Innovative Methods to Overcome Barriers and Improve Immunization Coverage: A Comparative Study in Two Wards of Ahmedabad City

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Abstract:

Introduction: Immunization is one of the most cost effective public health interventions since it provides direct and effective protection against preventable morbidity and mortality. **Objectives**: To identify the challenges and barriers associated with immunization coverage. Also to implement innovative strategies to overcome these challenges before session of Intensified Mission Indradhanush (IMI) and compare the coverage levels in areas with versus without use of innovative methods. **Method**: Two slum areas were selected from the South zone of Ahmedabad Municipal Corporation (AMC) and out of those one was from UHTC of AMC MET Medical College which was the intervention area in this study. Families with incomplete immunization of children <2 years were included in the study. In intervention area, personal visit by investigator, one to one health education, mobile reminders and support of local influencers was taken to increase the coverage. Data of both the areas were collected in a pre-designed and pre-tested proforma and analysed. Qualitative analysis of reasons for not accepting immunization services was also carried out. **Results**: Coverage of BCG, fIPV 1, OPV1 and Pentavalent-1 was 100% in both the areas. Coverage of OPV2 and Pentavalent-2 was 100% and 57% in intervention and non-intervention areas respectively. Overall coverage of all other vaccines was more in the UHC Isanpur which was the intervention area. Further even in the non-intervention area, more experience of ASHA was significantly associated with better coverage. Qualitative analysis revealed not informed about IMI round, fears and religious beliefs etc. as reasons for not accepting immunization services. **Conclusion**: Personal visits, Involvement of community leader, Motivation and mobile reminders about the round of IMI was highly effective in improving coverage of IMI from due list.

Key words: Intensified Mission Indradhanush, Immunization coverage, Motivation, Reminders, Vaccines.

Introduction:

The benefits of immunization are not restricted to improvements in health and life expectancy but also have the social and economic impact at both community and national levels. Global vaccination coverage – the proportion of the world's children who receive recommended vaccines – has remained the same over the past few years. During 2017, about 85% of infants worldwide (116.2 million infants) received 3 doses of diphtheria-tetanus-pertussis (DTP3) vaccine, protecting them against infectious diseases that can cause serious illness and disability or be fatal. By 2017, 123 countries had reached at least 90% coverage of DTP3 vaccine. [1] The 2018 Global Vaccine Action Plan report highlights that without sustained attention, hard-fought gains can easily be lost. Where children are unvaccinated, outbreaks occur and diseases that were eliminated become endemic once again.[2]To strengthen and re-energize the programme and achieve full immunization coverage for all children and pregnant women at a rapid pace, the Government of India launched "Mission Indradhanush" in December 2014. The ultimate goal of Mission Indradhanush is to ensure full immunization with all available vaccines for children up to two years of age and pregnant women. The Government has identified 201 high focus districts across 28 states in the

country that have the highest number of partially immunized and unimmunized children. To further intensify the immunization programme, Intensified Mission Indradhanush (IMI) was launched on October 8, 2017. Through this programme, Government of India aims to reach each and every child up to two years of age and all those pregnant women who have been left uncovered under the routine immunization programme/UIP. The special drive will focus on improving immunization coverage in select districts and cities to ensure full immunization to more than 90% by December 2018. Through UIP, Government of India is providing vaccination free of cost against vaccine preventable diseases include diphtheria, pertussis, tetanus, polio, measles, severe form of childhood tuberculosis, hepatitis B, meningitis and pneumonia (Hemophilus influenza type B infections), Japanese encephalitis (JE) in JE endemic districts with introduction of newer vaccines such as rotavirus vaccine, IPV, adult JE vaccine, Pneumococcal Conjugate Vaccine (PCV) and Measles-Rubella (MR) vaccine in UIP/National Immunization Programme.[3] To improve immunization coverage, most interventions that are part of the national immunization program in India address supply-side challenges. But, there is growing evidence that addressing demand-side factors can potentially contribute to improvement in childhood vaccination coverage in low- and middle-income countries. Participatory engagement of communities can address demand-side barriers while also mobilizing the community to advocate for better service delivery.[4] Evidence shows that unvaccinated and partially vaccinated children are most susceptible to childhood diseases and disability, and run a three to six times higher risk of death as compared with fully immunized children. There are wide variations in the proportion of unvaccinated and partially vaccinated children within states and districts. The latest NHM data shows that 86.9% children are fully immunized in Gujarat. [5] There is a long list of other challenges to India's immunization program. These include a shortage of trained personnel to manage the program at both the national and state levels; the need to undertake innovations in vaccines, disease surveillance, vaccine procurement, and effective vaccine management; the absence of good data on disease burden to inform vaccination priorities; the lack of baseline surveillance data for monitoring the effects of vaccination; and the absence of a system of routine reporting and surveillance. Challenges to improving coverage also lay on the demand side—that is, the degree to which individuals do their part to be vaccinated. Poor education levels, which are consistently correlated with the likelihood that individuals will not complete vaccination schedules, pose a major barrier to expanding vaccination rates in rural areas. Adverse events following immunization, even when these are shown to be unrelated to a vaccine, have been widely reported in the Indian news media and have contributed to a culture hostile to vaccination in certain Indian communities. Better communication about the benefits of vaccines and the potential but typically harmless side effects, such as sore arms and low-grade fevers, could greatly boost confidence in vaccines and the immunization program.[6]

In view of all this, the present study was carried out to identify the reasons for non and/or poor immunization, motivating the beneficiaries for acceptance of the immunization services by clearing their myths, sending them mobile reminders for the IMI session and increasing the participation by the involving community influencers for improving the coverage. Also the role of focused micro-planning was explored for improvement in the coverage levels.

Method:

A mixed methods interventional comparative study with qualitative component was carried out amongst children below 2 years of age who were in due list of immunization for IMI session atAMC's Urban Health Centers (UHC) Isanpur (UHTC of our institute) and Behrampura UHC (which was randomly selected out of all UHCs of South Zone of AMC) during the IMI round of November 2017. All the children in the due list of visited UHCs were included except mobile booth children. Study was carried out from 1st November to 15th November 2017. One week before IMI round due list of children was obtained from urban ASHA workers. Additionally, in our interventional area which was Isanpur UHC

following interventions were carried out:

- Personal visit was done by investigator to each of these families and an attempt was made to understand the reasons for refusal of immunization for their children. Families were cleared about their myths and fears related to vaccination and were on the spot educated about benefits of vaccination.
- Mobile number of a person from each family was noted down and they were reminded about vaccination, exact place and time of immunization session. This was done one day prior to IMI round.
- During house to house visit in intervention area, we came across four unimmunized children whose name was not in due list prepared by the health worker. So we asked ASHA to add them too in due list and motivated them to attend IMI session.
- Four community leaders were identified and they were requested to motivate families about benefits of vaccination. Community leaders personally visited all the houses of children whose families refused to vaccinate their children to remind them about visit in IMI session one day prior to IMI round.
- We tried to build positive rapport and trust between vaccine provider, community leaders and parents.

Predesigned and pretested proforma was used for data collection at both UHCs.

Additionally a semi-structured questionnaire for the personal interview of mother/ father/ grandmother/grandfather of the child in the family was also prepared for the purpose of qualitative analysis. During the interview responses given by all of them were noted down as common attitude of the whole family towards immunization of children of the family. At the end of IMI session data was compiled, analysed & compared. Qualitative analysis of the reasons for non-immunization which came forward during the process of intervention was also done.

Results:

Table 1: Coverage of different vaccines at Isanpur and Behrampura UHCs

Sr. No	Name of vaccine	UHC Isanpur			UHC Behrampura		
		Number of children			Number of children		
		In due list	Covered during IMI	%	In due list	Covered during IMI	%
1	BCG	10	10	100	5	5	100
2	OPV1	10	10	100	5	5	100
3	Pentavalent1	10	10	100	5	5	100
4	fIPV-1	10	10	100	5	5	100
5	OPV-2	8	8	100	7	4	57
6	Pentavalent2	8	8	100	7	4	57
7	OPV-3	7	9	128	12	8	66
8	Pentavalent3	7	9	128	12	8	66
9	fIPV-2	7	9	128	12	8	66
10	Measels-1	9	11	122	7	4	57
11	DPT-B	1	1	100	16	6	37.5
12	Measels-2	1	1	100	16	6	37.5
13	OPV-B	1	1	100	16	6	37.5
	Total	35	39	111	47	27	57

At Isanpur UHC which was our intervention area, vaccine coverage of BCG, OPV 1, Pentavalent-1and fIPV-1 was 100% as all 10 children from the due list were covered during IMI session. At Behrampura UHC (non- intervention area) vaccine coverage of BCG, OPV 1, Pentavalent-1 and fIPV-1 was 100% as all 5 children of the due list were covered during session. At Isanpur UHC vaccine coverage of OPV-2 and Pentavalent-2 was 100%as all 8 children of due list were covered during session. At Behrampura UHC, vaccine coverage of OPV-2 and Pentavalent-2 was 57 % as only 4 children were vaccinated from due list of 7 children.

At Isanpur UHC, vaccine coverage of OPV-3, Pentavalent-3 and fIPV-2 was 128% as due list had only 7 children but as mentioned earlier, more eligible children were enrolled by the investigator during the survey for the purpose of this study and hence 9 were covered during session . At Behrampura UHC, vaccine coverage of OPV-3, Pentavalent-3, fIPV-2 was 66 % as only 8 children were vaccinated from due list of 12 children. At Isanpur UHC, vaccine coverage of Measels-1 was 122% as 11 children were covered against the due list of 9 during session. The reason for the same is as explained earlier. At Behrampura UHC, vaccine coverage of Measels-1 was 57%as from due list of 7 children only 4 were covered during session. At Isanpur UHC vaccine coverage of Measels-2, DPT-B, OPV-B was 100% as there was one child in the due list and the same was vaccinated during session. At Behrampura UHC vaccine coverage of Measels-2, DPT-B, OPV-B was 37.5% as only 6 children were vaccinated from due list of 16 during session. At Isanpur UHC total vaccine coverage was 111% as 39 children were vaccinated from due list of 35 children. More than 100 % of vaccination coverage was because of interventional methods and additional registration of eligible children by the investigator during study. At Behrampura UHC total vaccine coverage was only 57% as only 27 children were vaccinated from due list of total 47 children. (Table 1)

There were 6 ASHA workers at each UHC which was included in the study. Mean age of ASHA in Isanpur was 42+ 3.2 year and mean age of ASHA in Behrampura was 34$\pm$ 4.96 years. This difference in age was statistically highly significant (t=3.320, p=0.0077) indicating that ASHA at Behrampura UHC were younger as compared to Isanpur.

Mean work experience of ASHA in Isanpur was 5$\pm$2.9 years whereas it was 3$\pm$0.89 years at

Table 2: Age and Experience of ASHA Workers in Isanpur & Behrampura UHCs

Variable	Isanpur UHC		Behrampura UHC	
Age (Years)	No.	Mean Age	No.	Mean Age
30-34	0	42$\pm$ 3.2 years	3	34$\pm$ 4.96 years
35-39	1		2	
40-44	4		1	
44-49	1		0	
Experience (in years)		Mean Experience		Mean Experience
0-2	1	5$\pm$ 2.9 years	2	3$\pm$ 0.89 years
2-4	1		2	
4-6	2		2	
6-8	1		0	
8-10	1		0	

Table 3 : ASHA's work experience Versus Vaccination coverage

Experience of ASHA (years)	Isanpur UHC		Behrampura UHC			
	No. of children		No. of children		Z value	P value
	As per due list	Covered	As per due list	Covered		
<4	9	11(122%)	19	8(42%)	1.7	0.008
≥4	26	28(108%)	28	19(68%)		

Behrampura. This difference in experience of ASHA was statistically not significant (t=1.61, p=0.1374). (Table 2)

When the coverage as per the experience of ASHA worker was analyzed for Behrampura UHC, there was statistically significant difference (p 0.008) with ASHA having more than 4 years of experience had more coverage as compared to ASHA having experience of less than 4 years. At Isanpur UHC, both categories had coverage more than 100%. (Table 3)

In the intervention area i.e. Isanpur UHC, during the visit by the investigator qualitative analysis revealed following reasons for non-receipt of the vaccines for their children by the families:

- Four families revealed that they were not contacted by the health worker regarding this IMI round hence they were not aware about the same.
- In one family the mother and grandmother of the child were having fear of fever after vaccination.
- In one family fear of occurrence of swelling at the site of vaccination was the reason for non-acceptance of vaccine for the child.
- In two families belief that child will get scared or get sick post vaccination was the reason.
- In five families mothers were illiterate and had no knowledge about the vaccination
- In two families there was perceived unaffordability and unawareness about free vaccination at government health facilities
- In one family there were cultural and religious beliefs due to which they were against vaccination of the children
- Three families said that there were rumors about vaccine contamination with chemical due to which they were not accepting the vaccines.
- Some families were ready for acceptance of oral vaccine but denied for injectable vaccines.
- In four families they were not getting female children vaccinated.
- One family refused to vaccinate child who was born after many miscarriages as that family believed that vaccination could negatively affect their child's health.
- Other reasons were lack of vaccine related education and misplaced immunization records (Mamta card/ private records). In majority of the families response was provided by mother, grandmother and grandfather. So they become influencers for the decision making regarding vaccination of the child in the family. However, all these issues were addressed during intervention by the investigators prior to IMI round.

Discussion:

The present Interventional comparative study with qualitative component was carried

out among Children below 2 years of age who were in due list of immunization for IMI session at AMC's UHC Isanpur (UHTC of our institute) and Behrampura UHC.PresentStudy used innovative methods like personal interaction, one to one health education, mobile reminders and reminders by the community influencers of the areas to overcome barriers in order to improve immunization coverage in a ward of Ahmedabad city. In another study by Debjani Berman et al District Level Household and Facility Survey-3 (DLHS-3) 2007-2008 data was used in exploring the quality of immunization in terms of month-specific vaccine coverage and barriers to access in West Bengal, India.[7] In a study by Ersin Uskun et al study of effectiveness of an intervention to increase knowledge of primary healthcare workers and vaccination coverage was done.[8] In present study one of the intervention method implemented was mobile reminder to parents of children. In another two studies, one by Peter G. Szilagyi et al and another by Jasim Uddinet al effect of Patient Reminder/Recall

Interventions on Immunization Rates was studied. [9,10] In present study another intervention method used was personal visit done by investigator to each of these families and motivation by respective community group leader and an attempt was made to understand the reasons for refusal of immunization. In study by Mira Johri et al personal home visits by volunteers and community mobilization were performed to promote acceptance of immunization.[11] Lack of adequate information from vaccine providers regarding the vaccination status of each child to whom they should administer the recommended vaccines can significantly influence vaccination coverage. In present study above barrier was found as one of the reason for non-immunization. In another three studies same reason was found to be a barrier in low immunization coverage. [12-14]

Low immunization rates in India are due to reasons such as lack of awareness among parents about the benefits of vaccination, fear of Adverse Events Following Immunization (AEFI), cultural diversity (with various religions, languages, traditions, beliefs and customs) mothers literacy, gender equity etc. In present study all these factors like Cultural and Religious beliefs, gender equity, false rumors about vaccine contamination with chemical, lack of vaccine related education, was found as reasons for refusal of vaccination. In study done by Devasenapathy N et al all the above factors were found for low immunization coverage in urban poor settlements of Delhi. [12]

Experience and well trained health worker plays important role to deliver immunization services efficiently. In our present study experience of workers played a significant role in immunization coverage. In study done by Ersin Uskun et all intervention to increase knowledge about immunization in primary health workers played a significant role to increase immunization coverage.[8] In the present study the local community influencers were sensitized to give reminders to the families about IMI round. Similarly in a study by J.P. Montgomery et al it was concluded that community leaders can be tremendously useful to health care providers, especially when it comes to improving vaccination coverage. [15] Multicomponent interventions strategies that use a combination of techniques to improve immunisation uptake are helpful to increase immunization coverage. In present study in our intervention area vaccination coverage was found to be more than 100% because of multiple interventions applied. In study by Nia Williamset al Health education programme including mass media campaign and distribution of immunization guidelines and updates , reminder cards plus educational posters in

examination rooms reported a statistically significant difference in immunization rate.[14]

Conclusion:

On the demand side of immunization services, personal visit by health care workers, specific health educational interventions aimed at improving vaccination by removing fears and myths related to vaccination amongst parents proved to be beneficial. Motivation by community leader played a crucial role in convincing the people about the need of immunization for their children. Reminder by mobile played very important role to increase the immunization coverage. Since many complex factors contribute to low immunisation rates, area specific combination of interventions will be required to improve immunisation coverage.

Recommendations:

Immunization service delivery is a complex process that can encounter barriers at many stages. Further, vaccine preventable diseases are still endemic or epidemic in India. Underlying issues need to be identified and addressed in order to improve vaccination coverage of India's children. Adoption of specific interventions for resistant areas has to be done often by involving local community influencers.

Declaration:

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