Original Article

Influence of Sociodemographic Factors in Measles-Rubella Campaign Compared with Routine Immunization at Mysore City

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Abstract

Background: Vaccines are mostly delivered through routine immunization and catch-up campaigns. Measles-rubella (MR) campaign, one of the largest vaccination campaigns, was launched on February 8, 2017, in five states of India including Karnataka. **Objectives:** The objective of this study was to compare the association of various sociodemographic factors influencing routine immunization and MR campaign and to identify the reasons for nonvaccination. **Materials and Methods:** A cross-sectional study was done after the end of MR campaign, by interviewing parents of 147 children aged 9 months to 5 years in urban areas of Mysore. Sociodemographic factors and measles vaccination status by routine immunization and MR campaign were studied. **Results:** The coverage of measles vaccination by routine immunization and the MR campaign was 93.9% (138/147) and 86.4% (127/147), respectively. While communication with field workers was significantly associated with both routine immunization and the MR campaign, religion and mother's educational status were associated with MR campaign ($P < 0.05$). The most common reason for not being vaccinated was lack of unawareness about the campaign and the location for vaccination which could have been curbed by health education. **Conclusions:** The study has shown that there are many factors which can be prevented by the health system that might help in improving immunization coverage.

Keywords: Child, immunization programs, measles, rubella, vaccination coverage

Introduction

Vaccines are the most powerful, cost-effective measures for the prevention of a number of diseases.[1] In 1974, the WHO launched its "Expanded Programme on Immunisation."[2] The Universal Immunisation Programme was started in India in 1985.[3] India has the world's largest annual birth cohort, and over 9 million sessions are held every year.[4] India also reports one of the lowest immunization rates of any country in the world.[5]

The high level of herd immunity is required for the elimination of measles and rubella.[6] While India has made a significant progress in child survival, measles is one of the leading causes of child death.[7]

One dose of measles vaccine was included in the Universal Immunisation Programme in India since 1985. In 2010, India introduced the second dose of measles-containing vaccine. The national routine measles vaccination coverage is 81%.[8] The first phase of measles-rubella (MR) campaign was launched in February 2017.[9]

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Full immunization coverage in Karnataka was 59.8% in urban areas.[10] The coverage of measles vaccination in urban areas of Karnataka was 80.7%;[11] however, in rural part of Mysore district, the coverage of measles vaccination was 95.2%, and in urban parts of Mysore district, the coverage was 93.4%.[12] The coverage of MR campaign in urban areas of Mysore taluk (one of the seven taluks of Mysore district) was 94% (as informed by the Reproductive and Child Health [RCH] office). Understanding the sociodemographic factors provides an inclination toward highlighting the attitude of the people toward MR campaign, and hence, the information can be utilized in view of similar future campaigns. The difference in impact of factors on MR campaign and routine immunization helps in

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addressing the issues and improving coverage. The study aimed to compare the association of various sociodemographic factors of measles vaccination through MR campaign with routine immunization and to identify the reasons for nonvaccination.

Materials and Methods

A cross-sectional study was done after the end of the MR campaign from April to September 2017 among 147 children aged 9 months to 5 years in urban areas of Mysore. The sample size is calculated with 90% coverage (report by RCH office on MR campaign coverage – February 28), with confidence interval of 95% and absolute error of 7% and design effect as 2. There are 21 urban primary health centers (PHCs) and 65 wards in Mysore city,[13] and all the 21 urban PHCs were taken. The sample size was equally distributed among the PHCs (seven each). One ward was selected randomly from each PHC, and seven houses with children in the specified age group (9 months–5 years) were selected by simple random sampling using lottery method after obtaining the required sampling frame of households having under-five children (Pulse Polio campaign) from the field workers.

Questionnaire and data collection

After obtaining ethical clearance and informed consent from the parents, relevant information was obtained using a semi-structured questionnaire. All parents with children of the specified age group were interviewed. Parents having children with any contraindication for vaccination were excluded. In case of more than one child in the specified age group, the youngest child was considered.

The questionnaire consisted of sociodemographic factors and health-care utilization. Good interpersonal communication and less interpersonal communication with field workers based on response of the parents were also considered.

Only measles immunization status through routine immunization and MR campaign was assessed. This was done by recall method. Observation of Mother and Child Protection Card (Thayi card) and MR vaccination card was also done. A child was considered vaccinated if the child had been vaccinated against measles up to date.

Data analysis

Data were analyzed by Statistical Package for the Social Sciences 25.0 (South Asia Private Limited, Bangalore, Karnataka, India). Descriptive statistics, Chi-square test, Fisher's exact test, and binary logistic regression models were used appropriately.

Results

Sociodemographic factors and health-care utilization

Most of the children were above 2 years of age (74.9%), and male and female children were equal in proportion (48.3% and 51.7%, respectively). Most of them belonged to Hindu religion (75.5%). Only 17% of fathers and 11.6% of mothers of the children were illiterate. Schooling as the highest attained educational status was by 55.8% of the fathers and 58.5% of the mothers. Most of the fathers were working in unorganized sector (78.9%), whereas 93.9% of the mothers were homemakers. Majority of the families had a per capita income of <2000 rupees (76.1%) and were using government health facilities (76.2%) for ailments. Distance to the nearest government immunization center was <1 km for 69.4% of the households.

Vaccination status and reasons for nonvaccination

We observed the immunization cards but only 99/147 children (67.3%) had Mother and Child Protection card to assess the status by routine immunization. Only 44/147 children (29.9%) had MR vaccination card at the time of interview. Since the percentage of children with immunization cards was low, we assessed the vaccination status only by recall method.

The coverage of measles vaccination by routine immunization and MR campaign was 93.8% (138/147) and 86.3% (127/147), respectively as in Table 1. Of the total 147 children, 20 of them (13.6%) were not vaccinated by MR campaign, whereas 9 children (6.2%) were not vaccinated against measles by routine immunization. The number of children who had been immunized by both was 82.3% (121/147) and by either routine or MR campaign was 98% (144/147).

There were six children (4%) who had not received measles vaccination through routine immunization but by MR campaign. These children had not been immunized up to date because of lack of awareness. There were three children (2.1%) who had neither taken measles vaccination through routine immunization nor MR campaign. One reason was there was no one to take the child for vaccination due to death of the father. Another had a travel history, and the health workers could not contact. The third child's parent replied that, due to religious reasons, they would not vaccinate the child.

Among the 20 children who had not been vaccinated by MR campaign, the reasons were sick child (5 children), unawareness of the need for vaccination (5 children), fear of adverse reactions (3 children), resistant families (3 children), no one contacted (3children) and no one to take the child for vaccination (1 child).

Comparison of the association of various factors

Religion, mothers educational status, and communication with field workers were statistically significant with vaccination by MR campaign, whereas distance to the government immunization center and communication with field workers were statistically significant with vaccination by routine immunization, as given in Table 2. Results of binary logistic regression using significant variables as predictors show that Hindu religion, mothers' education of schooling and above, and good communication with field workers were significant predictors of vaccination by MR campaign, whereas distance of more than 1 km to the nearby government vaccination center and good communication with field workers were significant predictors of vaccination against measles by routine immunization, as shown in Table 2.

Discussion

Mass vaccination campaigns are considered an important strategy to increase vaccine coverage. In the study, the coverage of MR campaign was 86.3% which was low as compared to a study in Bangladesh.[14] In a study in China, the overall coverage by mass measles campaign was 77%.[15]

The coverage of measles vaccination (93.8%) was higher when compared to other studies.[16] MR campaign had provided a second chance for six children to be vaccinated against measles.

Religion and mother's education were significantly associated with MR campaign, which was comparable to studies in Delhi.[17,18] There was antivaccination propaganda during the campaign which might have affected the immunization coverage.[19]

Communication with field workers was significantly associated with vaccination, but interpersonal communication with caregivers was very low in a study by Uddin *et al*.[14] Another study in Brazil showed that most of the people relied on the health staff for children's vaccination.[20]

The most common reason for nonvaccination by routine immunization was lack of awareness which was comparable to other studies.[21] The most common reasons for nonvaccination under MR campaign – lack of awareness and sickness of the child – were comparable with similar studies.[14]

To achieve herd immunity, 95% coverage by MR campaign was recommended, and in the study, the coverage of the campaign in the study area was slightly less to achieve the herd immunity. If the reasons such as unawareness of the need for immunization, resistant families, no one contacted, and fear of adverse reactions were prevented, the vaccination coverage would have been 141/147, that is, 95.7% which was sufficient to achieve herd immunity. These factors have to be considered in future campaigns.

Communication by the field workers has to be strengthened further which can overcome barriers that hinder the vaccination campaigns. Involvement of the religious leaders during the precampaign phase to create awareness in the community will help in removing the various misconceptions of the people.

The main limitation was that the study was done during 6 months after the MR campaign in Mysore district which might have led to recall bias.

Table 1: Comparison of measles immunization status

	Routine immunization		Total
	Vaccinated (%)	Not vaccinated (%)	
MR campaign			
Vaccinated	121 (82.3)	6 (4)	127 (86.3)
Not vaccinated	17 (11.5)	3 (2.1)	20 (13.6)
Total	138 (93.8)	9 (6.2)	147

Conclusions

MR campaign had increased the coverage of children immunized against measles, and understanding the factors, especially the role of field worker in the campaign, will help in strengthening the communication and in achieving an increase in immunization coverage.

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Table 2: Comparison of the association of the factors*

	Total number	Children vaccinated by MR campaign (%)	*P*	AOR (95% CI)	Number of children vaccinated against measles by routine immunization (%)	*P*	AOR (95% CI)
Religion							
Hindus	111	101 (91)	0.004	3.8 (1.3-11.4)	105 (94.6)	0.524	1.32 (0.29-5.9)
Muslims	36	26 (72.2)		1	33 (91.7)		1
Mother's education							
Illiterate	17	11 (64.7)	0.007	1	15 (88.2)	0.335	1
Schooling	86	74 (86)		4.6 (1.2-16.6)	80 (93)		1.8 (0.3-10.9)
Above 10th	44	42 (95.5)		11.2 (1.8-70.3)	43 (97.7)		5.2 (0.4-64.2)
Distance to the nearest government vaccination center (km)							
Below 1	102	85 (83.3)	0.263	1	93 (91.2)	0.04	1
Above 1	45	42 (93.3)		2.2 (0.1-4.7)	45 (100)		5.25 (1.11-24.7)
Communication with field workers							
Good	132	118 (89.4)	0.002	5.8 (1.6-20.9)	126 (95.5)	0.018	4.8 (1.0-22.4)
Less	15	9 (60)		1	12 (80.0)		1

*Only significant results are shown. AOR: Adjusted odds ratio, CI: Confidence interval

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Conflicts of interest
There are no conflicts of interest.

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