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Review Article

The evaluation of immunization coverage under mission Indradhanush: a review

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ABSTRACT

The government of India introduced mission Indradhanush (MI) to strengthen the routine immunization planning and delivery mechanism. It was launched on 25th December 2014 with an objective to achieve more than 90% full immunization (FI) coverage in the country. To evaluate universal immunization coverage, barriers encountered for not achieving the target and problem solving in removing the barriers. PubMed and google scholar were used to search the relevant articles. PRISMA tool was used for the review process and for inclusion of potential articles. The studies conducted in Manipur, Madhya Pradesh, Bihar and south Kerala reported successful achievement of MI goal. The minimum FI percentage was 57% and the maximum was 96.4%. The most common reason for not achievement of the goal was lack of awareness, illiteracy, child illness, fear of adverse effects.

Keywords: MI, Evaluation, Awareness

INTRODUCTION

India's immunization programme, launched in 1985, was one of the largest health programmes in the world. The programme provided vaccination against eight life-threatening diseases (diphtheria, whooping cough, haemophilus influenzae type B (Hib), tetanus, polio, tuberculosis, measles and hepatitis B) in the entire country.[1] After the introduction of the UIP there had been steady fall of infant mortality from 80 per 1000 live births in 1991 to 37 per 1000 live births in 2015 (SRS).[2]

As per NFHS-3, the immunization coverage in 12-23 months old children was 43.5% which has increased to 62% in NFHS-4.[3] On 25th December 2014 union health minister Mr. J. P. Nadda has introduced MI with an objective to achieve more than 90% FI coverage within the country, which would reduce immunity gaps and strengthen immunization coverage.[4]

According to immunization status estimated from routine immunization monitoring and MI data, it had been estimated that annually more than 70 lakh (7 million) children in the country did not receive all vaccines that were available under the UIP.[2] The first two phases of MI contributed to a rise of 6.7% points in FIC according to the integrated child health and immunization survey (INCHIS). Analysing the coverage trend and progress, it had been clearly understood that MI alone is going to be inadequate to reach the target of 90% FIC by December 2018. An intensified IMI was launched by the honourable prime minister in October 2017 to accelerate vaccination coverage and meet current gaps.[4,5]

The purpose of this review is to examine literature on MI. Specifically, seek to understand evaluation of universal immunization coverage, barriers encountered for not achieving target and problem solving in removing barriers.

METHODS

This paper is based on the literature review of assorted articles on MI. PubMed and other database were used to search the relevant articles. Process included assessment of literature using specific keywords such as MI, assessment/evaluation/analysis, awareness/knowledge.

Study selection

The study selection was done by using the PRISMA (preferred reporting items for the systematic review and meta-analysis) flow diagram to identify data included and excluded, and their rationale for exclusion.

The studies conducted within last five years related to awareness and utilization of MI, assessment of knowledge of care giver regarding immunization schedule in India were included. The studies were screened using their titles and abstracts then, the included studies were further thoroughly reviewed to select the potential articles.

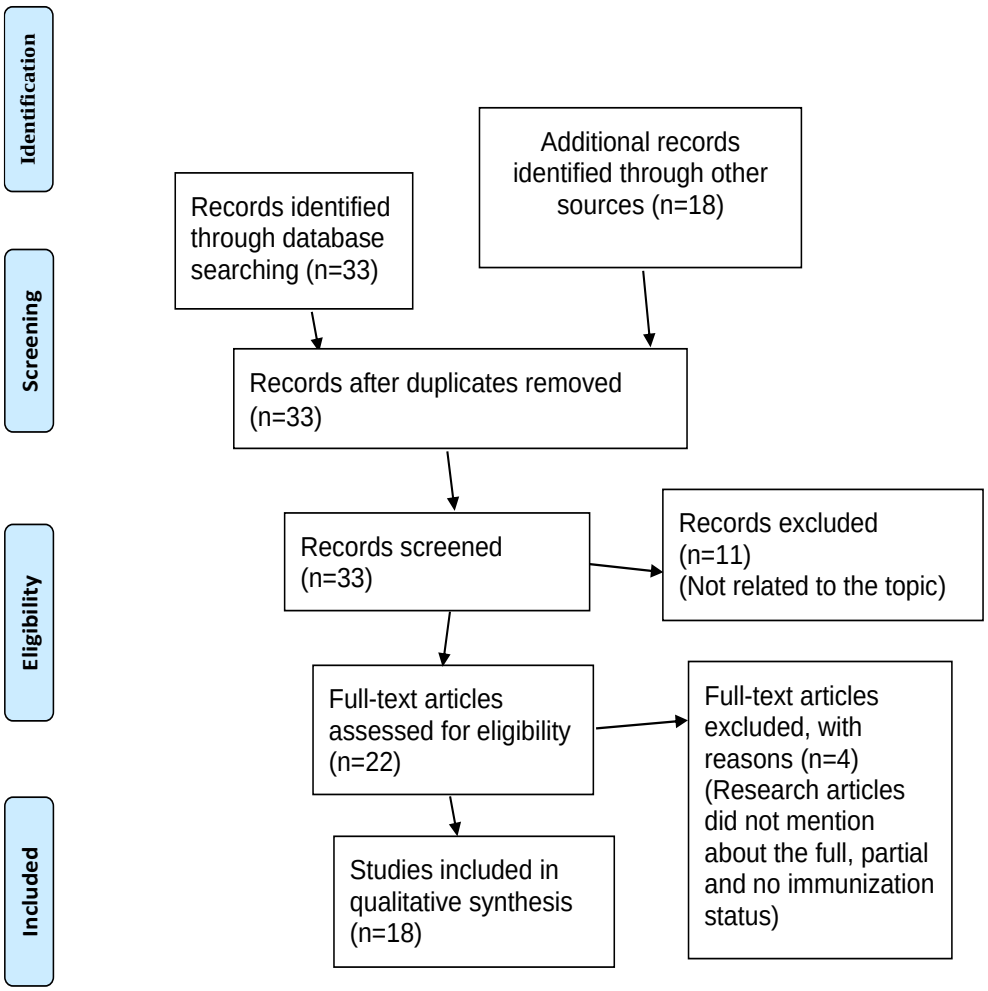

Figure 1: Prisma flow diagram.

RESULTS

Total 18 studies were reviewed. Most of the study participants belonged to the age group of 12-23 months. Out of 18 studies the minimum sample size was 100, considered in the studies conducted in Bhubaneshwar (urban slum) and Uttarakhand, maximum sample size was 108057 considered in district level analytical based study conducted in 601districts of India. Highest FI status was reported by south Kerala (96.4%) and lowest reported by study conducted in 601 districts of India (57%) (Table 1).

Coverage status for individual vaccine for different states

Out of 18 studies reviewed, coverage status for individual vaccination was given in 6 studies. Bihar has the highest BCG coverage (99.21%) followed by Manipur (98.6%), Telangana (96.7%) and Vellore (93.5%). The coverage of Penta (1, 2 and 3) and OPV (1, 2 and 3) was found highest in Manipur (98.6%). Telangana has reported highest measles coverage (96.7%) followed by Manipur (96.2%) and Bihar (92.5%) (Table 2).

Table 1: Immunization coverage status of various states.

Name of author	Title	Year of pub.	Type of study	Sample size	Age (month)	State	FI	PI	NI	Achieved/not achieved
Prinja et al[6]	District level analysis of routine immunization in Haryana state: implication of MI in universal immunization programme	2018	Analysis based study	11594	12-23	Haryana (district level analysis)	74.7	21	4.3	Not achieved
Murhekar et al[7]	Coverage of childhood vaccination among children aged 12-23 months, Tamil Nadu, 2015 India	2017	Cross sectional survey	3150	12-23	Tamil Nadu	79.9	17.7	0.3	Not achieved
Mohapatra et al[8]	A study on awareness and utilization of MI	2018	Cross sectional	100	12-23	Bhubaneshwar (urban slum)	72	28	NA*	Not achieved
Singh et al[9]	Coverage, quality and correlate of childhood immunization in slum under national immunization program in India	2019	Cross sectional study	550	12-23	Mumbai	73.1	23.8	3.1	Not achieved
Algotar et al[10]	Coverage evaluation of MI immunization programme in urban and rural communities of Ahmedabad district of Gujarat	2019	Cross sectional study	126	12-23	Gujarat (Ahmedabad)	74.5	15.18	9.52	Not achieved
Chavan et al[11]	Assessment of immunization coverage in paediatric population in Telangana	2019	Cross sectional study	122	0-23	Telangana	83.6	14.75	1.61	Not achieved
Kameshor et al[12]	Coverage evaluation survey of universal immunization program in north eastern India	2017	Cross sectional study	210	12-23	North eastern India (Manipur)	91.9	6.67	1.43	Achieved
Jain et al[13]	A study on MI programme under reproductive and child health among rural population of Tikamgarh district of Madhya Pradesh	2018	Descriptive study	204	0-24	Madhya Pradesh	91.2	8.8	NA*	Achieved
Gupta et al[14]	Determinants of immunization coverage in Lucknow district	2015	Cross sectional study	198	12-23	Uttar Pradesh (Lucknow)	74.7	11.1	14.1	Not achieved
Francis et al[15]	Vaccination coverage and factor associated with routine childhood vaccination uptake in rural Vellore, southern India 2017	2019	Cross sectional study	643	12-23	Southern India (rural Vellore)	84	NA*	NA*	Not achieved
Mugada et al[16]	knowledge towards childhood immunization among mothers and reason for incomplete immunization	2017	Descriptive obs study	377	<3 years	Andhra Pradesh (Kakinada)	69	31	NA*	Not achieved

Continued.

Name of author	Title	Year of pub.	Type of study	Sample size	Age (month)	State	FI	PI	NI	Achieved/not achieved
Shrivastava et al[17]	Predictor of vaccination India for children aged 12-36 months	2015	Analysis based study	108057	12-36	district level analysis of India (included 601 districts of 34 states)	57	31	12	Not achieved
Navaneeth et al[18]	Knowledge and perception regarding immunization among mothers of under five children: a community study from south Kerala	2020	Cross sectional study	140 (mother)	<5 years	South Kerala	96.4	3.6	NA*	Achieved
Singh et al[19]	Awareness attitude and utilization of universal immunization program with reference to MI Rudraprayag town	2020	Cross sectional study	100	12-23	Uttarakhand	76	22	2	Not achieved
Trushitkama et al[20]	Assessment of parent's knowledge, attitude and practice regarding child vaccination in rural area	2017	Prospective cross-sectional study	110	<5 year	Bangalore (rural area)	68.1	7.2	NA*	Not achieved
Singh et al[21]	Immunization coverage among children aged 12-23 months: a cross sectional study on low performing state of Bihar	2019	Cross sectional study	12331	12-23	Bihar	90.85	8.8	0.35	Achieved
Patidhar et al[22]	A cross sectional study to assess the awareness and satisfaction level among beneficiaries regarding MI in selected district of Indore division	2019	Cross sectional study	207 (care givers)	NA*	M.P (Indore)	NA*	NA*	NA*	NA*
Kaur et al[23]	Perceived barrier of child immunization among mothers of under five children in urban slum of Ludhiana city	2019	Descriptive study	200 mother	NA*	Ludhiana (urban slum)	NA*	NA*	NA*	NA*

*NA indicates not available.

Table 2: Coverage status for individual vaccine for different states.

States	BCG (%)	PENTA (1, 2, 3) (%)	PCV (1, 2, 3) (%)	OPV (1, 2, 3) (%)	Rota Virus (%)	Measles (1 dose) (%)
Bihar	99.21	97.37	42.8%	97.2	NA*	92.52
North eastern India (Manipur)	98.6	98.6	NA*	98.6		96.2
Gujarat (Ahmedabad)	85.71	73.96		70		74.65
District level analysis (India)	85.94	DPT (1, 2, 3) =70.78		Not given		71.22
Telangana	96.7	98.3		OPV and DPT 1st booster=93.4		96.7
Southern India (Vellore)	93.5	94.05		94.05		85.3

*NA indicates not available

Reason for partial/no immunization

Most common reason for partial and NI was lack of information/awareness (69.23%) followed by illiteracy, childhood illness, fear of adverse effects (30.76%) each, mother too busy (23.07%), unavailability of vaccination, religion disparity and vaccination site too far away from home (15.38%) each (Table 3).

Table 3: Reason for partial and no immunization (n=13).

Barriers	Frequency	Percentage (%)
Lack of information	9	69.23
Illiteracy	4	30.76
Child illness	4	30.76
Fear of adverse effects	4	30.76
Mother was too busy	3	23.07
Unavailability of vaccination	2	15.38
Religion disparity	2	15.38
Vaccination site too far from home	2	15.38

Solutions to overcome barriers

Most of the studies suggested that imparting health education to parents/guardians (58.33%) regarding importance of immunization, its benefits, immunization schedule will be helpful in achieving universal immunization coverage and will reduce drop outs rates. (33.33%) studies focused on strengthening IEC services. Few studies suggested that measures should be taken to increase institutional deliveries and active involvement of ASHA (accredited social health activist) workers (25%). (16.66%) studies concluded that education to health workers about correct vaccination schedule and need for adherence to the schedule is essential (Table 4).

Table 4: Solution to overcome the barriers (n=12).

Solutions	Frequency	Percentage (%)
Health education	7	58.33
Strengthening IEC	4	33.33
Promote institutional delivery	3	25
Active involvement of ASHA worker	3	25
Education to health worker	2	16.66

MI coverage status

Out of 18 studies,16 studies in which FI was reported were considered to assess the MI coverage status. Studies conducted in Manipur, Madhya Pradesh, South Kerala and Bihar reported successful achievement of 90% immunization coverage (Figure 2).

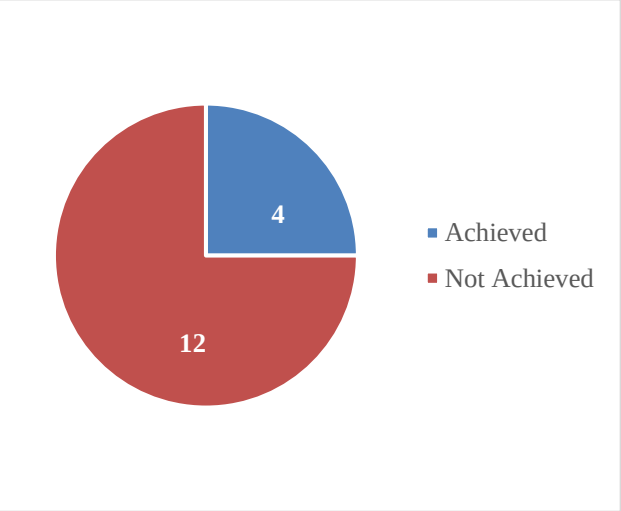

Figure 2: MI coverage status (n=16).

DISCUSSION

The national family health survey (NFHS-4) conducted during 2015-16, contains some key indicators that reflects the country's present status. The key indicators include infant and child mortality rates, maternal and child health, child immunization and vitamin A supplementation, child feeding practices, nutritional status and many more.[24] As per the analysis of NFHS-4, infant mortality rate (IMR) has reduced from 57 to 41 per thousand live births and a higher reduction has been seen in under-5-mortality rate from 74 to 50 per thousand live births. The state with the highest IMR was Uttar Pradesh (64 per 1000 live births) and that with the lowest IMR was Kerala (6 per 1000 live births).[3] At the national level, the percentage of children aged 12-23 months who were fully immunised (one dose of BCG, three doses of diphtheria, pertussis and tetanus (DPT) vaccine, and one dose of measles vaccine) increased by 18% points from 44% in 2005-06 to 62% in 2015-16.[24]

A study conducted in Bihar reported higher BCG (99.2%), OPV (1, 2, 3) (97.2%) and measles coverage (92.5%) which was comparatively higher than that reported in NFHS-4.[25] A study conducted in Ahmedabad district of Gujarat reported BCG coverage (85.7%) and measles coverage (74.6%) which was similar to the data reported by NFHS-4.[26] A district level analysis done in India reported BCG coverage (85.9%), DPT (1, 2, 3) (70.7%) and measles coverage (71.2%) which in contrast was lower than the NFHS-4 data fact sheet.[27] Similarly study conducted in Telangana reported BCG coverage (96.7%) which was similar to the NFHS-4 fact sheet, whereas measles coverage (85.3%) which was comparatively lower than the data reported by NFHS-4 fact sheet.[28]

All the sixteen studies reviewed for the evaluation of universal immunization coverage concluded that four states have achieved the MI goal that was Madhya Pradesh (91.2%), Bihar (90.85%), Manipur (91.90%) and South Kerala (96.40%). Some states have achieved more than 80% immunization coverage such as Telangana (83.60%) and Vellore (84%).[11-13,15,18,21]

Most common reason reported for partial and no immunization includes lack of information, illiteracy, childhood illness, mother too busy in their work, unavailability of vaccination at health centres, religion disparity and vaccination site too far away from home. A study conducted in Madhya Pradesh revealed that more than 90% of the children were completely immunized or fully immunized which were only 69% before the implementation of MI programme. Other than the most common barriers, this study focused on various other determinants such as myths about vaccination like impotency, disease and death, lack of interest of villagers towards vaccination and migration of villagers as a responsible factors for not availing 100% immunization.[13] A study conducted in south India (Vellore) mentioned that misplaced vaccination card on due date and unavailability of health care workers at the immunization site to record the date of immunization were also some of the other determinants for partial or no immunization.[15]

Most of the studies reported certain common solutions to remove barriers in achieving full immunization coverage such as promoting health education campaigns, strengthening IEC services related to MI program, promoting institutional deliveries, active involvement of ASHA worker in immunization awareness program and at immunization session site and education to health workers.

Apart from all these solutions, a study conducted in Lucknow (Uttar Pradesh) suggested that surveillance and referral system in the area needs to be reinforced so as to identify defaulters of immunization and to reduce dropout rates.[14] Whereas a study conducted in Mumbai emphasis on scaling up use of post-natal services and a study conducted in Madhya Pradesh suggested the need for intensive planning of immunization campaigns.[9,13]

A descriptive study conducted in urban slum of Ludhiana found that only 0.5% mothers had good knowledge regarding immunization, on contrary a cross sectional study conducted in south Kerala revealed, 48% of mothers had good knowledge.[18,23] A study conducted in Bangalore concluded 72.7% care givers had good knowledge, 21.8% had average knowledge and 5.40% have poor knowledge.[20]

Furthermore, a cross-sectional study conducted. in Madhya Pradesh (Indore) revealed,88% care givers were aware about immunization.[13] A cross sectional study conducted among 100 selected mothers in Rudraprayag town of Uttarakhand found that 97% mothers have adequate knowledge regarding immunization and vaccination whereas only 3% have inadequate knowledge.[19]

Strengths and limitations

The review has provided summary statistics of MI in last 5 years. Information related to number of immunization session planned under the program, evaluation of cold chain and logistics managements, human resource availability at the immunization session site were not included due to unavailability of the information in the selected articles.

CONCLUSION

The most common reason for not achievement of MI goal was lack of awareness, illiteracy, child illness and fear of adverse effects. Further research studies could be conducted to evaluate health system readiness for MI. This would be helpful in identifying the bottlenecks in implementation of the program and formulation of strategies to overcome it.

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