

## 'MR Vaccine Campaign in India' – Get ahead Success

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### Article History

Received: 30.07.2019

Accepted: 14.08.2019

Published: 30.08.2019

**Abstract:** India stands at the cusp of yet another public health feat. Having successfully overcome the challenges of diseases like polio, maternal and neonatal tetanus and yaws in the recent past, the country is making confident strides to triumph over measles and rubella. Viral diseases like measles and rubella even continue to flourish. MR (Measles & Rubella)-vaccine is a combination vaccine administered in a 2-dose schedule, offers protection against Measles, and Rubella. The vaccine is widely recommended by WHO and GAVI as a substitute for prevailing vaccination practices against the above mentioned diseases and viruses. Measles Rubella (MR) campaign is being launched in the country covering all children of 9 months to below 15 years of age group. The vaccine has met with positive and some little negative responses, which leads to challenges about the vaccine's safety and the pros and cons of the vaccine was to be evaluated carefully and ultimately time to replace the current measles primary vaccination schedule in the immunization programme first dose in 9 months, second dose in 15 to 18 months. Conclusion: Elimination of Measles and rubella in India will require a sustainable improvement in both commitment and activity of the whole country towards the WHO goals regarding MR vaccine launched into national immunization schedule.

**Keywords:** MR vaccine, Campaigning, Safety & Efficacy, Success.

## INTRODUCTION

Immunization is considered to be one of the most cost-effective public health interventions that have delivered excellent results in providing direct and effective protection against preventable childhood diseases such as tuberculosis, hepatitis B, poliomyelitis, diphtheria, pertussis, tetanus and measles. MR vaccine provides protection to a child against 2 life-threatening diseases – Measles & Rubella and in which measles is already part of routine immunization in India; rubella vaccine is a new addition. Together, the combination is called MR vaccine. Rubella vaccine can prevent serious diseases congenital rubella syndrome caused by rubella virus.

Initially Rwanda was the first sub-Saharan African country to introduce the MR vaccine with the support of Global alliance for vaccines and immunization (GAVI) in 2013. WHO recommended in 2012 that MR vaccines be included in all routine infant immunization programmes[1] vaccine has been progressively introduced in India after following the South-East Asia (SEA) Regional Committee resolution in September 2013, setting the goal for measles elimination and rubella / congenital rubella syndrome (CRS) control by 2020; India has geared up and accelerated its key elimination strategies. The National Technical Advisory Group on Immunization (NTAGI) in June, 2014, had recommended the introduction of measles-rubella vaccine in routine immunization program, following a nationwide MR campaign. Both doses of measles vaccine provided at 9-12 months and 16-24 months, will be replaced by MR vaccine under routine immunization, immediately after the campaign [2]. The MR (measles-rubella) mass vaccination campaign is in full swing throughout the country, and targets to vaccinate 95 per cent children between nine months and 15 years. India, along with 10 other Southeast Asian member countries of the WHO, aims to eliminate both measles and rubella by the year 2020

### Scope and Need

Every year in India nearly 2.7 million children get measles. Those who survive, suffer from serious complications including diarrhoea, pneumonia and malnutrition. Rubella transmission is also highly prevalent across India. It may lead to spontaneous

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abortion, stillbirth and irreversible birth defects such as lifelong disabilities affecting multiple organs like deafness, blindness, mental retardation, heart defect etc. Every year over 40 000 children are born with such birth defects caused by Congenital Rubella Syndrome [2].

The introduction of measles-rubella vaccine leads to several critical outcomes for children's health. Infants won't be born with the blindness, deafness and heart defects associated with congenital rubella syndrome (CRS), and, through high vaccination coverage, countries can reduce and even eliminate measles, rubella and CRS," said Dr. Susan Reef, the US Centers for Disease Control and Prevention rubella expert and member of the Measles & Rubella Initiative[1]. The measles-rubella vaccine offers protection against two unrelated diseases which cause some of the same symptoms and are frequently confused with each other. In their common form, both viruses cause a rash and fever. Measles can be deadly for children with poor nutrition and weakened immune systems. The virus still causes about 430 child deaths every day worldwide, mainly in developing countries.

Rubella, also known as "German measles", is also very contagious but causes relatively mild disease in children. More than 100,000 children are born with the birth defects, known as Congenital Rubella Syndrome (CRS), each year – of which 90,000 live in GAVI's 57 eligible countries [3]. As a result of high transmissibility of the measles and rubella virus; the herd immunity threshold is very high and consequently very high coverage (>95%) is necessary to interrupt virus transmission. With increasing immunization coverage, the number of measles death worldwide was estimated to have been reduced to about 548000 in 2000 (immunization coverage of 72%), and to an estimated 157,700 deaths, mostly children under five, in 2011 (immunization coverage of 84%). Measles is a leading cause of respiratory infections young children (0–4 y; 86/100,000) with case fatality ranging from 20 to 29%. The MR vaccines provide a golden opportunity to curb Measles along with rubella in the developing countries.

"Investing in rubella will provide a much-needed boost to improving women's and children's health in poor countries. GAVI's support for measles-rubella campaigns will help accelerate global progress in controlling two life-threatening diseases," said Dr Seth Berkley, GAVI Alliance CEO. "Rubella vaccine has been available since the 1970s in many parts of the world. Accelerating the introduction of rubella vaccine in developing countries will spread the benefits of the vaccine to those in most need and build on country efforts to control measles with a cost-effective combined vaccine. It brings us one step closer to ensuring that every child everywhere is fully immunized [3].

Both Measles and rubella meet all the requirements for potential eradication: they are caused by genetically stable microorganism, humans are critical for the transmission and there are no environmental or animal reservoirs for either virus, the period of infectiousness is short, infection confers lifelong immunity. All children from 9 months to less than 15 years of age will be given a single shot of Measles-Rubella (MR) vaccination during the campaign. Following the campaign, MR vaccine will become a part of routine immunization and will replace measles vaccine, currently given at 9-12 months and 16-24 months of age of child.

### **The MR campaign**

The measles and rubella (MR) campaign is an ambitious public health initiative of the Govt. of India to eliminate measles by 2020 and control rubella/congenital rubella syndrome (CRS). It targets children in a wide age group between 9 months and 15 years. This campaign is a second opportunity for those children who were left out due to either vaccine failure or failure to vaccinate. High population immunity will then be sustained by follow-up campaigns and incorporation into routine immunization schedule at 9 months and 18–24 months [2]. A MR Vaccination Campaign is a special campaign to vaccinate all children in a wide age group with MR vaccine, in all states of India. The MR campaign dose is given to all children, (both previously vaccinated and unvaccinated), who belong to the target age group (9 months to <15 years). The goal of the MR campaign is to quickly enhance the population immunity to both measles and rubella in order to reduce deaths from measles and disabilities like CRS due to rubella infection in early pregnancy. A MR campaign must immunize more than 95% of the target age group children in schools as well as outreach session sites with a country goal to achieve 100% coverage of targeted children with safety [4].

To address this public health concern, India launched the ambitious Measles-Rubella (MR) vaccination drive in February 2017 in Karnataka, Tamil Nadu, Pondicherry, Lakshadweep and Goa. It is the largest such effort anywhere in the world with the target to cover 405 million children in the age group of 9 months–15 years by 2019. The MR campaign aims to rapidly build up population immunity by reaching out to all target children with the vaccine, knocking out the susceptible cohort and, eventually, reducing the associated morbidity and mortality. Measles immunization directly contributes to the reduction of under-five child mortality. In combination with the rubella vaccine, it will help control rubella and prevent CRS. As part of the MR campaign, as of early July 2018, 92 million children have been successfully vaccinated in 20 states across the country. The MR Campaign is the perfect platform to raise public awareness before inserting into Universal Immunization Programme and that will help in reaching the underserved population and the ideal platform for capacity building of staff involved in RI and Surveillance programmes; MR Campaign can link UIP and surveillance programmes and strengthen coordination between their health staff. Against all odds & dilemma, India set to make Measles-Rubella campaign successful.

### **Immunogenicity, Safety and Efficacy of MR Vaccine**

The MR vaccine has a robust safety and effectiveness profile. Under field conditions, seroconversion is 85% at 9 months and 95% at 12 months or more for measles, and 95% at 9–12 months and more than 99% when given beyond 12 months for rubella [5]. Adverse reactions are generally mild and transient. Fortunately, most adverse effects are minor and transient (local reaction, fever, rash) with no long-term sequelae. One serious but extremely rare adverse effect of MR vaccine is anaphylaxis following vaccination [2].

Our study was conducted in Gwalior; Madhya Pradesh looks into a hitherto less explored area vis-a-vis the role of social capital in vaccine acceptance through a case-control study. The study emphasizes the role of social capital and trust on vaccine acceptance. By the study AEFI were found as Local reaction at injection site 10.71 % ( 15/140),Fever in 18/140 (12.9%) in which 7 cases was found under five children and only one case in above 6 yr old. and Rash among 7/140 (5.0%) children. We have also found that wherever school teachers have strongly recommended the vaccine the vaccine uptake has been good (>90%) and coverage levels sustained. Findings are alike as revealed in the WHO guidelines adverse reactions: incidence (%) per million doses local reaction at injection site 0–2 days 1 in10 (10%) Fever 6–12 days 1 in 6 to 1 in 20 (5–15%) Rash 6–12 days 1 in 20 (5%) [6] and in the study carried at Kancheepuram, Tamil Nadu[7].

### **Vaccine Prequalified with WHO**

WHO prequalification gives assurance that the vaccines are safe, effective and suit the needs of developing countries? The dossier (provides information that matters to the populations that will use the vaccine, such as stability at different temperatures and potential interaction with other vaccines) was examined by reviewers from within and outside WHO. They also reviewed the product itself by sending samples to a range of reference laboratories and carrying out site inspections. The vaccine was prequalified in less than the 12-month target period for the prequalification process. All serious cases of AEFI in each country were reviewed with independent national and international experts. Reviews have come up with a conclusion that none of the fatal cases could be classified as having a consistent causal association with MR vaccine immunization. Most of the reviews showed that mortality was due to some existing immunogenic or due to some other pre-existing conditions like malnourished child [6].

### **MR Vaccine adverse effects unsubstantiated**

The concerns raised regarding the adverse effects of the MR vaccine appear to be unsubstantiated. The authors themselves conclude that results of his survey experienced in Jan 2019, in 140 children of age 9 months to up to 15 yr of age. No cases were found with significant AEFI but all these data should be viewed with caution, mostly as an indication that high quality data are lacking.” Moreover, in trial studies found that the combination vaccine had a high immunogenicity and was well tolerated [2]. In resource poor settings like India, decisions to use the vaccine are expected to be guided by the cost associated with its introduction. While the concerns regarding the costs are legitimate, recent data suggest that the cost of the vaccine has reduced substantially. Before being introduced in India, the MR vaccine had been used in 49 countries [4]. The expert panel concluded that there was no evidence to establish a causal relationship between MR vaccine and any of the deaths reported following its administration. It was also concluded that “the reporting rate of HHE following the pentavalent vaccine (14.9 cases per 100 000 doses) was found to be well within the reported estimates of HHE following whole-cell pertussis-containing vaccines (21–250 cases per 100 000 doses). Even in countries which have poor immunization coverage like India, indirect benefits of the vaccine have been reported due to the herd effect. For instance, data from Gambia have shown the benefits of herd immunity even when vaccine coverage has been below 60% [8].

### **Vaccine hesitancy: A key challenge**

Though conceptually simple, implementation has run into issues with coverage more often than not being suboptimal and after repeated extensions the last run being an inch by inch progression toward the desired 95%. Vaccine hesitancy appears to be a global phenomenon and an increase in vaccine preventable disease has been observed in many developed and developing countries. Vaccine hesitancy refers to delay in acceptance or refusal of vaccination despite availability of vaccination services [5] and it is critical to understand this period of indecision. In India, resistance to vaccination was due to ignorance in the past, though currently, the campaign on social media such as WhatsApp—fuels a mix of conspiracy theories, safety concerns, and questions the need for the MR campaign. Studies show that the messages are inconsistent and negative [9]. A limited survey study about evaluation of MR campaign carried out by NPSP unit of SMO WHO Gwalior and the department of community medicine G.R.Medical College Gwalior during MR campaign in Jan 2019. This included questions about the respondent’s knowledge and opinions towards the measles and rubella disease and MR vaccine. The study demonstrated a discrepancy in the perceived severity of measles and rubella subjectively between immunisers and non-immunisers. Perceived severity is included in many psychometric models that aim to explain the way by which knowledge, attitudes and opinions shape a person’s health decisions [10]. By its nature, ‘perceived severity’ is a subjective experience and thus the term ‘disease severity’ was intentionally left undefined in the survey. Similarly Bond and Nolan [11] propose that perceived disease severity is influenced by one’s familiarity with the illness. They suggest that the threat of an unfamiliar disease with unknown consequences is more intimidating than a familiar disease with potentially lethal consequences. Indeed, the results of this study provide support to this assertion, as the perceived severity of measles was significantly lower among those who had met someone who had suffered from the disease. Participants were asked to rate their agreement with a series of statements regarding measles and rubella MR vaccine. Hesitant respondents were significantly less likely than non hesitant to agree that the MR vaccine is safe or effective. Hesitant respondents were also significantly more likely to have met or known somebody who reported to have

suffered side effects from the MR vaccine. Our results suggest that hesitant underestimate the potential severity of the measles and rubella disease and have significant doubts over the safety and efficacy of the MR vaccine when compared to their non hesitant counterparts. These misconceptions are likely to influence the way parents balance risk and benefit in making a decision about vaccination. So, by its nature, risk perception is innately subjective and parents may not make decisions as expected by experts or health professionals [12] currently, there is a lack of effective evidence-based intervention for approaching vaccine hesitancy.

### Looking ahead

Forging a strong collaboration under the stewardship of the Immunization Division of the Ministry of Health & Family Welfare, a strong partnership of various stakeholders like education is ensuring the successful roll-out of the MR campaign. The partners include state health, education, and women and child welfare departments. As per the order to schools, all children aged nine months to less than 15 years will be provided with an additional dose of MR vaccine, regardless of previous vaccination status or history of measles/rubella-like illness. Under the MR campaign, the departments of health and education are partnering so students and teachers of all schools actively participate. This will include orientation for officers, principals, teachers and students by experts of the Health Department. In our study when asked about symptoms and complications of measles and rubella with 79.3% (111/140) selecting "don't know" and when asked for specific side effects of the MR vaccine, 90.7% (127/140) said they didn't know. Overall, even after majority of people were unaware about the symptoms of MR disease and side effects of MR vaccine a little respondents 10 out of the 140 (7.1%) reported that they chose not to immunize their child with the MR vaccine. There was also No significant difference was found between hesitant and non hesitant participants were asked to list symptoms of measles and rubella and side effects of MR vaccine. This visible difference may be due to gap between the perception of risk and difficulties by respondents and available scientific evidence on vaccination. This is especially so as successes of prevention are less visible due to decreasing prevalence of disease and parents question vaccinating healthy children [13]. Methodical and proactive communication with formative research can help address issues in a systematic manner and also address misinformation. It would also be important to reach the ring of influence around families that refuse vaccination. Influencing the bonding, bridging, and linking capital will help to reach, persuade, and negotiate with the influencers around the resistant individual. The communication for development process should help to deal with such bonding, bridging, and linking capital[7], which may at times be outside the country, for example, NRI husbands in the middle east and within such as religious leaders, grandparents, etc[7]. India's recent public health successes give cause for optimism. The MR vaccination initiative is making rapid strides to ensure better life chances for India's children. "The MR elimination goal is achievable. India is making steady progress towards the goal of measles elimination, rubella and CRS control. The WHO Country Office for India is committed to going the extra mile along with its NPSP field network to help the country achieve the goals of the measles-rubella campaign," says Dr Bekedam [14].

### Justification for introducing MR vaccine in the National Immunization Programme

In all cases, the vaccine itself has never been proven to be bad. The equity argument is often brought up. It is said that the vaccine is given by private practitioners to their well-to-do clientele and it is the responsibility of government to make it available to the poor. Introduction of this new vaccine of MR in the national programme yet to face of proved low incidence of invasive disease. India's decision to expand access to MR vaccines through the Universal Immunization Programme will have a major long term positive health impact by averting the deaths associated with measles and rubella. The concerns regarding the introduction of a new vaccine on an already overwhelmed public health system in India appear to be valid. However, experience from other developing countries suggests that it is feasible despite limited resources. Further, it may not be inappropriate to assume that the opportunity offered by the introduction of a new vaccine may provide the desired boost to the health system through refresher trainings to the health workers and generating demand among parents and caregivers and may lead to an improvement in the routine immunization coverage especially in the North Indian states. Hence, while the decision regarding GAVI Alliance's efforts to introduce the pentavalent vaccine in India seems to be centered around debates regarding the associated commercial considerations, it may be prudent to focus more on the long-term benefits of the vaccine and its potential to reduce mortality and morbidity amongst children aged less than 5 years, bringing the country closer to Millennium Development Goal. In this scenario wherein the safety and tolerance of the vaccine is in serious debate, the certainties have to be cleared and more attempts are made for its administration. "India's decision to expand access to MR vaccines through the Universal Immunization Programme will be a major long term positive health impact by averting the deaths & serious complications associated with measles and rubella as well CRS. A small step of affixing MR vaccine in the UIP is welcome and can bring big changes like a pinch of salt that increase the taste of coverage. The success of the small pox eradication programme many years back is a role model for all other eradication programmes, including MR mass vaccination but it will require lot of conviction, high levels of public transparency, along with effective post vaccination surveillance.

## CONCLUSION

The results of this study contributed to the body of research that recognizes the relationship between decision to immunize and parental knowledge, attitudes and opinions regarding the measles and rubella disease and MR vaccine. Misconceptions about the reality of measles and rubella and suspicion over the safety and efficacy of the MR vaccine continue to be prevailing concerns of the major group of community. It is important that Indian public health groups and primary healthcare providers seek to address these concerns to minimize the hesitancy among the community. Better means of public education need to be developed. Perhaps the power of 'social media' could be harnessed to this effect. The success achieved in a number of countries against Measles and rubella shows that elimination is technically possible with the vaccine available and with targeted vaccination campaign strategies [15, 16].

In conclusion the epidemiological situation for Measles and rubella in India including the vaccination coverage rates is of great concern. All the above mentioned priority actions should be pursued to reach the goal of Measles and rubella elimination: indeed these actions have already been included in MR vaccine campaign without sustained political commitment and accelerated action, the elimination of measles and rubella will remain an unrealized dream.

#### Abbreviations

MR-Measles and Rubella  
WHO – World Health Organization  
GAVI - Global alliance for vaccines and immunization  
NTAGI - The National Technical Advisory Group on Immunization  
SEA – South East Asia  
RI – Routine Immunization  
CRS= Congenital Rubella Syndrome  
AEFI - Adverse events following immunization  
HHE – Hypotonic Hyporesponsive Episodes  
MDG – Millinium Development Goal

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