Original Article

Vaccination Status and Socio-demographic Study of Laboratory Confirmed Measles Cases in Upazilla Hospitals of Bangladesh

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Abstract

Background: Though Bangladesh has done well to reduce the measles cases and measles related deaths through an effective vaccination programme, measles cases are still found in a good number in hospitals. The objectives of our study was to find out the vaccination status of laboratory confirmed measles patients and also to see the socio-demographic status of those patients.

Methodology: This is a descriptive cross-sectional study conducted in five Upazilla Health Complexes (UHC) of Gazipur district during a period of one year from 01/01/2017 to 31/12/2017. The Upazillas included were Gazipur Sadar, Kaliganj, Kaliakair, Sreepur and Tongi. The suspected measles patients were admitted after taking history and clinical examination and confirmed by doing specific laboratory investigation. Measles vaccination status and socio-demographic status of the these confirmed cases were analysed by using SPSS version 21.

Results: Blood samples were sent from 93 patients who were admitted during the study period after observing the diagnostic criteria of measles. Out of them 45 patients were confirmed as measles and they are included in the study. Among the laboratory confirmed measles, 28 cases (62.22%) were males and 17 (37.78%) cases were females, ratio of male and female was 1.6:1. The maximum number of patients (62.22%) were in the age group of 9 months to 4 years. Maximum patients came from low socioeconomic condition with a monthly income of 10,000-15,000 taka. About maternal education, 26 mothers (57.78%) were uneducated, 12(26.67%) below primary and 7(15.55%) up or above primary level. Among the total patients, 27(60%) patients came with pneumonia, 16(35.56%) patients with both pneumonia and diarrhoea and 2(4.44%) patients only with diarrhoea. We found 32 patients (71.11%) received no MCV(Measles containing vaccine) , 11 patients (24.44%) with one MCV and 2 patients (4.44%) received two MCVs. There we found several causes of dropout of measles vaccine. Lack of awareness regarding one vaccine was the most common cause (42.22%) and then ignorance about two measles vaccine (28.89) followed by migration (17.78%) and parental occupation (11.11%). History of contact with measles patients were found in 24.44% cases , no history in 26.67% cases and in 48.89% cases the history of contact is unknown.

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Introduction:

Measles is an acute childhood infectious disease caused by a virus that persists for 5-6 days. Virus is transmitted from person to person through coughing or sneezing. Measles may lead to secondary infections such as pneumonia, diarrhoea, sepsis or other serious complications including encephalitis (1:1000 cases) and death (1:3000 cases) .[1]

The case definition for measles recommended by WHO is any person if presented with generalized maculo-papular rash and a history of fever of 38ÚÆC or more and at least with one of the followings: cough, coryza, or conjunctivitis.[2,3]

Measles is a highly communicable disease, one of the leading causes of death among young children globally. Despite the availability of safe and effective vaccine, approximately 1,34000 people died from measles in 2015 of which most of them were children under the age of 5 years,[4,5]. To prevent measles, two doses of vaccines are recommended for children. The efficacy of 1st dose of measles is about 95% whereas two doses provide immunity in 99% of recipients.[3,5]

Bangladesh initiated the Expanded Programme of Immunization on 7th April,1979. Measles Vaccine (MCV1) was introduced in immunization programme in 1989. Single dose has been recommended for children aged 9 months with second dose at 15 months of age since 2012. As a result the annual reported measles incidence decreased from 40.0 to 6.0 per million population.[8] In 2015, estimated measles routine vaccine national coverage increased up to 92% for MCV1 and 81% for MCV2.[8] Before 2000, estimated coverage with the routine 1st dose of measles containing vaccine (MCV1) in Bangladesh was < 75% nationally. But MCV1 coverage increased from 35% in 2013 to 93% in 2016.[7]

In 2014, a goal was set for measles elimination in Bangladesh by 2018.[8] It is known that elimination of measles from a country means the absence of endemic measles cases over a period of > 12 months in the presence of a high quality epidemiological surveillance (that is sensitive and specific enough to detect imported cases), which is supported by a net work.[2] Government has already adopted Supplemental Immunization Activities (SIA) for elimination of measles. Approximately 108.9 million children were vaccinated with SIA in 2005–2006, 2010 and 2014 respectively.[7] Challenges to achieve measles elimination include low coverage with MCV1 and MCV2 and suboptimal performance of the measles case-based surveillance system.[4]

Outbreak response immunization activities targeting 100,000 children aged 9–59 months were conducted in two districts of Bangladesh in December 2016[9]. An outbreak investigation in affected areas revealed persistent low coverage with MCV1 and MCV2 through routine immunization (RI) and during the 2014 through SIA.[9]

An important challenge for elimination of measles is that parents are unaware of severity of measles and it's consequences, so there is a reluctance to go for measles vaccination at 9th & 15th months respectively. The national vaccination coverage conducted in 2015 found that the most common reasons for a child being unvaccinated or partially vaccinated were.[6]

1. Caregivers are too busy with their other priorities that they did not remember to bring the child for vaccination.

2. Lack of information or understanding about when to bring the child for vaccination.

Measles is almost entirely preventable with two doses of measles vaccines, a safe and highly effective vaccine. High rate of vaccine coverage 95% nationally and also in communities are needed to ensure that measles is unable to spread.[6]

According to WHO and UNICEF coverage data released in July, 2019 , 86% children have received the first dose of measles vaccine and 69% the second. This means that around twenty million children in 2018 received no measles vaccine through their routine vaccination programmes.[15]

Although measles vaccine is very effective, there are many left cases for occurrence of the diseases. So we have studied the vaccination status of laboratory confirmed measles cases admitted in Upazilla Health Complexes of Gazipur district and also the socioeconomic reasons why these children did not receive measles vaccines.

Methodology:

This is a descriptive cross-sectional study conducted in UHCS of Gazipur district during a period of one year from 01/01/2017 to 31/12/2017. The Upazilla included were Gazipur Sadar, Kaligonj, Kaliakoir, Sreepur and Tongi. Children with fever and rashes with cough, runny nose or conjuctivitis with any complication were interviewed thoroughly and after doing clinical examination they had been admitted. After aseptic precaution, blood was collected from 4 th to 28 th day of appearance of rashes and the serum was sent to National Polio-Measles laboratory (NPML) for detection of IgM for Measles that was diagnosed by Enzyme Immunoassay (EIA) method. The diagnosis of Measles was confirmed by Measles specific Immunoglobuline positivity in serum sample and was included in the study. The following field from computer database were taken for the study: patients ID No, sex, age, socio-economic status, maternal education, associated complications, MCV vaccination status of them and also any history of contact with Measles patient.

Results:

A total 93 patients were admitted during the study period and 45 of them were identified as measles confirmed cases. Among the laboratory confirmed measles, 28 cases (62.22%) were males and 17 (37.78%) cases were females,

ratio of male and female was 1.6:1. The maximum number of patients were in the age group of 9 months to 4 years (Table-1). Among them, parents of 26 patients (57.78%) had monthly income 10000-15,000, 11 patients (24.44%) had less than 10,000 taka and 8 patients (17.78%) had more than 15,000 taka (Table -2). Maternal education is an important factor as it indicates the awareness regarding vaccine preventable diseases and the consequences of not getting vaccination. Most of the mother, 26 (57.78%) were uneducated followed by below primary 12 (26.67%) as shown in table-3. Un-complicated measles seldom come to health facilities. Among the patients, 27 patients (60%) came with pneumonia followed pneumonia and Diarrhoea in 16 (35.56%) patients as shown in table -4. Only 2(4.44%) patients came with diarrhoea. The vaccination status revealed that most of the patients, 32 (71.11%) did not get any measles vaccine, 11 (24.44%) patients got only one MCV and only two (4.44%) patients received two measles vaccines. Regarding the causes of drop out of vaccination, most important cause we found was ignorance about Measles vaccine itself in 19 cases (42.22%) and parents thought that initial three times visits for vaccination as per EPI schedule were sufficient. Thirteen parents (28.89%) did not have any knowledge about two doses of measles vaccine and their children received only one dose of vaccine. As the study area is an industrial area, so migration from another area for occupational purpose is another factor in 8(17.78%) cases and parental engagement for occupation was found in 5 cases (11.11%). When we tried to trace out any contact with measles patient in community, we found it was unknown in 22 cases (48.89%). Definite history of contact was present in 11 (24.44%) cases and there was no history of contact was present in 12 (26.67%) cases.

Table-II

Monthly income of parents of Measles Patients.

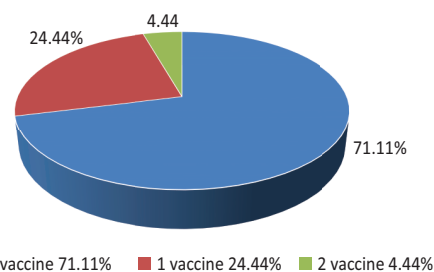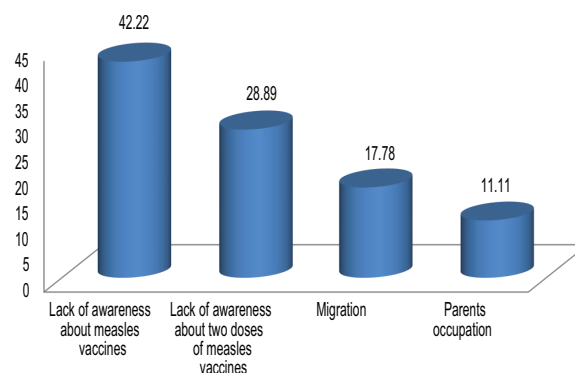| Monthly income (Taka)	No of patients	%
<10,000	11	24.44
10,000-15,000	26	57.78%
>15,000	8	17.78%

Table-III

Maternal educational status of Measles patients

Level of education	No of patients	%
Uneducated	26	57.78%
Below primary	12	26.67%
>class -V	7	15.55%

Table-IV

Showing complications of Measles at presentation

Complication	No of patients	%
Pneumonia	27	60%
Pneumonia & Diarrhoea	16	35.56%
Diarrhoea	2	4.44%

Fig.-1: *Showing vaccination status of Measles patients*

Table-1

Distribution of Measles cases in different age groups and sex

Age groups	Number of patients	%
> 9 months	6	13.33%
9 months -4 years	28	62.22%
>4 years	11	24.44%
Sex	Number of patients	%
Male	28	62.22%
Female	17	37.78%

Fig.-2: *Showing the causes of Drop out of Measles cases.*
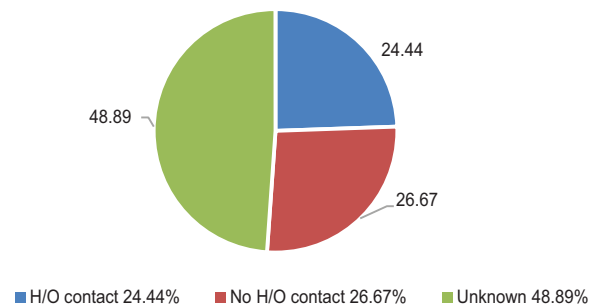
Fig.-3: *Showing H/O contact with Measles patient*

Discussion:

In our study, most patients were males that correspond with result of WHO fact sheet[10]. Here most patients belong to the age group of 9 months to 4 years. Ahsan et al showed maximum measles patients in the age group of 13-14 months (47.8%) followed by 9-12 months (34.8%)[11]. But Akramuzzaman et al in Bangladesh found 23% of measles cases found before 9 months of age and 19% between 9-11 months of hospitalized children admitted with Measles[12].

Maternal education revealed most mothers were uneducated and most patients came from low socio-economic status. Similar data was showed by Akramuzzaman et al.

Majority of our patients 62.22% (age 9 months to 4 years) were in the target age group for measles immunization and the most of them (71.11%) were not immunized. This continued occurrence of measles reflects parental unawareness as well as programmatic weakness. Among the patients, 24.44% got only one vaccine. Our estimate of one-dose measles-containing vaccine (MCV) coverage in the routine immunization among children aged 9–59 months was considerably below the threshold necessary to provide herd immunity[13]. As shown in other studies, the resurgence was likely caused by an accumulation of unvaccinated, measles-susceptible children due to low MCV coverage, this is likely the main cause of the outbreak.[14]

Different studies showed one dose of MCV is approximately 85% effective when administered at 9 months of age and two doses of MCV is 93% effective when given after 1 year of age.[15]

The Measles cases of our study came to hospital with complications, mostly it was respiratory tract Infection like pneumonia (60%) followed by diarrhoea associated with pneumonia in 35.56% cases. Rana MN showed Pneumonia with super-added bacterial infections were present in 100% cases[16]. On the other hand,

Akramuzzaman et al showed Diarrhoea as a complication in most cases. Rana et al showed history of contact with measles patients in 28% cases which is nearer to other study[16]. In our study, two cases of fully vaccinated patients developed measles. While measles containing vaccine is highly effective, a small proportion of vaccinated persons (i.e.3%) exposed to the virus are known to manifest as Measles despite having been vaccinated with two doses of MCV[17]. There are two types of vaccine failure that can make people susceptible to infection after vaccination and both are extremely rare events. As a result 1 % who fail to develop protective immunity after receiving 2 MMR vaccines can contract measles if they travel to an area where the disease remains endemic.

Conclusion:

From the findings of the study and the discussion thereof, it can be concluded, lack of vaccination is the most important risk factor for the resurgence of measles virus infection. So awareness for two doses of measles vaccines should be strengthened among the parents and immunization coverage for two doses of measles vaccines can be increased. In this way elimination of measles is possible in near future.

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