

Review Article

The Child Immunisation Programmes and Challenges in Bangladesh

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Background of Child Immunisation Programme in Bangladesh

Immunisation has been a proven and one of the most cost-effective child survival interventions in the world.¹ Every country has its own immunisation programme to provide selected vaccines to the targeted group of population, generally focusing on infants and children, and pregnant women, who are at a high risk of diseases preventable by vaccines. There are at least 27 causative agents against which vaccines are available and many more agents are targeted for development of vaccines.² The number of antigens used in the immunisation programmes varies from country to country. However, there are a few selected antigens which are given against diphtheria, pertussis, tetanus, poliomyelitis, measles and hepatitis B which are part of immunisation programmes in most of the countries in the world. The first vaccine, against small pox, was discovered in 1798, and from the early 18th century, the British health administration introduced vaccination against small pox in the Indian sub-continent.³ The first doses of smallpox vaccine lymph in India arrived in May 1802.⁴ The most striking success of these efforts has been the eradication of smallpox disease from the world.⁵ EPI is implemented in 192 countries of the world. But data shows that despite being a proven cost-effective preventive public health intervention, the benefits of immunisation is not reaching many children who are at risk of the diseases preventable by these vaccines. Majority of the children who do not receive these vaccines live in the developing countries. It

is important to understand the underlying factors which causes non-immunisation of children and specifically, in Bangladesh, in this review article.

The Expanded Programme on Immunisation (EPI) was launched in Bangladesh on April 7, 1979, on World Health Day, by the government and supported by WHO, UNICEF, World Bank and other development partners.⁶ In 1995, national immunization day was initiated by EPI to sustain the polio-free status and also to increase the immunization coverage. However, despite introduction of the EPI in Bangladesh in 1979, it had not picked up steam until the government made a public commitment to improve childhood vaccine coverage in 1985. Upto this time, Bangladesh was lagging behind in immunization coverage in comparison to other countries with similar social and economic conditions. In 1985, having realized the inherent weakness of Bangladesh's EPI programme strategies and inadequate commitment from the government, Mr. James P. Grant, Executive Director of UNICEF, travelled to Bangladesh. With his charismatic leadership and unique qualities for advocacy on children's right to health, Mr. Grant secured commitment from high-level political leaders including the President of Bangladesh. The government then made sincere efforts and allocated adequate resources from the national budget towards child immunization. Then, in the early 1990s, near universal child immunization (UCI) was achieved in two out of four Divisions of the country. The below graph shows the child immunization coverage in 1991 and 1992 in Bangladesh.

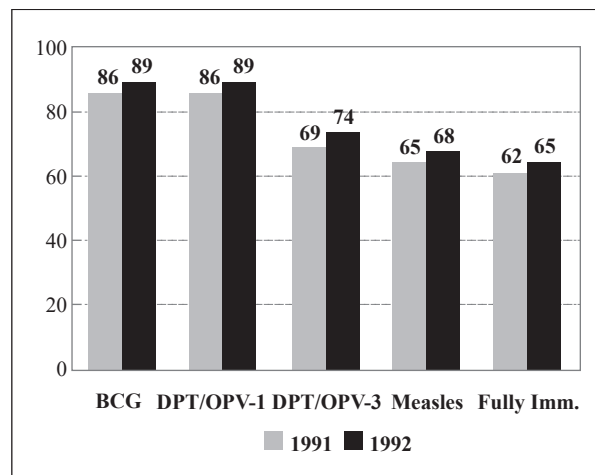
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Graph 1: Child Immunisation Coverage in 1991 and 1992 in Bangladesh

The Ministry of Health and UNICEF used innovative communication strategies and the most successful social mobilization campaign to popularize immunization in Bangladesh. Several ground-breaking promotional activities were adopted to raise social awareness on child survival and create demand for quality immunization services. It included the active participation of the top political leadership in promoting EPI at the National Immunisation Day (NID) inauguration, thereby creating tremendous interest, which generated immense media coverage. Working with UNICEF's communication experts, the government designed and popularized the Moni Logo. The logo included six arrows symbolizing six immunizable diseases with a ring of protection. Over time, Moni became the symbol of EPI and had a great impact on raising public awareness and creating demand for immunization. Many commercial entities printed the Moni logo on their products. Dhaka Match factory was among the commercial entities to come forward to print the Moni Logo on their matchboxes.

The role of NGOs and civil society organizations were vital to promoting awareness and bringing women and children to the vaccination centers. They also provided additional frontline workers in some centers. In addition, both effective logistical planning and timely management of resource allocation were imperative to the programme's success. Also, effective coordinating and technical support to ensure timely supply of vaccines and other logistics, including IEC materials by EPI Headquarter was key to the successful implementation of EPI. The training of mid-level managers and frontline health workers also ensured efficient delivery of services in every corner of the country. Refrigerators with gas cylinders, boats and additional funds for the remote areas helped to access all children and women in those most regionally inaccessible areas.

During the last four decades, remarkable progress has been made in terms of child immunization in Bangladesh

with continuous development of the immunization programmes.^{7,8} The aim of this programme is to prevent infant and child deaths caused by six vaccine-preventable infectious diseases which are, diphtheria, whooping cough, tetanus, measles, poliomyelitis and tuberculosis.⁹ In the 20th century, these diseases were the major global causes of child deaths in the world.^{10,11} Although Bangladesh has made remarkable achievements in childhood vaccination, attaining complete coverage remains a public health concern.

This massive routine immunization programme saves the lives of millions of children by reducing morbidity and disability and is one of the most successful and cost-effective public health interventions around the world.^{12,13}

The EPI got encouragement from successful eradication of smallpox.¹⁴ The EPI has been successful globally as polio has almost been eradicated, deaths from measles have dropped by 78% and maternal and neonatal tetanus has been eliminated in 58 high-risk countries.¹⁵⁻¹⁸

Evaluation of EPI Coverage

According to the Bangladesh Immunisation Guidelines, children who receive one dose of the vaccine against tuberculosis, BCG, three doses of a pentavalent vaccine (DPT, Hib, and HepB), three doses of the polio vaccine (excluding the polio vaccine given at birth), and one dose of the measles and rubella vaccine, are considered as fully vaccinated. As stated in the EPI Coverage Evaluation Survey 2015, the vaccination coverage rate increased from 76.0% in 1995 to 93.2% in 2015. A study conducted in Bangladesh in 2010 revealed immunisation coverage which reported that approximately 60% of rural children were fully immunised, whereas more recent studies have reported that immunisation coverage was 99% for BCG, 93% for OPV and 83% for measles.¹⁹⁻²⁰ Other surveys have also provided the vaccination coverage data by administrative regions, that showed

that crude vaccination coverage was the highest in Rajshahi Division (96.8%) and lowest in Sylhet Division (88.6%).²¹

One study conducted by Satyajit Kundu et al²² estimated the vaccination coverage among 12–35 months aged children in Bangladesh over three-time periods from the data of Bangladesh Demographic and Health survey (BDHS) (2011, 2014, and 2017-18). The study found that in 2014, the coverage of full vaccination (85.13) was slightly lower than the previous BDHS 2011 (86.17%), the status of full vaccination has increased significantly over time, reaching 89.23% in 2017-18. The vaccination coverage data was derived from either the vaccination cards or by mother recall, has significantly increased over time. In 2011, the coverage of BCG was 97.33%, in 2014 it was 97.70% while in 2017-18, the coverage increased to

98.50%. All three doses of polio (Polio 1, Polio2, Polio 3) vaccines increased over time and a significant increment was seen in the full coverage of OPV (1–3) though a little decrease has been observed in 2014 DHS. Similarly, the full coverage of DTP was also increased from 2011 (92.96%) to 2017-18 (96.01%). The overall prevalence (weighted) of full vaccination coverage was 86.71% in 2011, 85.13% in 2014, and 89.23% in 2017-18 where the pooled prevalence was 87.06%. The study showed that maternal age and education had a significantly positive association with vaccination coverage. A study conducted in 2014,²³ reported that Bangladesh was in the midst of political unrest and volatility during 2013-2014, which produced frequent violence, had a serious negative effect on the economy which affected the health system outcomes.

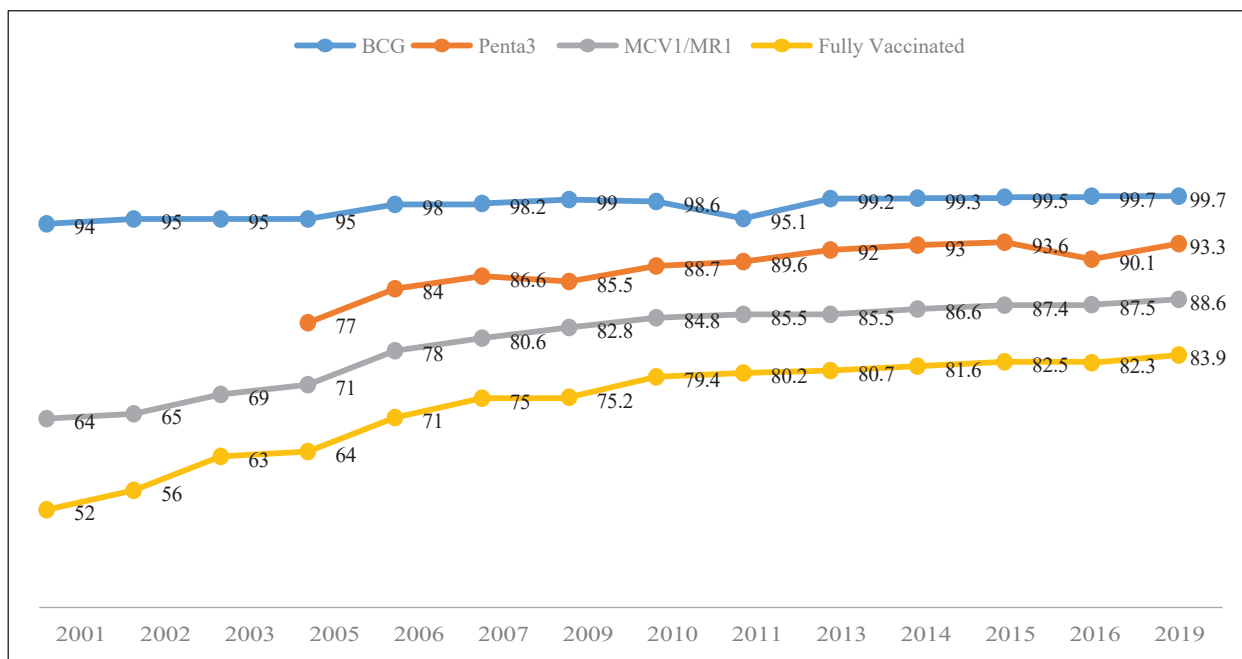


Figure 1: Annual trend on national valid full vaccination coverage by the age of 12 months among 12-23 months children from 2001-2019

Another study conducted Abdur Razzaque arker et al²⁴ showed that immunisation coverage was highest among the children whose parents had higher educational levels (94.2% and 93.7% for higher educated mother and father, respectively). Full vaccination coverage was found to increase with the economic status of the children’s family (73.9% for the poorest to 93.2% for the richest quintile). Full immunization coverage rate was interestingly higher among children whose mother had freedom in healthcare decision-making in the family, including that of her children’s healthcare. The study found that full immunization coverage was higher among elder children (e.g., 48–59 months of age) compared with the younger children (e.g., 12–23 months of age). Again, the size of the family appeared to be a significant factor of

fully immunized children. Those who belonged to larger family size were more likely to remain unimmunized.

The above study found that vaccine coverage rate was also higher among the children of mothers who have access to mass media, such as possession of television and radio. Less than half of the mothers of sample study children (40.9%) had access to mass media, i.e., radio and television. The community-based behaviour changes programmes, such as immunization announcement through radio, television and using local drama and public announcement through miking (loud speaker), played a significant role to mothers and care-givers in providing a better understanding of the beneficial role of immunization so that they are encouraged to vaccinate their children in a timely fashion. The study found that

full immunization coverage was slightly higher in urban areas (88.5%) as compared with rural areas (85.1%) and was highest in the Rangpur division (91.5%) followed by Khulna (89%), Dhaka (88.8%) and the lowest in Sylhet division (69.8%).

Below is an annual trend of immunization coverage by different antigens, between the period 2001 and 2019. It shows how the coverage improved over time.

In Bangladesh, like other countries, health services were severely impacted due to the lockdown during initial Covid-19 pandemic months starting in March 2020, leading to fall in immunization coverage. However, in 2021 and 2022, immunization coverage in Bangladesh picked up and remained high. The valid immunization coverage remained close to 84 percent of children receiving their vaccines by 12 months of age. Valid coverage means when a child receives all vaccines due in their first 12 months of age according on the national immunization schedule. In 2022, UNICEF supplied 173 million vaccine doses with a total cost of US Dollar 80 million. These vaccines were funded by Gavi, the Vaccine Alliance, and the Government of Bangladesh. The success of the child immunization programme in Bangladesh is a testament to what is possible when there is sustained political commitment and a well-trained and motivated health workforce.²⁵

Challenges of Achieving High Immunisation Coverage in Bangladesh

Administering an immunisation programme includes several complex components including a reliable cold chain system, transportation for the delivery of vaccines to about 134,000 EPI outreach sites in the country, maintenance of vaccine stocks, training and monitoring of thousands of mid-level managers, supervisors, health workers and field support staff in both the public and private sectors; outreach educational programmes and communication campaigns to inform the people; and documenting and recording of all children who received which vaccines. In Bangladesh, despite an impressive track record in managing childhood immunisation programme, about 16% of children are not receiving all scheduled doses, i.e., not receiving the right dose at the right time. The reasons for low immunisation rates are, poor transportation systems in some remote areas such as haors and hilly areas, low educational level of parents, behaviour change communication methods not adequately reaching remote areas, fear of side effects of vaccines, religious conservatism, and lack of understanding about the benefit of vaccination for children. In addition to this, one study has shown that immunisation rate is lower among the Rohingya refugee population in Cox's Bazar compared to the national average. Immunisation rates are lower among newly

arrived refugees due to their makeshift nature of housing, low level of education, poor understanding about the benefit of immunisation and poverty.²⁶ Bangladesh despite making remarkable achievement of the immunisation programme, geographical and socio-economic inequities affect vaccination coverage. Immunisation coverage remains low compared to the national coverage in remote areas and in the urban slums. The number of zero-dose children, i.e., who did not receive a single dose, in Bangladesh is about 30,000 children, or less than one percent of children aged under one year, representing pockets of unimmunised children in the country.²⁷

Conclusion

Immunisation of children has made enormous contribution to public health, including the eradication of small pox, and elimination of poliomyelitis from every country except three which are Nigeria, Pakistan and Afghanistan. Although great effort has been made in EPI in Bangladesh, all eligible children have not yet been fully vaccinated in the country. To achieve full success and to save children from preventable diseases, it is essential to explore the issues obstructing the success of the EPI. Simultaneously, the monitoring and supervision system of the EPI should be further strengthened to ensure that all children become vaccinated irrespective of their socioeconomic conditions, including sex and religion. It is especially important that all children complete all doses of vaccines at the appropriate intervals and times. Some studies suggested that policy-makers should provide more focus on continuous monitoring and promotional activities to increase the number of full immunisation coverage of all strata. Policies should also focus on awareness development, especially in targeting the larger family and poorest families to increase full immunisation coverage rate.

Several studies have found that more children in Sylhet Division remained unimmunised when compared with other parts of the country. This may be due to various supply-side and demand-side factors, such as the distance of health facilities and vaccination centres, poor transportation systems in some remote areas, low level of literacy, fear of side effects of vaccines, religious conservatism, and even lack of awareness about the benefit of vaccination for children. Therefore, immunisation strategy should target Sylhet Division with low immunisation coverage with an innovative immunisation approach that addresses both supply-side and demand-side barriers. For instance, families living away from or have difficulty in accessing immunisation services, especially in hilly areas, might benefit from outreach programme or mobile immunisation strategies. Furthermore, the use of mobile phones may be important vehicles for tracking and improving immunisation coverage in these rural, remote areas of Bangladesh.

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