Original Research Article

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Closing the immunity gap through the strategy of intensification of routine immunization using the offline tool immunogram and supportive supervision - experiences from the rural health training centre of KVG medical college, Karnataka, India

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ABSTRACT

Background: Since the inception of EPI in 1978, India is consistently trying to achieve and sustain high vaccination coverage. The objectives were to detect population immunity gap in the catchment area of RHTC through the offline tool - immunogram and to evolve the shortest period required for closing this gap using immunogram and supportive supervision.

Methods: A short term interventional field study from December 2012 to April 2013 done in RHTC of KVG Medical College. Children born since 1st April 2010 were line-listed chronologically in the 'immunogram' which can both record vaccination data and measure programme indicators - hence the name. Data analyzed and baseline indicators obtained. Sustained Supportive Supervision provided was documented at the RHTC. The study ended on 31st March 2013 on clearance of the backlog coinciding with the launch of pentavalent - replacing DPT + HepB from 1st April 2013 in Karnataka.

Results: RHTC is a good performing planning unit with high baseline coverage; ~90% for primary vaccination. Significant impact was seen with measles 1, DPT/OPV booster dose and Measles 2nd dose which increased from 89 to 97%, 85 to 95% and 55 to 94% respectively in consecutive intensified regular sessions in 3 months.

Conclusions: Immunogram precisely detected the immunity gap in a good performing planning unit and rapidly closed the gap in just 3 months, realizing the theme of WHO world immunization week 2016 - close the immunization gap. The planning unit graduated from good to better forever.

Keywords: Immunogram, Population immunity gap, Supportive supervision, Vaccine preventable diseases

INTRODUCTION

Immunization is one of the most cost effective public health interventions; eradicated small pox in the past and now polio has been stopped in all countries except for 2: Afghanistan and Pakistan. It averts an estimated 3 million deaths annually. Despite the success, globally, in 2015 an estimated 19.4 million infants did not receive even basic routine immunization services and yearly ~1.5 million children die of VPD.1

Since the inception of EPI in 1978, India is consistently trying to raise and sustain the coverage ≥90% with 6 basic vaccines passing through UIP in 1985, CSSM in 1992, part of RCH in 1997 / NRHM in 2005, introduction of Measles 2nd dose in 2010.² Coverage is not uniform

among the states and among the districts within the state trickling down up to session sites. As per DLHS3 (2007-08) National average of DPT3 coverage was 71.5%, that of Karnataka was 84.8%.3 CES 2009 revealed 61% & 78% FIC Nationally and in Karnataka respectively as depicted in comparative Table1.^{4,5} 14 states had DPT3 coverage less than national average, hence India declared 2012-13 as year of IRI to achieve >90% coverage by rapidly clearing the backlogs under two year children: born since April 2010. Conducting additional 4 intensified IWs in 4 successive months was one of the key strategies.⁶ Author conducted IRI simulation study in 2012 in which "regular sessions were intensified" through IRI specific offline tool blended with supportive supervision and obtained unprecedented results. On seeing IRI model, ANMs of Peraje Sub-Centre demanded the same and also for studying the impact of the same strategy in a good performing planning unit - RHTC for which Karnataka State specific tool was evolved and termed "immunogram"

Objectives

- To detect population immunity gap in the catchment area of RHTC through the offline tool -'immunogram'.
- To evolve the shortest period required for closing this gap using immunogram and supportive supervision.

METHODS

Existing mother and child register helps in recording vaccination data and tracking the beneficiaries but cannot provide the required denominator / numerator and indicators comprehensively in one sheet for studying the progress and comparing the impact. The Rockefeller foundation awarded Karnataka for using MCTS as the top innovative programme of the year 2011, but it is having many shortcomings experienced by the ANMs. MCTS being online, its output depends on the quantity and quality of input. 65.53% of ANC data and 39% vaccination data of children were "MCTiSed" (uploading the data for making online) in 2012-13, depicting 34.47% ANCs and 61% of children as left-out.8 Hence offline tool "immunogram" was evolved for this study which can record the vaccination data and concurrently ANMs themselves can derive RI programme Indicators accurately, prepare session wise child specific duelist. RHTC is a good performing planning unit of Madikeri Taluk, Kodagu district, Karnataka state; attached to KVG Medical College for field practice. For making a template, Peraje SC with 3,862 populations was selected. 141 children born between 1st April 2010 and 31st Dec 2012 were chronologically line-listed in the Immunogram. Soon remaining 7 SC's adopted the tool through peer education.

Population of RHTC was 16, 880 with an annual target of 216 infants. 575 children born between 1st Apr 2010 & 31st Dec 2012 were line-listed session site wise for the entire RHTC. At the end of the study on 31st March 2013, total children were 629 i.e. 54 live births occurred in 3 months – on an average 18 per month; birth rate – 12.8, perfectly matching with the annual expected target of 216. This perfectness is attributable to the supportive supervision and the simplicity of the tool which inculcated sense of ownership of the programme and infused empowerment. ANMs shared Immunogram with AWWs / ASHAs for uniform data sharing and management.

These 3 Aces' meticulously registered and tracked the Pregnant Women and children. From Jan 2013, they started mobilizing the children for booster dose on completion of 16 months. Earlier ANMs used to mobilize on completion of 18 months. For reaching every child with every dose of antigen, session specific due list was prepared – one of the 2 key elements of present MI. The beneficiaries were contacted personally by the Aces' for IEC & IPC; mobilized to the regular session sites. Vaccination data were entered in the immunogram at the session sites, absentees were directed to the earliest sessions to the nearest sites convenient to the beneficiaries for attaining timely vaccination.

RESULTS

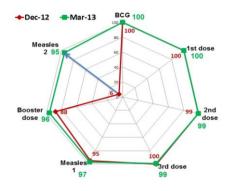
As per DLHS3 (2007- 08) National average of DPT3 coverage was 71.5%, that of Karnataka was 84.8%3. CES 2009 revealed 61% & 78% FIC Nationally and in Karnataka respectively depicted in the table below.

Both the Tables 2 and 3 and the Figures 1 and 2 depict very high baseline coverage of primary vaccination. Gaps in the booster dose and measles 2nd dose coverage was precisely detected by the immunogram and rapidly closed through sustained supportive supervision which intensified the regular sessions without incurring additional fatigue and financial burden.

Table 2 shows high coverage of primary vaccination and the significant impact of intervention on measles in Peraje Sub-Centre.

Table 3 shows high coverage of primary vaccination and the significant impact of intervention on measles 1, DPT/OPV booster and measles 2 of RHTC Sampaje.

After the intensification of regular sessions through immunogram and supportive supervision approach, coverage significantly enhanced from 88 to 96%; 85 to 95% for booster dose & 6 to 95% and 55 to 94% for Measles 2nd dose in Peraje SC and RHTC respectively. Baseline coverage of measles 1 of Peraje SC itself was high – 95% and that of planning unit increased from 89 to 97% - p<0.05 (Table 4).





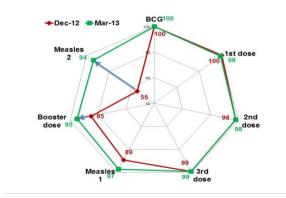


Figure 2: RHTC sampaje.

Table 1: Comparison of various survey data and study data.

	Surveys / Studies	FIC	BCG	DPT 1	DPT 3	Drop- out	Left- out	Measles 1	OPV Booster	DPT Booster
India	DLHS 3	54.0	86.7	82.0	63.5	19.0	4.5	69.5		
Karnataka	DLHS 3	76.7	96.9	95.0	84.8	10.2	0.7	85.2		
Karnataka	DLHS 4	77.6	97.2		88.6		1.4	89.6		
India	NFHS 3	43.5	78.1	76.0	55.3	20.7	5.1	58.8		
IZ 4 . 1 .	NFHS 3	55.0	87.8	86.7	74.0	14.7	6.9	72.0		
Karnataka	NFHS 4	62.6	89.2		72.7			80.7		
CES 2009	India	61.0	86.9	82.6	71.5	13.0	7.6	74.1	37.9	41.4
CES 2009	Karnataka	78.0	97.1	95.2	88.2	7.4	1.0	89.9	62.7	68.4
2012/13	IRI Study	93.0	100	99	98	1.0	0	93	86	86
2012/13	RHTC Study	97.0	100	99	99	0.0	0	97	95	95
India 2013-14	RSOC	65.3			74.8			78.9		
Karnataka 2013-14	RSOC	79.4			89.2			87.4		

Table2: Comparison of pre and post intervention indicators Peraje sub-centre (in %).

		BCG	1 st dose	2 nd dose	3 rd dose	Measles1	Booster	Measles 2
D	Target	141	131	126	124	98	64	62
Pre	Achievement	141 (100)	131 (100)	125 (99)	124 (100)	93 (95)	56 (88)	4 (6)
Post	Target	153	141	138	135	112	76	74
	Achievement	153 (100)	141 (100)	137 (99)	134 (99)	109 (97)	73 (96) p=0.061	70 (95) p<0.0001

Table 3: Comparison of pre and post intervention indicators RHTC (in %).

		BCG	1st dose	2nd dose	3rd dose	Measles1	Booster	Measles 2
Pre	Target	575	545	520	508	424	272	267
	Achievement	575 (100)	545 (100)	509 (98)	503 (99)	377 (89)	231 (85)	147 (55)
Post	Target	628	586	570	548	465	304	298
	Achievement	628 (100)	580 (99)	557 (98)	543 (99)	452(97) p<0.0001	289 (95) p<0.0001	281 (94) p<0.0001

^{1&}lt;sup>st</sup> dose/2nd dose/3rd dose = OPV/DPT/HepB; Booster = OPV/DPT.

Vaccine	Intervention	Vaccinated	Unvaccinated	Significance
Measles 1	Before (n=424)	377	47	24.2
Wieasies 1	After (n=465)	452	13	p < 0.0001
	Refore (n=272)	231	41	16.8

15 120

17

Table 4: Statistical test signifying the impact of intervention.

289

147

281

DISCUSSION

Booster

Measles 2

ANMs of Peraje SC rightly demanded IRI model though the district was not in the National list for IRI giving a scope for graduating further by precisely detecting the covert immunization gap even in a good performing planning unit and closing the gap in just 3 months.

After (n=304)

After (n=298)

Before (n=267)

World has witnessed the success stories of immunization programme; small pox was eradicated in the 'past'; polio is in the verge of eradication, left with only 2 endemic countries. Before measles vaccination, in1980's an estimated 2.6 million children died of measles which dropped to 114,900 by 2014, 79% reduction from that of 546,800 of 2000 attributed to rise in vaccination coverage of 12% from 73% in 2000 to 85% in 2014. Objective 2 of goal 3 of Sustainable Development Goals 2030 [SDG] aims to end preventable deaths and reduce <5 year mortality to at least 25 per 1000 live births per year. ¹⁰ Of an estimated 28.5 million <5yr deaths, 15 lakhs die of VPDs sharing >50%. ~4% is by measles alone. 11 We have to move faster than the VPDs killing our precious children.

Immunization coverage has grown by just 1% per year, reached 65.3% by 2013-14 from 61% of 2009. 12,13 Rise in coverage between DLHS3 (2008-9) and 4 (2013-14) was minimal in Karnataka: 76.7% to 77.6% and 79.4% as per RSOC; where as NFHS4 of 2015-16 revealed FIC of 62.6%, a drop by 15.4% compared to 78% of CES 2009 inspite of operating IRI since 2012-13 (Table 1).5,13-15 This low coverage is close to Afghanistan which is polio endemic. In 2013, >60% wild polio cases occurred in previously polio free countries. Syria which was polio free for more than 10 years had fresh outbreak in 2013 when vaccination coverage dropped from 90% to 60% ¹⁶. Outbreaks of pertusis and measles occurred in developed countries in 2012-13 with drop in coverage and undue delay in timeliness of vaccination.¹⁷ If this continues, Karnataka may face what Syria has faced and Afghanistan is experiencing. By the end of 2015, 85% of children had received 1 dose of measles vaccine by their second birthday and 160 countries had included a second dose as part of routine immunization and 61% of children received 2 doses of measles.¹ RHTC achieved >95% coverage both for Measles 1 and 2 in 3 months.

Thus, there is an urgent need for simpler, sustainable, replicable intervention to accomplish the objectives of GVAP by 2020. General tendency in public health for solving a long-standing problem is 'staging'. India is committed. Health ministry launched Mission Indradhanush (MI) on Good Governance Day- 25th Dec 2014, setting a target @ of 5% increase in coverage every year to achieve >90% by 2020. 12 But Both IRI and RHTC studies proved that through simple tool and approach, irrespective of the baseline status, the backlogs can be cleared and the population immunity gap can be closed within a short time. Jamatara district was listed for IRI in 2012-13 is out of MI list is an evidence of 'sustenance' through 'innovations' - 5th and 6th principles of GVAP; gracefully acknowledged by the District Chief Medical Officer. 18 BCG coverage rose from 89 to 98%, DPT 3 from 75 to 99%, measles 1st dose from 78 to 93%, DPT Booster from 58 to 86%, OPV booster from 44 to 85% and measles 2nd dose from 41 to 84% in the IRI study – all in 4 months, where as in RHTC study, measles 1st dose increased from 89 to 97%, booster dose from 85 to 95% and Measles 2nd from 55 to 94% - all in 3 months through intensification of regular sessions with marginalized budget irrespective of baseline coverage of antigen.⁷

p < 0.0001

p < 0.0001

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In HMIS, numerator and denominator are not cohort specific hence drop-out rate in Karnataka ranged from -23.81% to +23.97% for the year 2014-15. ¹⁹ This is fully addressed by immunogram since vaccination status of every child is line-listed, provides child/cohort specific indicators.

Supportive supervision is superior to fault finding monitoring and feedback.²⁰ Prior to doing this study the author had done a study on supportive supervision in an area near to the study setting with encouraging results.²¹

Spin off

On seeing the above dramatic results by the state authorities, between June and Nov 2013, Immunogram was scaled up and replicated in a difficult district of Karnataka - Chikkaballapur supported by KSHSRC. Ministry of Health and Family Welfare, Govt of India, in their 7th Common Review Mission report - Nov 2013, appreciated the state specific innovation "Chikkaballapur Immunogram pilot project" and recommended training of all Immunization field Volunteers²². Later in July 2014; on demand, 57 ANMs of 30 planning units of Kodagu district were trained as a part of regular RI training to implement Immunogram and is ongoing in this district.

CONCLUSION

Immunogram precisely detected the immunity gap in a good performing planning unit and rapidly closed the gap in just 3 months, realizing the theme of WHO world immunization week 2016 – close the immunization gap. The planning unit graduated from good to better forever.

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Institutional Ethics Committee

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