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Immunization in India: A systematic review of the programme

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Abstract

Immunisation is a vital component of public health it is the foundation of a healthy, productive population. Preventing infections reduces the burden on health systems, and a healthier population is a more productive one. Vaccines benefit not only infants, children, and pregnant women but also older people. India has the largest global immunisation program including vaccine coverage, new vaccines, vaccine hesitancy, advances in medical science, technological innovations, public-private partnerships, public health policies, and public awareness. Therefore Mission Indradhanush (MI) was launched by the Ministry of Health and Family Welfare (MoHFW), which is focused on covering children who are either unvaccinated or partially vaccinated against vaccine-preventable diseases. Universal Immunization Programme (UIP) provides to all children across the country free of cost to protect seven vaccine-preventable diseases such as Tuberculosis, Diphtheria, Pertussis, Tetanus, Polio, Hepatitis B etc. This study aimed to focus Universal Immunization Programme (UIP), Mission Indradhanush (MI), Objectives, implementation, strategy, intensified Mission Indradhanush (IMI), Intensified Mission Indradhanush (IMI) 2.0, Intensified Mission Indradhanush (IMI) 3.0, Intensified Mission Indradhanush (IMI) 4.0, and Intensified Mission Indradhanush (IMI) 5.0. It has helped save countless lives and will help save more if the 2030 Immunization Agenda (IA2030) goals are achieved.

Keywords: UIP, mission Indradhanush, objectives, implementation, IMI 2.0, IMI 3.0, IMI 4.0, IMI 5.0

1. Introduction

Immunization is the process whereby a person is made immune or resistant to an infectious disease, Vaccines stimulate the body's immune system to protect the person against later infection or disease. Immunization is a proven tool for controlling and eliminating life-threatening infectious diseases and is estimated to prevent between 2 and 3 million deaths each.

Year. Over the years various strategies to make vaccines available to all beneficiaries across the community area, including the most hard-to-reach and vulnerable populations, have saved countless lives. Each vaccine provides immunity against a particular disease; therefore, several vaccines are administered to children and women to protect them from many vaccine-preventable diseases (National Health Mission. Immunization Handbook for Medical Officers, 2018) ^[1]. World Immunization Day (November 10), is particularly significant due to the unique challenges the country faces in reaching remote areas. Further, children, in particular, remain at significant risk because are either unimmunized or partially immunized against vaccine-preventable diseases. Partially immunized and unimmunized children are most susceptible to childhood diseases and are at a much higher risk of dying as compared to fully immunised children (World Immunization Day 2024-PIB) ^[9, 10].

The World Health Organization (WHO) launched the Expanded Program on Immunization (EPI) in 1974 globally with a focus on the prevention of six Vaccine-Preventable Diseases in children by the year 2000. EPI was introduced in India in 1978 and was expanded in 1985 as the Universal Immunization Program (UIP), (Porchelvan *et al.*, 2023-24) ^[6]. Is one of India's most comprehensive public health initiatives, aiming to provide life-saving vaccines to millions of newborns and pregnant women each year? Currently, the program provides free immunization against 12 diseases, including nine nationwide, such as Diphtheria, Tetanus,

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Polio, Measles, and Hepatitis B. Additionally, it offers vaccines against Rotavirus diarrhoea, Pneumococcal Pneumonia, and Japanese Encephalitis in specific regions. Under this initiative, a child is considered fully immunized

(World Immunization day-2024-PIB)^[9, 10].

2. Universal Immunization Program

Table 1: Vaccine-preventable diseases under the Universal Immunization Program (Immunization Handbook for health workers, 2018)^[4]

Disease	Vaccine	Age	Dose	Rout	Site
Tuberculosis	BCG	From birth till one year	0.05 ml until 1 month/0.1 ml beyond age 1 month	Intradermal	Upper Arm
Hepatitis B	Hepatitis B	From birth/within 24 hours	0.5 ml	Intramuscular	Antero lateral side of mid-thigh-LEFT
Polio	OPV-0/OPV1,2 & 3	At birth to 6, 10 & 14 weeks or within 15 days to 5 years of age	2 drops	Oral	Oral
Diphtheria Pertussis Tetanus	Diphtheria Pertussis Tetanus	At 6,10 & 14 weeks to years of age	0.5 ml	Intramuscular	Antero lateral side of mid-thigh-LEFT
Diarrhoeas due to Rotavirus	Rotavirus	At 6, 10 & 14 weeks/1 year of age	5 drops	Oral	Oral
Pneumococcal	Pneumococcal conjugate vaccine (PCV)	At 6 to 14 weeks/1 year	0.5 ml	Intramuscular	Antero lateral side of mid-thigh-RIGHT
Measles/Rubella	Measles/Rubella – 1 st dose	At 9 completed months-12 months/5 years of age	0.5 ml	Subcutaneous	Upper-Arm-RIGHT
Japanese Encephalitis	Japanese Encephalitis-1	At 9 months-12 month	0.5 ml	Subcutaneous	Upper-Arm-LEFT

3. Mission Indradhanush (MI)

The Ministry of Health and Family Welfare (MoHFW), Government of India, launched Mission Indradhanush (MI) in December 2014 as a special drive to vaccinate all unvaccinated and partially vaccinated children under UIP with seven vaccines by utilizing the learnings from polio eradication to improve full immunization coverage (Porchelyan *et al.*, 2023-24)^[6]. Aiming to immunise children under two years and pregnant women against vaccine-preventable diseases, the program targets regions with the lowest immunization coverage. Employing a phased, multi-dimensional strategy, it emphasises community engagement, awareness campaigns, and technological integration for effective implementation. The program initially targeted seven diseases: diphtheria, whooping cough (pertussis), tetanus, poliomyelitis, tuberculosis, measles, and hepatitis B. In subsequent phases, vaccines for Japanese Encephalitis and Haemophilia influenza type B were also included (Singh, A. 2018)^[7].

3.1 Objectives of Mission Indradhanush

The main objective of Mission, Indradhanush is to ensure high coverage of children and pregnant women with all available vaccines throughout the country.

- Generating a high demand for immunization services by addressing communication challenges;
- Enhancing political, administrative and financial commitment through advocacy with key stakeholders; and
- Ensuring that the unvaccinated and partially vaccinated children are fully immunized as per the national immunization schedule

3.2 Implementation of Mission Indradhnush

Mission Indradhanush is a special immunization drive spread over 7 days, These 7 days do not include the routine immunization days planned in that week and the 7 days planned (in addition to routine Immunization days) for all ANMs in Districts. Every district should identify urban nodal officer(s) for planning and implementation of activities during Mission Indradhanush and routine immunizations (National

Health Mission. Immunization Handbook for Medical Officers, 2018)^[11].

3.3 U-Win Portal

The Government of India has launched the U-Win portal to provide a fully digitized record of vaccination for pregnant women and children from birth to 17 years under the Universal Immunization Programme. The digital platform aims at record-keeping, ensuring that every individual can easily access and manage their immunization records. The citizen-centric services of the digital platform include 'Anytime Access' and 'Anywhere' vaccination services, Self-Registration by citizens using the U-WIN web portal or the U-WIN citizen mobile application, automated SMS alerts, universal QR-based e Vaccination Certificate and utility to create their Ayushman Bharat Health Account (ABHA) ID for themselves and Child ABHA ID for their children. The portal is in 11 regional languages, including Hindi (Union Health Ministry in the First 100 Days of the New Government 2024)^[8]. As of September 16, 2024, the platform has registered 6.46 crore beneficiaries, conducted over 1.04 crore vaccination sessions, and recorded 23.06 crore administered vaccine doses. This scale of registration and record-keeping highlights U-WIN's impact in making immunization data readily accessible and securely stored for millions of families across the country (World Immunization Day 2024)^[9, 10].

3.4 Immunization Agenda (IA2030)

The Immunization Agenda (IA2030) sets an ambitious, overarching global vision and strategy for vaccines and immunization for the decade 2021–2030. It draws on lessons learnt, acknowledges continuing and new challenges posed by infectious diseases and capitalizes on new opportunities to meet those challenges. IA2030 positions immunization as a key contributor to people's fundamental right to the enjoyment of the highest attainable physical and mental health and also as an investment in the future, creating a healthier, safer, more prosperous world for all. IA2030 aims to ensure that we maintain the hard-won gains and also that we achieve more – leaving no one behind in any situation or at any stage of life (Immunization Agenda 2030)^[3].

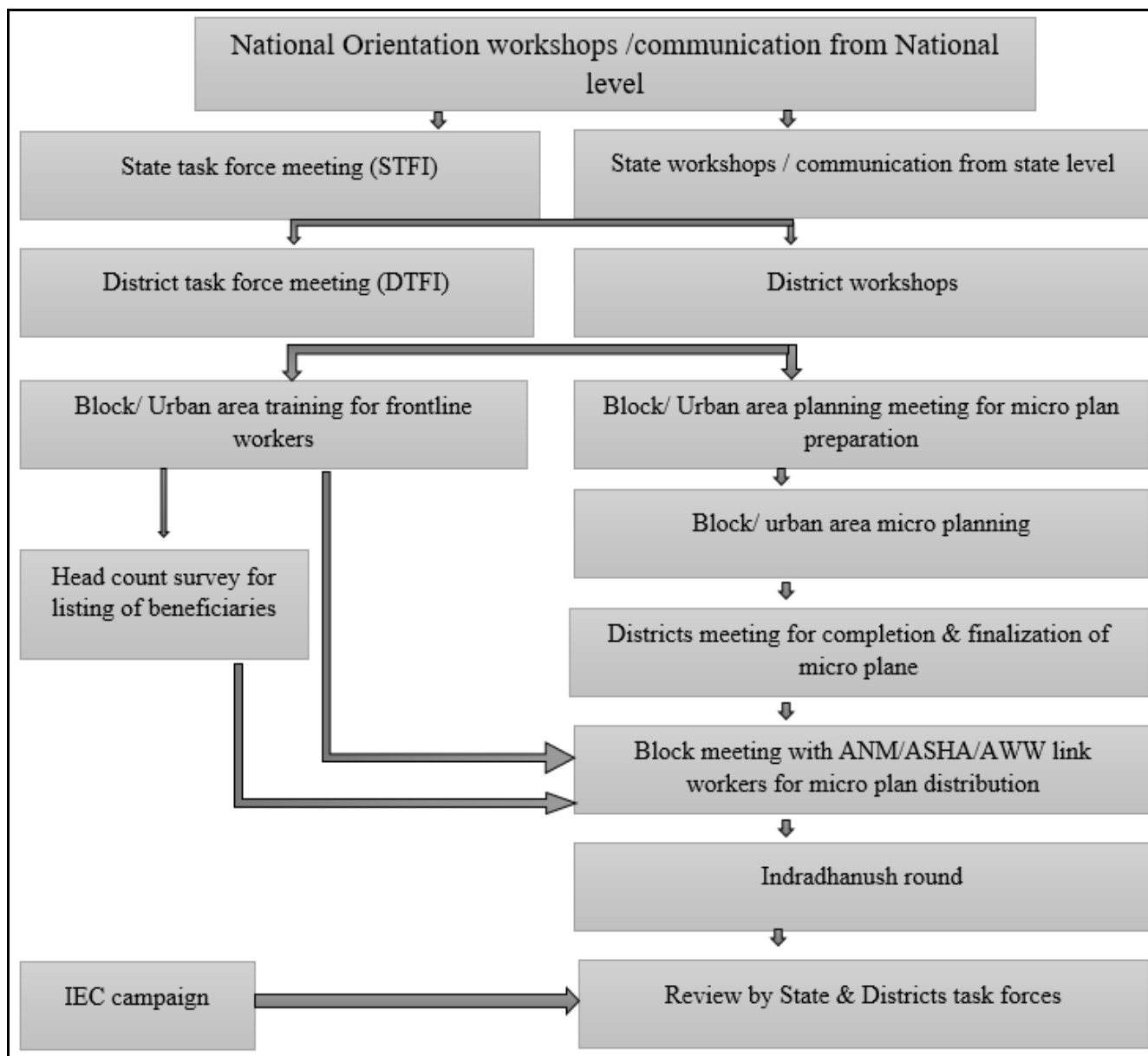


Fig 1: Steps of Mission Indradhanush implementation (Mission Indradhanush Operational Guideline 2016)

Table 2: Intensified programme & Portal under Mission Indradhanush (National Vaccination Day March 16, 2023) & (Intensified Mission Indradhanush 5.0 (IMI 5.0) Campaign 2023)

Sr. No.	Programme	Descriptions
1	Intensified Mission Indradhanush (IMI)	“Intensified Mission Indradhanush (IMI)” on October 08, 2017, to cover 121 districts, 17 urban areas and 52 districts of NE state (A total of 190 districts/urban areas across 24 states) for intensified immunization campaign. IMI was built on MI, using additional strategies to reach populations at high risk. It aimed to achieve 90% Full Immunisation Coverage (FIC) with a focus on districts, and urban areas with persistently low levels. IMI mobilise communities and deals with barriers to seeking vaccines.
2	Intensified Mission Indradhanush (IMI) 2.0	The Government of India introduced “Intensified Mission Indradhanush (IMI)” 2.0 in December 2019-march to ensure reaching the unreached with all available vaccines and accelerate the coverage of children & pregnant women in the identified districts and blocks. It is focused on full immunization coverage of 380 districts spread over 29 states.
3	Intensified Mission Indradhanush (IMI) 3.0	The Intensified Mission Indradhanush (IMI) 3.0, launched by the Central Government on February 19, 2020, focuses on children and pregnant women who missed their vaccine doses during the COVID-19 pandemic. 250 districts across 29 states/UTs were covered, and around 9.58 lakh children and 2.24 lakh pregnant women were vaccinated.
4	Intensified Mission Indradhanush (IMI) 4.0	The IMI 4.0 was launched on February 07, 2022. Under IMI 4.0, the immunization drives were conducted in 416 districts (including 75 districts identified for Azadi ka Amrit Mahotsav), Across 33 States/UTs in the country. A total of 59.99 lakh children and 15.31 lakh pregnant women were vaccinated under IMI 4.0.
5	Intensified Mission Indradhanush (IMI) 5.0	Intensified Mission Indradhanush (IMI 5.0), a routine immunization campaign of the Union Ministry of Health and Family Welfare will conclude all 3 rounds on 14 October 2023. IMI 5.0 ensures that routine immunization services reach the country's missed-out and dropped-out children and pregnant women. The IMI 5.0 campaign aims to enhance immunization coverage for all vaccines provided under the Universal Immunization Programme (UIP) as per the National Immunization Schedule (NIS). The special focus is on improving Measles and Rubella vaccination coverage with the aim of Measles & Rubella elimination by 2023 and using the U-WIN digital platform for Routine Immunization in pilot mode across all districts in the country.

4. Conclusion

In conclusion, this study has demonstrated an overview of immunization to protect infants' and pregnant women's health. India has the largest global immunisation program including vaccine coverage, new vaccines, vaccine hesitancy, advances in medical science, public-private and awareness. The government of India has launched many programs to boost the immune system to provide a healthy and hygienic life.

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