

Coverage survey of Measles-Rubella mass vaccination campaign in a rural area in Tamil Nadu

Priyadharshini¹, Aliya Jasmine¹

¹Department of Community Medicine, Sri Ramachandra Medical College and Research Institute, Sri Ramachandra Institute of Higher Education and Research, Chennai, Tamil Nadu, India

ABSTRACT

Background: In Tamil Nadu, where health indicators are above the national average and routine immunization coverage is >95%, the tepid response to Measles-Rubella (MR) mass vaccination campaign was unexpected. Several parents refused MR vaccine for their children, due to false news claiming inefficiency and adverse effects due to the vaccine. **Aim:** This study was conducted to assess the Measles-Rubella (MR) mass vaccination coverage and to know the motivating factors and barriers for vaccination. **Methods:** A cross-sectional study was conducted in a rural area immediately following the mass vaccination campaign. Using a pre-tested structured questionnaire, data was collected on awareness of MR vaccination campaign, MR vaccination status, motivating factors and reasons for non-acceptance of the vaccine. **Results:** Vaccine coverage among the 616 children surveyed was 80.2%. Factors that motivated acceptance of vaccine among the immunized participants were easy access to immunization (85%), support and motivation from school teachers (41.1%) and community level health workers (25.5%). Barriers reported among the unimmunized participants were rumours of adverse effects (47.5%), fear of adverse effects (53.3%), and no faith in immunization (18.9%). Risk factors for vaccine refusal included female child (OR = 1.7, 95%CI = 1.1-2.6), Children not attending school (OR = 3.32, 95%CI = 2.1-5.1), Mothers with higher education (OR = 4.3, 95%CI = 1.2-15.2). **Conclusion:** An effective communication strategy addressing the needs and concerns of the public/parents should be in place and started early on before initiation of the mass vaccination programme.

Keywords: Barriers, India, mass vaccination, measles, motivating factors, rubella, vaccine coverage

Introduction

India, along with other World Health Organization-South East Asia Region (WHO-SEAR) countries, in September 2013, resolved to eliminate measles and control rubella/congenital rubella syndrome (CRS) by 2020. India is a priority geographic area for intensified vaccination as it accounts for 47% of global measles deaths.^[1] The Ministry of Health and Family Welfare (MOHFW), Government of India (GoI), consistent with World Health Organization (WHO) recommendation, proposed to introduce Rubella vaccine in its Universal

Immunization Programme (UIP).^[2] In accordance with the WHO Strategic Plan for Measles Elimination and Rubella/CRS Control in SEAR, India's National Technical Advisory Group on Immunization (NTAGI) planned a 3-year MR mass vaccination campaign in phases across the country. This wide age-range vaccination campaign, targeting children aged 9 months to less than 15 years will rapidly build up immunity and help reduce measles and rubella transmission in the community. Subsequently, MR vaccine has replaced the Measles vaccine given at 9 months and 14-16 months in the UIP.^[3]

In Tamil Nadu, the vaccination campaign began on 3rd February 2017. The vaccine was given to children aged 9 months to <15 years. For those who had already received MMR or MR Vaccine earlier, the campaign dose was given as a booster dose.

Address for correspondence: Dr. Aliya Jasmine, Department of Community Medicine, Sri Ramachandra Medical College and Research Institute, Sri Ramachandra Institute of Higher Education and Research, Chennai, Tamil Nadu, India. E-mail: draliyajasmine@gmail.com

Received: 20-04-2019 Revised: 27-04-2019 Accepted: 17-05-2019

Access this article online

Quick Response Code:



Website:
www.jfmprc.com

DOI:
10.4103/jfmprc.jfmprc_319_19

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

For reprints contact: reprints@medknow.com

How to cite this article: Priyadharshini, Jasmine A. Coverage survey of Measles-Rubella mass vaccination campaign in a rural area in Tamil Nadu. J Family Med Prim Care 2019;8:1884-8.

All immunized children received a vaccination card to verify the MR vaccine administration. The vaccination campaign was held in government, private and aided schools, Integrated Child Development Services (ICDS) centres, health sub-centres and mobile posts in villages and urban areas. Around 1,500 doctors and 10,000 nurses—besides anganwadi workers and volunteers—were involved in the programme.^[4]

During the mass vaccination campaign, there were several rumours regarding inefficiency and adverse effects caused by the vaccine.^[5] This led to a large number of parents refusing vaccines for their children, resulting in a low coverage in the anticipated time duration. To cover the missed target population the campaign was extended by a month till March 31st.

This study was conducted to assess the Measles-Rubella mass vaccination coverage and to know the reasons for its non-acceptance.

Methods

A cross-sectional study was conducted immediately after the mass vaccination campaign from April 2017 to May 2017 to estimate the coverage in field practice area of the Rural Health and Training Centre (RHTC), Vayalanallur of Sri Ramachandra Institute of Health Education and Research (SRIHER). The field practice area of RHTC, located in the poonamallee block, covers 9 panchayats and 38 villages. All children aged 9 months to 15 years who have been residing in the area during the vaccination campaign and were available at the time of the interview were included in the study.

The required sample size was calculated based on the assumption that at least 85% of the target population will be immunized in the mass vaccination campaign. With an allowable error of 4%, and a design effect of 2, a total sample size of 614 was required.

The World Health Organization (WHO) cluster survey method for immunization coverage was utilized.^[6] The total population covered by the centre was 18,503. The total under-15 years' population was 3860. A sampling frame was prepared by enlisting all the children aged <15 years in each village. Using the cluster sampling technique, 30 clusters were identified.

In each selected cluster, the approximate geographic centre of the village was identified. Following which, a household was randomly selected to begin searching at consecutive households, until 21 eligible children were identified in the cluster. The first 21 children identified in the age group of 9 months to 15 years were enrolled. Only one eligible child was selected from each household. Once informed consent was obtained from the child's parent or guardian, they completed a short structured interview and were asked to show the child's vaccine record, if available.

Data was collected using a pre-tested structured questionnaire. Information was collected on awareness of MR vaccination

campaign, MR vaccination status, motivating factors and reasons for not accepting the vaccine.

The Institutional Ethics Committee approved the study protocol.

(Ref: IEC-NI/17/MAR/58/28)

Results

Interviews were conducted for 616 children. The mean age of the participants was 7.37 years (SD = 4.12) and 40.6% of the children were in the age group of 9 months to 5 years. An approximately equal number of males (49.4%) and females (50.5%) participated in the study. Among children not attending school, majority (85.7%) were under 5 years. Majority of the parents (mother – 76%, father – 77.9%) had completed higher secondary education. As per Prasad's Socio-economic Classification, majority of the families belonged to middle class (50.3%) and lower middle class (32.5%) socio-economic status.

Vaccination coverage

Among the 616 children participating in the study, 80.2% (95% CI = 77.1% to 83.3%) of them were immunized. Vaccine coverage was 84.6% among male children as compared to 75.9% among female children ($P = 0.007$).

Among children attending school, vaccination coverage was 84.5% versus coverage among children not attending school was 62.2%. ($P = 0.000$). Mother's literacy status also played a significant role with highest vaccination acceptance among illiterate mothers (88.2%) and lowest among mothers who were graduates (56.3%, $P = 0.005$). [Table 1]

Majority of the participants received the vaccine at School ($n = 353$, 71.5%), followed by ICDS centres ($n = 88$, 17.8%) and Primary Health Centres ($n = 53$, 10.7%). Only 278 (56.3%) of the 494 immunized participants reported receiving vaccination cards and only 66 (13.4%) at the time of the interview had the card.

Measles-Rubella vaccination campaign awareness

Awareness of the mass Measles-Rubella vaccination campaign was very high (97.7%) and vaccination session sites were known by 89.4% of the subjects. The main source of information regarding vaccination campaign was reportedly provided by school teachers (55.6%), followed by community level health workers (24.4%), media (9.4%), friends and relatives (2.7%), and health professionals (0.6%).

Awareness of why the vaccine was needed was low, as only 276 (44.8%) participants were aware that the vaccine would help prevent disease. Of these 276 participants, 211 (76.4%) responded that the vaccine prevents only Measles, 3 (1.1%) responded that it prevents only Rubella, and 62 (22.5%) responded that it prevents both Measles and Rubella.

An exclusive medical helpline 104 was available to the public for clarification of queries regarding the vaccine. Awareness of availability of the 104 helpline was low and among the 75 (12.2%) participants who were aware, only 2 (0.3%) reported to have used it.

Motivation and barriers for immunization

All participants who took the vaccine were asked about factors that motivated them to immunize themselves. Ease of accessibility ($n = 420$, 85%) was reported as a major motivation factor among those vaccinated ($n = 494$). Of the 494 immunized participants, 102 (20.6%) participants reported that they were vaccinated mandatorily, without prior consent from parents. [Table 2]

The barriers for immunization among those who refused the vaccine were categorized as lack of information, lack of motivation and obstacles for immunization [Table 2]. The main reason for refusal of vaccine was false rumours of adverse effects during the mass vaccination campaign (53.3%) and lack of information regarding the adverse effects (47.5%).

Both Immunized and Unimmunized participants ($n = 259$, 42%) reported false rumours about the vaccine. The main source of these rumors were social media ($n = 117$); false messages and videos were circulated on WhatsApp ($n = 107$) and Facebook ($n = 10$). Participants also claimed that television and local newspaper information ($n = 101$) discouraged them from using the vaccine, followed by advice from family, friends and neighbors ($n = 46$).

When parents were asked whether they would encourage their family and friends to accept MR vaccine, 421 (68.3%) subjects responded positively, whereas 156 (25.3%) subjects said they will not encourage. The rest did not respond.

Variables that were found to have significant likelihood of reducing vaccine acceptance were included in a multiple logistic regression model and using Backward Wald model, these variables were analysed. Details are given in Table 3.

Female children were 1.75 times ($P = 0.007$) more likely to not be vaccinated compared to male children. Children who did not attend school were 3.32 times ($P = 0.000$) more likely not to be immunized than children who attended school. Mothers who graduated were 5.83 times ($P = 0.005$) more likely than illiterate mothers to refuse vaccination.

Discussion

The results show that the MR mass vaccination coverage was 80.2% among children aged 9 months to 15 years. Although lower than the expected target coverage of 95%, coverage of 80% is still a commendable achievement, considering the fact that the vaccination campaign was conducted with a short notice-period. It is appreciable that there was involvement of healthcare workers

Table 1: Coverage of Measles-Rubella Vaccination according to background characteristics of the population

Background Characteristics	n	Vaccinated n (%)	p	
Age	9 mths - 5 years	250	193 (77.2%)	0.176
	5-10 years	197	166 (84.3%)	
	11-15 years	169	135 (79.9%)	
Sex	Male	305	258 (84.6%)	0.007
	Female	311	236 (75.9%)	
School	Attending school	497	420 (84.5%)	0.000
	Not attending school	119	74 (62.2%)	
Education - Father	Illiterate	64	52 (81.3%)	0.622
	Primary	65	56 (86.2%)	
	Higher secondary	468	371 (79.3%)	
	Graduate	19	15 (78.9%)	
Education - Mother	Illiterate	68	60 (88.2%)	0.031
	Primary	52	40 (76.9%)	
	Higher secondary	480	385 (80.2%)	
	Graduate	16	9 (56.3%)	
Socio-economic Status	Lower class	11	8 (72.7%)	0.214
	Lower middle class	200	165 (82.5%)	
	Middle class	310	251 (81%)	
	Upper middle class	84	63 (75%)	
	Upper class	11	7 (63.6%)	

Table 2: Motivation factors and Barriers for immunization during the mass vaccination campaign

Motivating factors for Immunization (n=494)			
S.No.	Motivating Factors	n*	Percentage*
1.	Easily Accessible	420	85
2.	Motivation from school teacher	203	41.1
3.	Motivation from community health workers	126	25.5
4.	Family physician's advice	63	12.6
5.	Influence of family and friends	47	9.5
6.	Messages on TV/Newspaper	33	6.7
7.	Self-motivated	28	5.7
Barriers for Immunization (n=122)			
S.No.	Barriers	n*	Percentage*
Lack of information			
1.	Fear of adverse effects	58	(47.5%)
2.	Unaware of need for immunization	20	(16.4%)
Lack of motivation			
3.	Rumours of adverse effects	65	(53.3%)
4.	No faith in immunization	23	(18.9%)
5.	Postponed until another time	11	(9%)
Obstacles			
6.	Illness at the time of immunization	16	(13.1%)
7.	Taken MMR previously	16	(13.1%)

*The sum will add up to more than the total participants because of multiple responses.

at all levels in the community to create awareness of MR mass vaccination campaign. Novel school-based immunization strategy in addition to the routine vaccine administration sites also helped

Table 3: Risk factors for not accepting vaccine during the campaign

	Risk factors	Not immunized n (%)	OR	95% CI	P	Adjusted OR	95%CI	P
Age	11-15 years	34 (20.1%)	1					
	5-10 years	31 (15.7%)	1.17	0.73 - 1.89	0.514			
	9 months - 5 years	57 (22.8%)	1.58	0.97 - 2.56	0.064			
Sex*	Male	47 (15.4%)	1					
	Female	75 (24.1%)	1.75	1.16 - 2.62	0.007	1.7	1.1 - 2.6	0.007
Schooling*	Attending school	77 (15.5%)	1					
	Not attending school	45 (37.8%)	3.32	2.13 - 5.17	0.000	3.3	2.1 - 5.1	0.000
Mother's educational status*	Illiterate	8 (11.8%)	1					
	Primary	12 (23.1%)	2.25	0.84 - 5.44	0.105			
	Higher secondary	95 (19.8%)	1.85	0.85 - 4.01	0.118			
	Graduate	7 (43.8%)	5.83	1.7 - 20.01	0.005	4.3	1.2 - 15.2	0.005
Socio-economic Status	Lower class	38 (18%)	1					
	Middle class	59 (19%)	1.07	0.68 - 1.68	0.769			
	Upper class	25 (26.3%)	1.63	0.91 - 2.89	0.098			

*Indicates statistically significant variables which were analysed further by multiple logistic regression

to cover a large target population in a short interval of time. School teachers played an important role in motivating school children for immunization. In spite of the false rumours that spread like wildfire and created doubts among the population, majority of the target population were vaccinated. This success was due to the support and motivation received from the healthcare workers and school teachers during the campaign.

Vaccination coverage was significantly higher in males (84.6%) when compared to females (75.9%). A study analysing NFHS data between 1992 and 2006 observed similar results with girls having a significantly lower coverage when compared to boys for BCG, DPT and Measles.^[7] This gender difference is observed in healthcare utilization throughout India at all age groups.

Vaccine availability at school along with motivation and support from school teachers improved immunization uptake among the school children (84.5%) when compared to children not attending school (62.2%). This was similar to a previous study, which reported easy accessibility improved vaccination coverage rates.^[8] World Health Organization (WHO) has approved school-based immunization as a promising strategy to improve vaccination coverage and reduced cost of delivery based on experiences from countries with existing school-based immunization programmes.^[9]

A systematic review studying the effect of maternal education on childhood vaccination concluded better vaccination uptake with higher maternal education.^[10] Another study conducted in Delhi, India, showed similar results, with better chances of complete immunization if the mother was a literate.^[11] This study however demonstrated an inverse relationship with maternal education. Vaccination coverage was highest among illiterate mothers (88.2%) and lowest among graduate mothers (56.3%). A study to evaluate Measles-Rubella mass vaccination campaign in Iran made a similar observation of lowest vaccination coverage in families where the head of household had a university education.^[12] Although educated mothers are more likely to avail the benefits of vaccination,

they may not be very receptive about the benefits of mass vaccination provided free of cost. Besides, educated mothers with access to social media, use it as a parenting tool, and the rumors on various social networking platforms must have demotivated them. They are also more likely to have already availed the vaccine in a private clinic and hence refuse a repeat dose of the same vaccine.

Support and motivation from community level health workers and physicians was reported as a reason for vaccine acceptance. A study conducted by Gargano L, *et al.* gave similar results concluding that physician recommendation plays a crucial role to improve immunization uptake.^[13] In this study, the influence of family and friends on immunization played an important role both as a barrier as well as, as a motivating factor. A study to assess vaccine utilization showed similar results.^[14]

Fear and misconception of adverse effects in addition to being unaware of the benefits of vaccine was responsible for refusal of the vaccine by majority of the parents of children not immunized. The fear of adverse effects was attributed to various rumours during the vaccination campaign. A review article to assess the barriers for immunization attributed these fears to general lack of information and understanding of vaccines.^[15,16]

Limitation

Vaccination coverage was based on self-report and not on the vaccination record, as majority of the population did not receive or possess a record at the time of the interview.

Conclusion

Tamil Nadu has a high Routine Immunization coverage of >95%.^[17] Considering the large target population and limited time period, 80% coverage is creditable. Community level health workers played an important role to improve vaccination coverage. Doctors addressed concerns of the teachers and

parents at school assembly and Parent-Teacher meetings, to clear the fear and confusions caused by the rumours.

The main reason for the low coverage was refusal of vaccination due to various rumours about the vaccination's adverse effects. The impact of these rumours was because of lack of information about MR vaccine among the public. An effective communication strategy acknowledging parents' concerns and addressing them will promote uptake of vaccination. A vaccine information leaflet should be made available to parents. It should provide information about the vaccine benefits and possible adverse effects of the concerned vaccine and danger signs to look out for when parents should consult with a doctor.

Providing access to vaccine information personalized to the public's cultural beliefs, literacy status and concerns could be effective to improve vaccine acceptance. Improved inter-sectoral coordination with Department of Education, effective communication and appropriate resource material for teachers can improve vaccine coverage.

Further insight about vaccine hesitancy could be explored by a qualitative study.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

References

- World Health Organization. Strategic plan for Measles Elimination and Rubella and Congenital Rubella Syndrome Control in the South-East Asia Region 2014-2020. Available from: <https://apps.who.int/iris/handle/10665/205923>. [Last accessed on 2019 Feb 6].
- Rubella. World Health Organization. Available from: <https://www.who.int/news-room/fact-sheets/detail/rubella>. Updated 19 February, 2018. [Last accessed on 2019 Mar 6].
- Ministry of Health and Family Welfare, Government of India. National Operational Guidelines for Introduction of Measles-Rubella Vaccine (campaign and routine immunization, 2017, Second Edition). Available from: <https://mohfw.gov.in/sites/default/files/Measles%20rubella%20vaccine%20operational%20guidelines.pdf>. [Last accessed on 2019 Feb 6].
- Health and Family Welfare Department, Government of Tamil Nadu. Immunization programme. Available from: <http://www.tnhealth.org/dph/dphis.php>. [Last accessed on 2019 Feb 6].
- Zubeda H. MR Vaccine: DPH files complaints against misinformants. The Hindu. February 14, 2017. Available from: <https://www.thehindu.com/news/cities/chennai/M-R-vaccine-campaign-DPH-files-complaint-against-misinformants/article17298889.ece>. [Last accessed on 2019 Feb 06].
- World Health Organization. Vaccination Coverage Cluster Surveys: Reference Manual. Published 2018. Available from: <https://apps.who.int/iris/bitstream/handle/10665/272820/WHO-IVB-18.09-eng.pdf?ua=1>. [Last accessed on 2019 Feb 06].
- Corsi DJ, Bassani DG, Kumar R, Awasthi S, Jotkar R, Kaur N, *et al*. Gender inequity and age-appropriate immunization coverage in India from 1992 to 2006. BMC Int Health Hum Rights 2009;9. doi: 10.1186/1472-698x-9-s1-s3.
- Hwang S, Lim H. Barriers and motivators of influenza vaccination uptake among primary healthcare workers in Singapore. PoSH 2014;23:126-33.
- World Health Organization. School-based immunization. Available from: https://www.who.int/immunization/programmes_systems/policies_strategies/school_based_immunization/en/. [Last accessed on 2019 Feb 6].
- Forshaw J, Gerver S, Gill M, Cooper E, Manikam L, Ward H. The global effect of maternal education on complete childhood vaccination: A systematic review and meta-analysis. BMC Infect Dis 2017;17:801.
- Devasenapathy N, Ghosh Jerath S, Sharma S, Allen E, Shankar A, Zodpey S. Determinants of childhood immunisation coverage in urban poor settlements of Delhi, India: A cross-sectional study. BMJ Open 2016;6:e013015.
- Majdzadeh R, Moradi A, Zeraati H, Ghajarieh Sepanlou S, Zamani G, Zonobi V. Evaluation of the measles-rubella mass vaccination campaign in the population covered by Tehran University of Medical Sciences. East Mediterr Health J 2008;14:810-7.
- Gargano LM, Herbert NL, Painter JE, Sales JM, Morfaw C, Rask K, *et al*. Impact of a physician recommendation and parental immunization attitudes on receipt or intention to receive adolescent vaccines. Hum Vaccin Immunother 2013;9:2627-33.
- Nischal T, Bhattacharya M. Utilization of immunization services in two districts of Haryana: Beneficiaries' perspectives. Health and Population-Perspectives and Issues 2013;36:45-6.
- Esposito S, Principi N, Cornaglia G. Barriers to the vaccination of children and adolescents and possible solutions. Clin Microbiol Infect 2014;20:25-31.
- Dubé E, Loberge C, Guay M, Bramadat P, Roy R, Bettinger J. Vaccine hesitancy. Hum Vaccin Immunother 2013;9:1763-73.
- Immunization Programme. National Health Mission, Tamil Nadu. Available from: <http://www.nrhmtn.gov.in/immunization.html>. Published 2019. [Last accessed on 2019 Mar 12].