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Research Article

REVELATIONS FROM MONITORING POLIO IMMUNIZATION AND THEIR GLOBAL IMPLICATIONS, INDIA

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A B S T R A C T

Problem Existing gap between microplanning, execution and monitoring of immunization program is impeding progress towards polio eradication.

Approach This three day project began by reviewing microplans and picking high risk areas of Surat corporation of Gujarat state. East and South zones of Surat were selected and random teams were monitored from a total of 160 vaccination teams. Monitoring focused on every key aspect of the immunization work flow, from team composition, training, and visiting households to providing supportive feedback in order to solve ongoing issues in the same setting.

Local Setting There are only three polio endemic countries on the planet, Afghanistan, Pakistan and Nigeria[1]. India being a common neighbor to two of these nations, faces significant risks of cross-border polio virus transmission. Consolidating every round of immunization program is necessary to mitigate such risks.

Relevant Changes Apart from rectifying flaws in operational components such as inappropriate team composition, unsustainable individual team workload and improper handling of vaccine; house-to-house monitoring detected 4.76% (10/210) unimmunized children below 5 years of age, and 6.67% (14/210) unimmunized children of the same age group were detected in migratory and mobile sites. These children were subsequently immunized with polio vaccine drops and vaccination teams were sensitized to minimize these occurrences.

Lessons Learnt Adequately trained human resources need to be directed towards coverage of migratory, mobile and transit sites. Biphasic rounds of vaccination by separate teams will significantly improve immunization coverage, reducing probability of missing eligible children.

INTRODUCTION

Seemingly uphill task of polio eradication began with the genesis of Global Polio Eradication Initiative (GPEI) by World Health Assembly in 1988. Inspired from smallpox eradication, GPEI has managed to paralyze polio virus to an extent of 99%, from infecting 350,000 children in 125 countries to 11 confirmed cases of Wild Polio Virus (WPV) infection in 2 countries in September, 2017[1,2]. This far-fetched mission to eradicate Polio has reached this close to its fulfillment by a massive amalgamation of human resources. Over 20 million volunteers and staff members vaccinate more than 400 million eligible children (aged 0-5 years) every year to make this world polio-free for future generations[1].

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Polio virus is transmitted through faeco-oral route and contaminated food/water to a certain extent. Once excreted, it has a distinctively high half-life of infectivity of 48 hours. With paralysis occurring in only 1 out of 200 infected cases, it is not uncommon to act as a carrier for infection without being symptomatic.

When more than 80% of World population is living in certified polio-free regions[3], Is it feasible to drain billions of dollars which could be invested in overhauling health care? On the journey to polio eradication, this particular question has been answered more than once. Since the beginning of this millennium only, as many as 49 certified polio-free countries have reported one or more importations of wild polio virus[4]. Most recent case was observed in Nigeria in August, 2016 when a confirmed case of Wild Polio Virus type-I (WPV-I) revealed fragility of immunization program due to an existing monitoring and surveillance gap[1].

This paper attempts to illuminate innovative approaches and prevalent shortcomings of polio immunization program, in one of the most epidemiologically challenging Nation of the World.

Local Setting

When Global Polio Eradication Initiative (GPEI) was launched in 1988, polio virus had crippled more than 350,000 children across the globe. India was home to 200,000 of these paralyzed children[4]. After being declared as polio-free in early 2014[3], as India is placed into 16 top priority nations for transition planning, two of its neighboring countries are among the only three polio endemic regions of the World[1]. As late as September, 2017, Afghanistan has 6 while Pakistan has 5 confirmed cases of wild polio virus infected children[2].

Reaching over 27 million newborns every year and 170 million children in one of the most densely populated sub-continent on Earth is a notion never conceived before[4]. Poor sanitation, high population density and, hot and humid weather conditions facilitate polio virus transmission. Maintaining the threshold of immunity in such a population required vaccination of more than 95% of children below 5 years of age, more than 8 times for each child[4]. This translates to 90 million doses of Oral Polio Vaccine (OPV) every month through at least 10 immunization campaigns every year[4].

Polio immunization in India is carried out in the form of National Immunization days (NIDs) and Sub-National Immunization days (SNIDs). While NIDs are held twice a year, 6-8 SNIDs are spread across the year in high risk areas (HRAs)[4]. Over 170 million children are vaccinated in NIDs every year and these 2 drops of life reach more than 70 million children through SNIDs[4].

Success of Indian immunization program to reduce polio cases from 200,000 to zero can be attributed to adoption of these innovative approaches:

1. Political commitment and investing largest amount (more than $2 billion) in this project than any other nation[4].
2. Mobilization of community by aggregating a workforce of over 155,000 supervisors to reach out to every single child[5].
3. Recruitment of ASHA (Accredited Social Health Activists) and Anganwadi workers as vaccinators. These are female workers selected from the same community, offering additional advantage of community mobilization and enhanced vaccine coverage.
4. Analysis of qualitatively generated data from surveillance activities and subsequent policy modification.

Approach

Identification of High Risk Areas (HRAs) was the first step in monitoring ongoing Sub-National Immunization Day (SNID) in September, 2017. Last case of Wild Polio Virus (WPV) was reported from West Bengal and Gujarat states in 2011[6]. East and South zones of Surat Corporation of Gujarat state were mapped up for this three day monitoring project. Microplans of all planning units were extensively scrutinized to pick up areas with most probability of missing eligible children (below 5 years of age) from polio immunization.

Vaccination teams are divided into three sub-types,

- House-to-house vaccinating team – Visiting every household and vaccinating every eligible child with Oral Polio Vaccine (OPV)
- Mobile teams – Visit construction sites, brick kilns, slums, nomad areas.
- Transit teams – Vaccinate children on areas of transit such as railway station and bus stands.

Microplans of a total of 160 teams were studied and 15 high risk areas were identified with an average workload of 180-200 houses per team.

Following operational components were assessed:

1. Team composition, training and supervision.
2. Proper storage and handling of vaccine.
3. Estimating viability of oral polio vaccines (OPVs) by vaccine vial monitor (VVM).
4. Identification of ASHA and anganwadi workers and conforming their involvement with the team.

House-to-house teams mark every house as they proceed. House is marked as 'P' if all eligible children of the house are vaccinated or, if there are no eligible children in the house (P_0). 'X' marked houses indicate that either the house was locked during visit or, some eligible child is left to be vaccinated due to any reason.

False-P houses are the ones which are marked as 'P' but the house has child below 5 years remaining to be vaccinated. False-P houses were detected by looking for indelible ink mark on little finger of left hand of the child and interviewing parents of eligible children. Interviews revealed a few houses where some of the eligible children of a house were immunized while others were not and, some children with indelible ink marks without dosing with oral polio vaccine. While the number of False-P houses does not directly help in deducing efficacy of a round of immunization, they have a significant contribution to reporting of a false-high coverage. Detection of more than three false-P houses demands repetition of vaccination activity in that particular area. Similarly, detection of more than 10% unimmunized children at mobile sites was followed with repetition of the vaccination round.

Relevant Changes

Table 1 Outcomes of monitoring house-to-house, mobile and transit team activities in High Risk Areas (HRAs).

	House-to-House survey	Mobile/Transit sites survey
Houses/Sites visited	148	18
Eligible Children (Below 5 years of age)	210	210
Unimmunized eligible children	10	14
Missed areas detected	2	0
Missed houses detected	18	Not Applicable
Percentage of False P houses/unimmunized children	4.76%	6.67%

Every unimmunized child was given 2 drops of Oral polio vaccine (OPV) upon detection. Missed areas are clusters of houses that are not marked or, not covered in the preceding round. All missed houses were visited by the team as a part of biphasic approach.

According to the criteria mentioned earlier, activity was repeated in team areas with more than three False-P houses and 10% unimmunized children. While the difference between proportion of unimmunized children in houses and mobiles sites is not significantly high, it does point to an area with more challenges.

Almost half of Polio cases detected during 2009 in India were among migrants[4]. With more than 23 million Indians moving by over 11000 trains every given day[4], house-to-house immunization is an inadequate approach. Superlative coverage for mobile population has been achieved by appointing more teams at religious festivals, congregations or, seasonal gatherings.

Two rounds of immunization every day by the same team was replaced with biphasic activity by different teams every morning and evening in all high risk areas. Surveying at the end of round revealed expanded coverage with this approach.

Lessons Learnt

Government of India has invested more than any other nation in polio eradication program[4] and yet the ground-work laying vaccinator reaches every child with drops of life for a stipend of as low as $1/day[4]. Purpose is the currency to drive such a humongous army of volunteers towards polio eradication. Appropriate training is not an option but the obligation. All team members must appreciate that they are part of a project whose scale extends beyond humanity. Together, they have saved more than 1.5 million childhood deaths and polio virus would have paralyzed well over 16 million people if those drops were not given to eligible children[3].

When these motivated personnel are directed towards mobile and transit sites, they aim to vaccinate every last child. Formatting comprehensive microplans and composing larger number of teams for high risk mobile population ensures greater coverage and fewer missed children.

While composing teams for vaccinators, involving ASHA/Anganwadi workers provides an upper hand. Being the same lady who happens to be involved in childbirth enables them to never miss a single footprint.

Routine SNID microplans consist of a single team covering a particular area for all days of the program. While this method reduces workload and effort on part of the vaccinating team, a better approach has been realized. Separate teams are appointed for carrying out biphasic activity in a single area. Comparing this with earlier practice has established visible augmentation in vaccination coverage.

Box 1 Summary of Lessons learnt from the field:

1. Higher frequency of polio infection in migratory areas demands increased focus on mobile population coverage through mobile and transit teams.
2. Purpose driven training of vaccinators is necessary to reach every child before the polio virus does. Human chain of the polio eradication program is as strong as its weakest link.
3. Conduction of biphasic activity with separate teams in the same area can significantly enhance coverage.

Objective of this study is to seek attention of policy makers of polio endemic nations towards coherent approaches adopted by India to eliminate polio virus. Afghanistan, Pakistan and Nigeria are security-challenged areas, exposing polio eradication mission to constant impediments, but it is time to acknowledge the fact that the World has never been closer to being polio-free.

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