received single dose of measles vaccine, 13 (3%) received two doses whereas 349 (69%) of the patients did not receive measles vaccine at all.

Conclusion: High number of infants under 9 months of age are affected by measles. It is recommended to review the immunization schedule for measles and the first dose of measles vaccine to be administered at least at 6 months of age.

Keywords: Measles, infants, vaccination, 9 months, Children.

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INTRODUCTION

Worldwide, around 132,129 cases of measles were reported resulting in 89,780 deaths in 2016¹. Before the advent of vaccine against measles in 1963, an estimated 30 million cases of measles were reported with more than 2 million deaths occurring annually². Measles continues to be one of the major causes of death in young children even though a safe and effective vaccine is available^{3,4,5}.

Many outbreaks/epidemics of measles were reported in Pakistan in the last few years. In 2012-13, epidemic in Sindh, 19,048 cases of suspected measles with 463 deaths of children were reported which is

definitely a low figure as most of the cases of measles are usually not reported due to the poor surveillance system in the country⁶. Measles is highly contagious viral infection and humans serve as the only natural host of measles virus^{3,7}.

Most deaths in measles are due to its complications^{8,9}. The risk of mortality and morbidity due to measles is greatest in children younger than 1 year of age or adults above 30 years of age². Some of the serious complications of measles are blindness, diarrhea with dehydration, otitis media, pneumonia and encephalitis².

In population with high incidence of malnutrition and other infectious diseases, like in our country, case-fatality rate of measles is reported to be 3-6% and can reach up to 30%².

There is a general consensus that the frequent outbreaks of measles in Pakistan are due to the failure of routine EPI immunization system⁶. The fact is evident from the data that only 47.4% of children in KPK are fully vaccinated, 24.8% are partially vaccinated and 27.8% are missing their routine vaccination¹⁰.

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Other factors contributing to frequent measles outbreaks are: cold chain factor, electricity break downs, floods and natural disasters in the last few years, less investment in EPI programs and diversion of most of the trained staff towards Polio Eradication in surveillance system⁶.

World Health Organization (WHO) recommends giving measles vaccine at 9 months of age in high-risk settings in the developing world¹¹. The current policy for vaccination of children against measles at 9 months of age in developing countries was formulated in 1970s which reported reduction of mortality of >40%¹². Studies from Bangladesh and Haiti presented comparable results¹³⁻¹⁵. WHO recommend measles vaccination even before 9 months in endemic areas³.

All WHO regions have now established goals to eliminate this preventable diseases by year 2020¹⁶. In 2010, the World Health Assembly (WHA) set three milestones for measles control by 2015 which have not yet been met except for one WHO region which has been verified as having eliminated measles¹⁷.

To reduce measles related morbidity & mortality, it is a prerequisite to determine the frequency of measles in our country affecting infants of age below 9 months. To the best of our knowledge, there is limited data available on the frequency of measles in infants younger than 9 months of age. This study aims to determine the frequency of measles in infants younger than 9 months of age.

MATERIAL AND METHODS

This was an observational cross-sectional study carried out in Paediatric Department of Khyber Teaching Hospital, Peshawar-Pakistan, from November 2012 to October 2013. Consecutive, non-probability sampling technique was used. Khyber Teaching Hospital is a tertiary care hospital which is situated in the main city of Peshawar. Both the in-patients and out-patients attended at Paediatrics department of the hospital were included in the study. Patients coming here are from local areas as well as far-flung areas of KPK & FATA. Most the patients belong to poor socioeconomic status.

Inclusion Criteria: WHO case definition for measles was applied for labelling a child as a case of measles and patients fulfilling this criteria were included in the study. WHO clinical case definition of measles is "Any person in whom a clinician suspects measles infection, or any person with fever and maculopapular rash (i.e. non-vesicular) and cough, coryza (i.e. runny nose) or conjunctivitis (i.e. red eyes)".

Patients having rash without cough, coryza, con-

conjunctivitis, fever and children aged below six months and above 10 years were excluded from the study.

A standard proforma was designed to collect the data from sample cases. All the patients coming to OPD were entertained and the parents were interviewed for collection of information. Those patients who were not accompanied by the parents were not entertained. Parents of the admitted cases were interviewed on the bedside.

There are two paediatric units in Khyber Teaching Hospital. Patients admitted in these units who fulfilled the WHO clinically compatible case definition of measles were interviewed and examined after taking the informed consent from the parents. Patients in OPD and EPS (Emergency Paediatric Services) were also included in this study who fulfilled the WHO criteria for case definition of measles.

After entering the basic bio-data of the patients, questions regarding fever, cough, and coryza were asked from the parents of the patients and entered in the proforma. After taking detailed history, including history of contact, patients were examined for conjunctivitis, stomatitis, skin rash, Koplik's spots, temperature and respiratory signs. Data was categorized into two groups on the basis of age: age < 9 months (Group A) and age ≥ 9 months (Group B).

Vaccination status of these patients was also recorded by asking the parents for vaccination card. If vaccination card was not available, then questions regarding different vaccination sites, timings and numbers were asked.

Education status of the parents was also recorded. Parents were regarded as educated if they had cleared primary level of education.

The study was approved by Ethical Review Committee of Khyber Medical College. Confidentiality of the data was maintained according to guidelines laid down by the Helsinki Declaration.

RESULTS

A total number of 503 cases (n=503) of age 6 month and above were enrolled in this study. Vaccination status was classified as fully vaccinated, partially vaccinated and unvaccinated according to WHO and EPI schedule, as shown in table 1.

In Group 'A', 17.69% patients and in Group 'B' 82.3% patients were enrolled (Figure.1). In group 'A' 60 (67%) were male and 29 (33%) were females. In Group 'B' 245 (59%) were male and 169 (41%) were female.

Regarding education status of parents, 325 (65%) of the fathers were educated whereas 178 (35%) were

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Table 1: Vaccination Status of Patients

Vaccination Status	Fully Vaccinated n (%)	Partially Vaccinated n (%)	Unvaccinated n (%)	Total
Group A	24 (26.96)	35 (39.32)	30 (33.70)	89
Group B	133(32.70)	109 (26.32)	172 (41.54)	414
Total	157 (31.21)	144 (28.62)	202 (40.15)	503

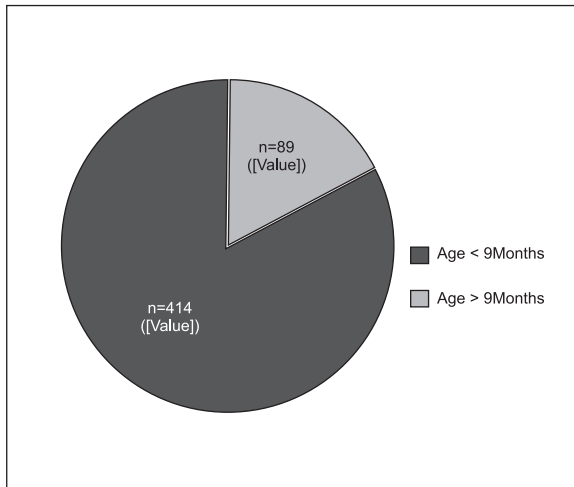


Figure 1: Distribution of Cases

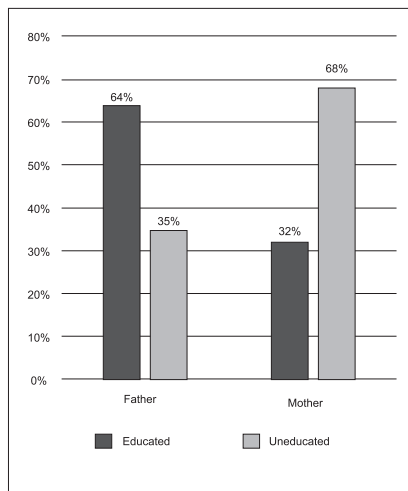


Figure 2: Education Status of Parents

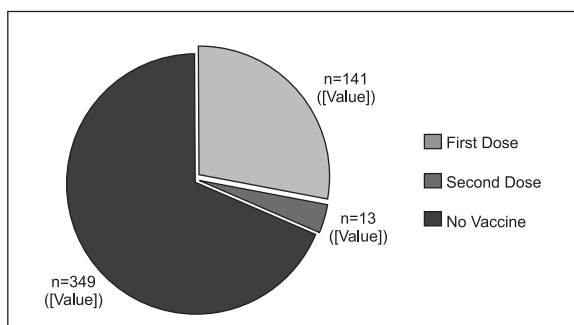


Figure 3: Dose Wise Distribution of Measles Vaccine

uneducated. Mothers of the patients, 160 (32%) were educated whereas 343 (68%) were uneducated Figure 2. Dose wise distribution of measles vaccination is shown in Figure 3.

DISCUSSION

Vaccination of children in our country is always a difficult task to achieve. Reasons behind low vaccination coverage are many. Different reasons prevail in different provinces. In our province KPK, one of the major reasons of low vaccination rate is law and order situations, especially in FATA.

The data in this study depicts the high number of patients acquiring measles even below 9 months of age when maternal antibodies against measles virus are already present⁹. In our study, 17% of infants younger than 9 months of age were affected by measles which is lower than a city of Punjab (25.4%)¹⁸ and comparable to a city of Sindh (18%)¹⁹ but relatively higher compared to our neighboring countries like in India²⁰, where only 4% of infants younger than 9 months of age were affected.

In our study, the total percentage of fully vaccinated children was 31.2%, partially vaccinated were 28.6% and 40.1% were unvaccinated. Another local study reports 47.4% to be fully vaccinated, 24.8% to be partially vaccinated and 27.8% were unvaccinated¹⁰. Both of these results demonstrate a high rate of failure to vaccinate in our population despite the availability of widespread free EPI vaccination provided by the Government of Pakistan.

Education status & awareness of parents is one of the key factors that affect the overall ratio of vaccination¹⁸. Mothers are integrally involved in care and nurturing of a child, therefore, education and awareness of a mother is important. In our study, 68% of mothers of children affected by measles were uneducated which can be a reason for failure to vaccinate the child.

Regarding number of doses of measles vaccine (Figure. 3), the completion of both doses was low (3%) in our study population whereas 69% did not receive measles vaccine at all. On the similar factor, the other national study¹⁸ reports a higher number of completion of two doses of measles vaccine (20%) but a comparable frequency (65.5%) of failure to vaccinate the chil-

dren against measles. The frequency of unvaccinated children is alarmingly high considering that measles is an easily preventable disease due to availability of an effective vaccine.

LIMITATIONS OF THE STUDY

The study was an observational study and a non-probability sampling technique was used.

CONCLUSION

Frequency of unvaccinated children, especially against measles was alarmingly high. Furthermore, a higher number of infants younger than 9 months of age were affected by measles.

RECOMMENDATIONS

It is recommended that the first dose of measles vaccine should be administered at least at 6 months of age to avoid morbidity and mortality associated with measles. Further studies to determine the causes of failure to vaccinate should be carried out so that these causes could be addressed and the full schedule of immunization can be implemented. Studies to determine the level of maternal antibodies against measles should be carried out to support the high rate of incidence of measles in infants under 9 months of age.

REFERENCES

1. WHO. Measles. [Internet]World Health Organization 2017. [Cited 2017 Nov 6]. Available from http://www.who.int/immunization/monitoring_surveillance/burden/vpd/surveillance_type/active/measles/en/
2. WHO. Weekly Epidemiological Record [Internet]. World Health Organization 2017. [Cited 2017 Nov 6]. Available from <http://apps.who.int/iris/bitstream/handle/10665/255149/WER9217.pdf;jsessionid=8D83E04AB42BA2C044C558C67B1D2E30?sequence=1>
3. Melissa M. Coughlin, Andrew S. Beck, Bettina Bankamp, Paul A. Rota. Perspective on Global Measles Epidemiology and Control and the Role of Novel Vaccination Strategies. *Viruses*. 2017; 9(1): 11-13.
4. F. K. Nkrumah, M. Osei-Kwasi, S. K. Dunyo, K. A. Koram, and E. A. Afari. Comparison of AIK-C measles vaccine in infants at 6 months with Schwarz vaccine at 9 months: a randomized controlled trial in Ghana. *Bull World Health Organ*. 1998;76(4): 353-359.
5. Shakya AK, Shukla V, Maan HS, Dhole TN. Identification of different lineages of measles virus strains circulating in Uttar Pradesh, North India. *Virol J*. 2012; 9:237-42.
6. Wafaqi Mohtasib (Ombudsman)'s Secretariat. Report on measles outbreak in Pakistan. [Internet]. 2013. Volume-I. Islamabad. [Cited 2017 Nov 6]. Available from <http://mohtasib.gov.pk/wafaqimoh/userfiles1/file/Mohtasib/reports/Measles%20Report.pdf>.
7. Kliegman RM, Stanton BF, St.Geme JW, Schor NF, Behrman RE. Measles. In: Wilbert H. Mason, editor. *Nelson textbook of pediatrics*. 20th edition. Philadelphia. Saunders, Elsevier. 2016: 1542-45.
8. Park K. Epidemiology of communicable diseases. In: Park K, editor. *Textbook of preventive and social medicine*. 21st ed. Jabalpur, India: BanarsidasBhanot Publishers; 2011.147.
9. Patro BK, Shewade HD, Kathirvel S, Senjam SS, Singh MP, Ratho RK. Outbreak of "modified measles" in an urban resettlement colony of North India. *Indian J Publ Health*. 2012; 56:168-9.
10. Sabir Khan, Zia Muhammad, Irshad Ahmad, Amin Jan Gandapur. Status of Immunization in Young Children. *J. Med. Sci*. 2016;24 (1): 36-40.
11. World Health Organization. WHO position on measles vaccines. *Vaccine* 2009; 27: 7219-21
12. Martins CL, Benn CS, Andersen A, et al. A Randomized Trial of a Standard Dose of Edmonston-Zagreb Measles Vaccine Given at 4.5 Months of Age: Effect on Total Hospital Admissions. *J Infect Dis*. 2014; 209(11):1731-38.
13. Holt EA, Boulos R, Halsey NA, Boulos IM, Boulos C. Childhood survival in Haiti: Protective effect of measles vaccination. *Pediatrics*. 1990; 85:188-94.
14. Clemens JD, Stanton BF, Chakraborty J, Chowdhury S, Rao M, Ali M. Measles vaccination and childhood mortality in rural Bangladesh, *Am J Epidemiol*. 1988;128:1330-39.
15. M.A. Koenig, M.A. Khan, B. Wojtyniak, J.D. Clemens, J. Chakraborty, V. Fauveau, et al. The impact of measles vaccination upon childhood mortality in Matlab, Bangladesh. *Bull World Health Organ*. 1990;68:441-47.
16. Vaidya SR. Commitment of measles elimination by 2020: challenges in India. *Indian Pediatr*. 2015; 52(2):103-06.
17. Dabbagh A, Patel MK, Dumolard L, Gacic-Dobo M, Mulders MN, Okwo-Bele JM, Kretsinger K, Papania MJ, Rota PA, Goodson JL. Progress toward Regional Measles Elimination - Worldwide, 2000-2016. *MMWR Morb Mortal Wkly Rep*. 2017; 66(42):1148-53.
18. Abida Sultana, Syed Arshad Sabir, Amna Awan. Characteristics Of Patients With Measles Admitted To Allied Hospital Rawalpindi. *J Ayub Med Coll Ab*

Frequency of malignancy in clinically benign looking thyroid swelling.....

bottabad 2015; 27(2):318–22.

19. Jamal A, Yahya Y, Karim MT. Do we need to give measles vaccine to children earlier than the currently recommended age? J Ayub Med Coll Abbottabad 2018;30(1):111–4
20. Bose AS, Jafari H, Sosler S, Narula APS, Kulkarni VM, Ramamurty N, et al. Case Based Measles Sur-

veillance in Pune: Evidence to Guide Current and Future Measles Control and Elimination Efforts in India. PLoS ONE [Internet]. 2014 Oct [Cited 2017 Nov 6];9(10): e108786. Available from <http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0108786> DOI: 10.1371/journal.pone.0108786

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AUTHOR'S CONTRIBUTION

Following authors have made substantial contributions to the manuscript as under:

Muhammad Z: Main idea.
Khan S: Literature Review & Data collection
Ahmad I: Article Review & internet Search
Shadab T: Helped in References
Haider Z: Computer typing & Article Compilation
Sheer J: Statistics

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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