

EVALUATING THE IMPLEMENTATION OF THE IMMUNISATION WHEEL IN MADHYA PRADESH:

FRONTLINE WORKER PERSPECTIVES, FIELD ADAPTATION, AND ITS ROLE IN ENHANCING VACCINE UPTAKE AND COMMUNICATION

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Background

Immunisation is one of the most universally recognised cost-effective and impactful public health interventions, preventing an estimated 4.4 million deaths in children each year. Thanks to concerted global efforts since the World Health Organisation's Expanded Programme on Immunization (EPI) launched in 1974, vaccination coverage worldwide saw dramatic improvements through the late 20th century. As of 2023, coverage has only partially rebounded to 84%, still below pre-pandemic levels.

Beneath the global average lie stark inequities. Low-income countries continue to lag far behind high-income countries in vaccine access. India alone accounted for roughly 2 million zero-dose children in 2023 despite its high overall coverage (93% of its 22.7 million infants). This paradox—country achieving high coverage yet still having a large absolute number of unvaccinated children – underscores the immense birth cohort in India and the pockets of children missed by services.

India's Universal Immunisation Programme (UIP), launched in 1985, is one of the largest routine immunisation programmes in the world. With an annual target of around 26 million infants and 30 million pregnant women, and over 13 million vaccination sessions held each year, the UIP is an enormous undertaking in both scope and complexity.

The routine immunisation system in India relies on an extensive network of frontline health workers: Auxiliary Nurse Midwives (ANMs) who conduct vaccination clinics, and Accredited Social Health Activists (ASHAs) who undertake community mobilisation and tracking of beneficiaries. Achieving and sustaining high immunisation coverage is not merely a technical exercise of vaccine supply; it is equally a social endeavour.

India's progress has been impeded by several historical and persistent issues that cause children to be missed or to drop out partway through their vaccine schedule. These challenges, which are mirrored in many countries, include missed opportunities, dropouts between doses, health system limitations, and behavioural or demand-side barriers.

India has also contended with geographic and cultural diversity that affects immunisation. Remote rural areas, nomadic communities, conflict-affected regions, and urban slums each present unique challenges. Crucially, incomplete immunisation has real public health consequences. Children who miss vaccines remain vulnerable to life-threatening diseases, undermining India's ability to meet child mortality reduction goals. Addressing the causes of dropout and missed doses is not only about individual rights to health, but also about India's commitment to broader targets like the Sustainable Development Goals (SDG 3).

In sum, reaching that last 15–25% of children with all vaccines is essential for equity, for community protection, and for maximising the return on investment of India's immunisation programme.

In Madhya Pradesh (MP), a central Indian state with a large rural and tribal population, improving immunisation coverage has been a priority due to historically lower rates. Over the past decade, MP made commendable progress – full immunisation coverage of children 12–23 months increased from just 53.6% in 2015–16 to 77.1% by 2020–21. This leap of 23 percentage points was one of the largest among Indian states, attributable in part to Mission Indradhanush and state-led innovations. Yet, about one in five children in MP still does not receive all basic vaccines, and certain districts lag behind the state average.

Recognising that missed appointments and dropouts were a persistent challenge, especially in remote communities, the Government of Madhya Pradesh in collaboration with development partners sought an intervention to strengthen interpersonal communication and scheduling at the last mile. The result was the development of the "Immunisation Wheel," locally dubbed Tikakaran Chakra, an innovative job aid for health workers and a visual tool for caregivers, essentially like a circular vaccine calendar.

In Madhya Pradesh, as of 2023, the Immunisation Wheel initiative has been scaled up state-wide. The state government formally approved it as a part of the routine immunisation communication toolkit and began distribution across all districts, with orientation sessions for all ANMs and ASHAs. The Tikakaran Chakra exemplifies how a behaviour change communication tool, can support frontline workers and caregivers alike to bridge the last mile gap in immunisation. It transforms the abstracts chedule into a conversational piece at every immunisation encounter, reinforcing the message that full immunisation is the norm and expectation.

Madhya Pradesh's Immunisation Wheel initiative sits at the nexus of global best practices and local innovation. It addresses a clear need – reducing missed doses and dropouts – through a culturally appropriate, user-friendly solution. Keeping these complexities in mind, the present study has been designed to examine the use and implementation of the Immunisation Wheel (Tikakaran Chakra) in Madhya Pradesh as a behaviour change communication tool aimed at reducing immunisation dropouts and improving full immunisation coverage. The objective is to explore how this intervention is utilised by frontline workers such as ASHAs and ANMs, how it is perceived by beneficiaries, and what barriers and enablers exist in its routine usage. The larger purpose of this study is to comment on the effectiveness of the Immunisation Wheel as a model communication innovation within the broader Routine Immunisation programme, while identifying best practices, operational gaps, and contextual challenges that may hinder its scalability and long-term impact.

Literature review

S.no	Author (year)	Location of Study	source journal	Sample Size	Sampling Techniques	Findings
1	Singh P et al.(2020)	India	BMJGlobal Health	190 districts	Stratified cluster sampling	Demonstrates that focused, periodic intensification in routine immunisation using system-level strategies can yield measurable gains. Underscores the importance of demand-side and outreach innovations in addressing coverage gaps.
2	Shrivastwa N et al.(2015)	India (NFHS- 3)	Vaccine	10,000+children	Secondary data analysis	Using NFHS-3 data, this study identified predictors such as maternal education, antenatal care, and place of delivery as strongly correlated with full immunisation. Highlights the socio-demographic barriers to vaccine adherence. Places emphasis on frontline health workers' role in bridging knowledge gaps among vulnerable caregivers.
3	UNICEF/WHO (2023)	Global	WHO/UNICEF Joint Reporting Form	194 countries	Administrative data and surveys	Global administrative and survey data showed DTP3 stagnating at 84% and 18 million zero-dose children in 2022. South Asia achieved>90%, but absolute numbers remain high due to population size. The report highlights inequities in coverage, making the case for country-specific and locally tailored communication tools.
4	Gurnani V et al.(2018)	India	Vaccine	Narrative review	Narrative synthesis	Narrative review tracing the evolution of India's immunisation policies and programmes. Emphasises the expansion of the UIP and integration of new vaccines. Stresses the importance of frontline health worker engagement, communication tools, and outreach activities.
5	Waisbord S & Larson H (2005)	Global	WHOWorking Paper	Not applicable	Literature review	WHO-backed review arguing for investment in communication to support immunisation. Describes interpersonal communication, visual tools, and job aids as essential for vaccine acceptance and completion, reducing dropouts by simplifying schedules and encouraging informed caregiver engagement.

S.no	Author (year)	Location of Study	source journal	Sample Size	Sampling Techniques	Findings
6	Khan A et al.(2021)	Bangladesh, India & Pakistan	Human Vaccines & Immunotheraputics	6,500 caregivers	Multistage stratified sampling	Explored the behavioural and structural barriers contributing to immunisation dropouts in South Asia. Highlighted the idea that low knowledge retention and risk perception amplify dropout behaviour.
7	Balasubramanian S et al.(2021)	India (Uttar Pradesh)	Journal of Global Health Reports	400 mothers, 60 ASHAs	Mixed methods- household survey and interviews	Evaluated the role of Accredited Social Health Activists (ASHAs) in improving RI uptake. Analysis revealed that mothers who had been visited at home by an ASHA in the previous month were significantly more likely to have completed their child's schedule. Qualitative findings revealed that interpersonal communication, when reinforced with materials such as healthcharts or visual references, significantly increased trust and recall.
8	Patel M et al. (2020)	India (Madhya Pradesh)	Indian Pediatrics	20 ANMs, 350 children	Observational cohort study	Highlighted how structured tools improve not only planning but also communication between health workers and families, focusing on the utility of due lists and defaulter tracking for improving immunisation adherence. Documented immunisation coverage trends with and without consistent due list usage.
9	Lwanga J et al. (2019)	Uganda	BMC Public Health	180health workers	Cluster sampling	Studied the effect of visual job aids on immunisation counselling practices among health workers in Uganda. Demonstrated a 28% improvement in mothers' retention of vaccine due dates and a 16% increase in full immunisation compared to the control. Further, interviews revealed that visual materials were easier to understand for caregivers with low literacy, and improved caregiver-health worker dialogue.
10	Yadav K et al. (2019)	India (Haryana)	PLOS ONE	2,800 children	Household survey	Analysed the association between home-based immunisation records (HBIRs) and full immunisation coverage (FIC). Demonstrated that children whose caregivers retained their immunisation cards were 1.9 times more likely to be fully immunised. Additionally, the study showed that households where ANMs or ASHAs used the card during visits or sessions had higher awareness of vaccine schedules.

S.no	Author (year)	Location of Study	source journal	Sample Size	Sampling Techniques	Findings
11	Ali M et al.(2022)	India, Nepal, Sri Lanka	Vaccine X	12,000+ records	Regional DHS data analysis	Found persistent immunisation dropouts, especially in rural and low-literacy populations, despite overall regional improvements. Maternal education emerged as a consistent predictor of full immunisation across countries. The findings are significant in highlighting that structural barriers are similar across South Asia, underscoring the need for simple, culturally adaptable communication tools that target caregiver education.
12	George A et al. (2017)	Bihar	Health Communication	420 FLWs	Pre-post intervention	Assessments showed a 25% increase in immunisation knowledge scores and significant improvement in caregiver trust and adherence to vaccination schedules, laying importance on the role of structured, pictorial tools in enhancing interpersonal communication and boosting caregiver confidence.
13	Srinivasan R et al.(2016)	Kerala	Indian Journal of PublicHealth	200 caregivers	Qualitative focus groups and interviews	The study found that even mild, self-limiting AEFIs led to heightened perceived risk, often resulting in delayed or missed subsequent doses. This misperception was more prevalent among caregivers who did not receive adequate post- immunisation counselling. These findings emphasise the importance of consistent, clear, and visual counselling on what to expect post- vaccination and address gaps by standardising key messages and reinforcing vaccine safety.
14	Marathe A et al. (2023)	India (Delhi slums)	Journal of Urban Health	800 mothers	Stratified sampling	Findings showed that frequent migration, loss of vaccination cards, and lack of session reminders significantly affected immunisation continuity. The study underscores the need for interventions that can function as visual scheduling aids and reminders, especially in informal settlements where digital tracking is limited and health access is fragmented.
15	Das J et al.(2020)	India (NFHS- 4)	The Lancet Regional Health - Southeast Asia	75,000 + children	Secondary data analysis	Analysis revealed that maternal education was the single most significant predictor of a child's immunisation status, more than economic or geographic factors. The study called for targeted communication and education strategies to bridge this gap.

Research Question & Objectives

How is the Immunisation Wheel being used by frontline health workers in Madhya Pradesh, and what is its perceived impact on communication, caregiver engagement, and immunisation dropout reduction?

1.

To determine how frontline health workers (ASHAs and ANMs) implement and utilise the Immunisation Wheel during routine immunisation activities.

2.

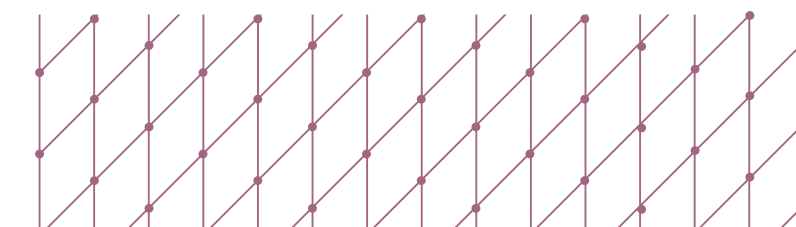
To explore the perceived behavioural and communication impacts of the Immunisation Wheel on caregiver engagement and immunisation adherence.

3.

To identify major operational, design-related, and institutional challenges encountered during the use of the tool, along with frontline suggestions for adaptation and scale-up.

4.

To identify key recommendations for improving and scaling the Immunisation Wheel as a behaviour change communication (BCC) innovation.



Methodology

1.

Study Design

This study employed a cross-sectional qualitative design to evaluate the implementation and effectiveness of the Immunisation Wheel

2.

Study Setting:

The study was conducted in selected Anganwadi Centres (AWCs) within Phanda block of Bhopal district, Madhya Pradesh.

3.

Study Area & Population

The target population consisted of two categories of Frontline Workers- Auxiliary Nurse Midwives (ANMs), and Accredited Social Health Activists (ASHAs).

4.

Tools

Two primary tools were used in the data collection process:

- Structured Checklist (ANM/ASHA Survey)
- A semi-Structured In-Depth Interview Guide was developed to conduct in-depth interviews with the 11 ASHAs and ANMs

Methodology

Sampling Technique

Purposive Sampling

(FLWs)

ANMs and ASHAs were selected through purposive sampling, focusing on those who had actively used the Immunisation wheel and were based in areas with varying immunisation coverage levels.

Data Analysis

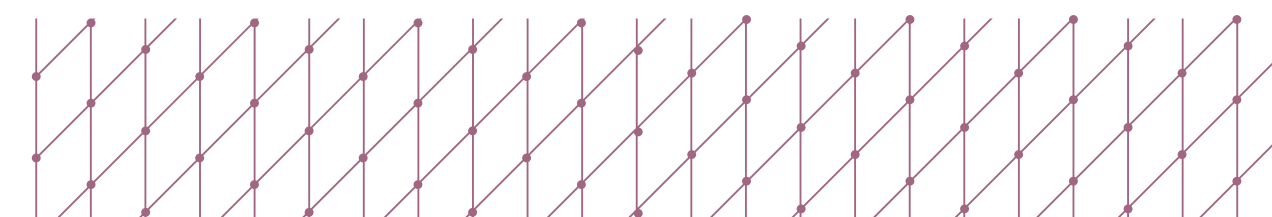
Transcripts from in-depth interviews were subjected to thematic analysis. An inductive approach was used to code transcripts line-by-line, from which broader themes and sub-themes were generated. Qualitative analysis software was not used due to the small dataset; instead, coding was done manually using matrix frameworks.

Ethical Considerations

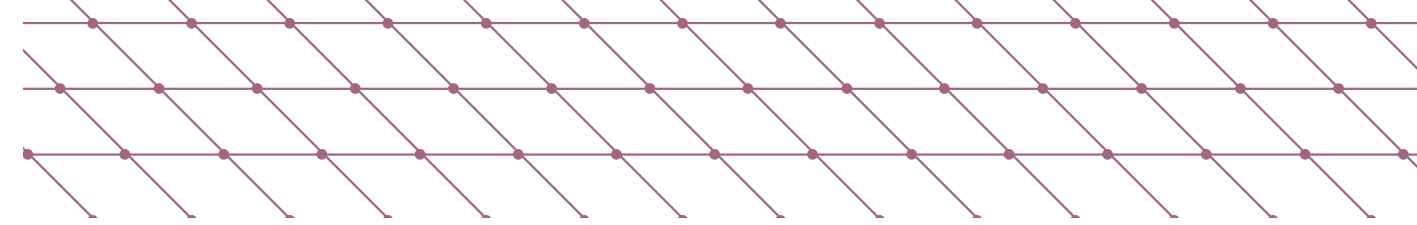
The study adhered to all ethical norms applicable to small-scale field-based evaluations. Informed verbal consent was obtained prior to any data collection.

Limitations

A small sample of caregivers ($n=3$) as well as the frontline workers ($n=11$) limits generalisability of findings. The study was confined to one district, and findings may not reflect implementation realities in other parts of the state, reducing its geographical scope. The cross-sectional design of the study only captures a snapshot in time and may not reflect changes in practices or perceptions over the long term. Finally, the self-reporting questionnaires could have led to over reporting due to social desirability bias.



Findings



Introduction and Orientation to the Wheel

1.1 First Encounter and Initial Response:

- ANMs and ASHAs were first introduced to the Wheel during VHNDs, block meetings, or by supervisors.
- Initial reactions were predominantly positive; many described the Wheel as a “new” and “innovative” tool.
- Some confusion was reported at first, particularly in aligning dates, but this diminished with brief explanations and practice.

“At first I thought it was some kind of a clock because of its round design. But when they turned it and showed how dates come up based on the child’s birthdate, I understood that it was for scheduling the vaccines. It was simple but smart.” ANM, rural AWC

1.2 Official Introduction and Training:

- ANMs received a one-day training in Bhopal, where the Wheel’s functionality and application were demonstrated.
- ASHAs predominantly learned to use it from ANMs or through peer-sharing in their clusters.
- Although initial understanding was strong, some ASHAs required additional practice and support to become proficient.

“I was confused about what to tell the mother exactly from the wheel, so I mostly ended up manually calculating all dates for a more accurate date. But after using it two-three times with ANM didi, I got more confident.” ASHA, urban AWC

1.3 Adequacy and Clarity of Orientation:

- Overall, training was considered useful but rushed; many felt additional time for questions and practice would have enhanced confidence.
- ASHAs reported that their roles in communication and caregiver education were not sufficiently defined during training.
- Nevertheless, the Wheel was broadly adaptable and easily integrated into their routines once a clear understanding was established.

“It was only a one day session for everyone. It was good, but it felt a little rushed. It would have helped more if they held longer training sessions.” ANM, urban AWC

Findings

Integration into Routine Immunisation Workflows

2.1 Operational Ease of Use:

- The Wheel simplified the process of calculating due dates, reducing cognitive load and the likelihood of human error during busy sessions.
- ANMs and ASHAs described it as a reliable, low-tech tool that enhanced their confidence and efficiency, regardless of their educational background.
- The intuitive design made it broadly applicable in rural and resource-poor settings, strengthening its potential for scalable implementation.

“For us, the chakra is easy. Even if someone doesn’t have much educational qualifications, it can still be understood easily and show others how to use it.” ASHA, rural AWC

2.2 Compatibility with Routine Immunisation Sessions:

- The Wheel was seamlessly integrated into home visits, anganwadi sessions, and busy immunisation days.
- Frontline workers used it to streamline their workflow, track vaccines accurately, and provide clear guidance to caregivers.
- ASHAs frequently employed the Wheel during follow-up visits to counsel families and reinforce adherence to vaccines.
- Importantly, the tool required no additional infrastructure and was adaptable to varying workloads and field conditions.

“We use the Wheel for every new baby, but sometimes we end up having too many children in onesession, so the wheel really helps to streamline the process because of its easy to use mechanism.”ANM, rural AWC

Findings

Impact on Interpersonal Communication

3.1 Improved Engagement with Caregivers:

- The Wheel enhanced the clarity and delivery of messages to caregivers, making immunisation schedules more comprehensible.
- Frontline workers described its visual, interactive format as a key aid in reducing confusion and strengthening caregiver understanding.
- The tool fostered credibility and trust in health workers' knowledge and guidance, particularly for caregivers with low literacy.

“When I show them the chakra and point to the date, they understand faster. Before, we would say the date and they wouldn’t always remember it. Now they can see and remember.” ASHA, urban AWC

3.2 Enhanced Caregiver Behaviour and Awareness:

- After its introduction, caregivers were more likely to remember vaccines, proactively maintain immunisation cards, and track due dates.
- Some caregivers started asking questions, verifying dates, and participating more actively in health decisions for their children.
- The Wheel also facilitated tailored communication in cases of vaccine hesitancy, helping health workers address doubts and misconceptions through clear explanations.

“Mothers now ask us – ‘Didi, you said this vaccine is due, but the Wheel is showing this date. Which one is correct?’ They are asking more questions and not just blindly following.” ANM, urban AWC

Findings

Perceived Effect on Dropout Reduction and Awareness

4.1 Visual aid for memory and adherence:

- Visual aid for memory and adherence:
- The Wheel was viewed as a powerful memory aid, making vaccine schedules more accessible and memorable for caregivers, especially those with low literacy.
- Its tangible and durable format facilitated clear communication of timelines, reducing confusion and improving adherence.

4.2 Increased completion of immunisation:

- FLWs observed a reduction in dropouts after the Wheel's introduction.
- The tool made it easier for health workers to provide precise, personalized reminders during home visits, thereby improving follow-up and reducing defaulters.
- Some ASHAs used it to motivate families who were irregular in vaccinating their children, helping them complete the full schedule.

4.3 Enhanced caregiver awareness:

- The Wheel not only facilitated adherence but also raised caregiver awareness about vaccines and the diseases they prevent.
- FLWs described it as a useful tool for counselling, especially for first-time parents and hesitant families.
- Caregivers increasingly asked questions and took a more active role in their children's health care, reflecting greater understanding and engagement.

“One family had missed the last two vaccines. I used the Wheel to show them what was left and why it mattered. They brought the child to the next VHND.” ASHA, urban AWC

“Earlier they didn't ask questions. Now they ask – what is this vaccine for? That means they are more aware and interested.” ASHA, rural AWC

Findings

Design and Operational Challenges in Field Use

5.1 Field usage and related challenges:

- The Wheel's compact and durable design made it convenient for frontline workers to carry and use in the field.
- However, many ASHAs and ANMs reported physical wear and tearing with repeated use (such as a loosening rivet).
- Some health workers found the text small and hard to read in low light, and misalignments sometimes occurred when matching birthdates.
- Visual clarity and robustness were identified as key areas for improvement.

"Sometimes when we enter the birthdate, there is a slight confusion about the dates showing up wrong, mostly due to print issues and the font size being too small. That leads to confusion and sometimes we just have to end up manually calculating all dates." ANM, urban AWC

5.2 Absence of monitoring and reporting mechanisms:

- There was no formal system to track the Wheel's usage or measure its impact on service delivery.
- FLWs suggested adding a simple reporting column to existing health registers or integrating the Wheel into home-based records.
- Without a monitoring process or supervision, utilization largely depended on individual motivation and experience, affecting consistency and scale-up.

"We use it, but there's no form to say we did. So no one checks if it made a difference." ANM, urban AWC

Findings

Final Reflections on Empowerment, Adaptation, and Future of the Tool

6.1 Confidence and role reinforcement:

- The Wheel enhanced frontline workers' confidence and autonomy in counselling caregivers.
- It provided a clear, tangible aid that supported their explanations and reduced reliance on memory.
- The tool was viewed as a symbol of recognition for their role and responsibilities, strengthening their professional identity and motivation.

"It gives me confidence. Even if someone asks suddenly about the next dose, I can just show them on the wheel and answer immediately with confidence." ASHA, urban AWC

6.2 Worker-driven innovations and feedback:

- FLWs identified areas for improvement, suggesting modifications to materials (such as making it waterproof or more durable), adding symbols for low-literacy settings, and creating multi-purpose versions (for ANC or nutrition services).
- Some called for a dual-language format or a culturally tailored adaptation to align with community needs.
- These suggestions reflect a strong sense of ownership and engagement, indicating a potential for co-creating more effective health communication tools.

6.3 Reflections on the caregiver wheel:

- The caregiver-specific Wheel was discontinued due to limited use and cost-efficiency concerns.
- Nevertheless, many FLWs believed it could serve as a valuable supplementary aid for caregivers to remember vaccines at home.
- They advocated for retaining it, noting it could empower families to become more active participants in their children's health care.

"If mothers had something to see at home, like the wheel, they would remember dates better. We cannot visit everyone before every session." ASHA, rural AWC

6.4 Aspirations for scale-up:

- There was a clear demand for scaling up the Wheel to all health workers across states.
- FLWs stressed its utility in strengthening service delivery and improving caregiver adherence.
- Some suggested integrating it into health policy alongside existing materials, akin to the Mother and Child Protection Card (MCP).

"Like the MCP card is used everywhere, this wheel should also be given everywhere. It will make our work easy and help with reminders." ASHA, rural AWC

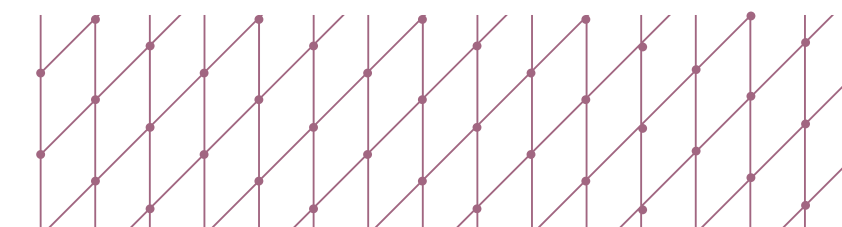
Conclusion

The findings highlight that the Immunisation Wheel was broadly well-received by frontline health workers. Both ASHAs and ANMs reported improvements in their ability to communicate the immunisation schedule clearly and consistently. The wheel helped reduce confusion around dates and served as a visual prompt during counselling sessions, enabling better caregiver understanding and engagement. Importantly, its alignment with existing immunisation workflows made it easy to adopt without placing additional burden on health workers.

The Immunisation Wheel, while a relatively simple intervention, exemplifies the potential of well-designed, low-tech job aids to catalyse improvements in communication, planning, and adherence within routine immunisation. Its effectiveness, as evidenced in this study, is rooted not only in its technical function but in the socio-behavioural transformation it fosters—empowering frontline workers, engaging caregivers, and demystifying immunisation schedules.

Nonetheless, the study also reveals important gaps and constraints that impact the sustainability and scalability of the tool. Issues around physical durability, schedule misalignment, and the lack of embedded reporting or tracking mechanisms were repeatedly cited. Moreover, while the tool bolstered health worker confidence and motivation, the discontinuation of the caregiver wheel version and the absence of formal institutional support mechanisms underscore challenges in maintaining consistent usage over time.

These limitations, however, are equally instructive: innovations must be institutionalised to survive beyond pilot phases. For the Wheel to realise its full potential, health systems must evolve to co-create, track, and continuously refine such tools, grounded in the lived realities of the workers and communities they are meant to serve.



Implications

01.

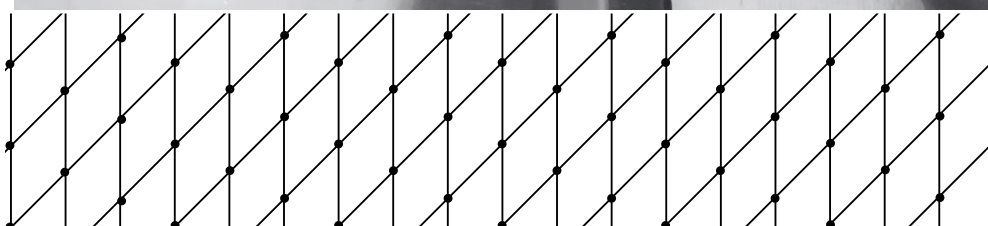
The study contributes to the growing body of evidence supporting the importance of culturally appropriate, context-sensitive tools in bridging communication gaps between health workers and caregivers. In doing so, it highlights the critical role that health worker empowerment and interpersonal communication play in reducing dropout rates and promoting full immunisation.

02.

The findings also have operational implications for public health administrators and programme designers. For innovations like the Immunisation Wheel to be effective at scale, they must be systematically integrated into training, supervision, and reporting frameworks. Additionally, tool usability must be balanced with adaptability – considering field-level constraints, literacy barriers, and evolving immunisation policies.

03.

The mixed perceptions around the caregiver wheel version further emphasise the need for iterative designated continuous field feedback before discontinuing components. Overall, the study advocates for a system-oriented approach that values frontline worker input, promotes consistent usage through supportive infrastructure, and recognises behavioural tools as integral—not peripheral—to routine immunisation delivery.



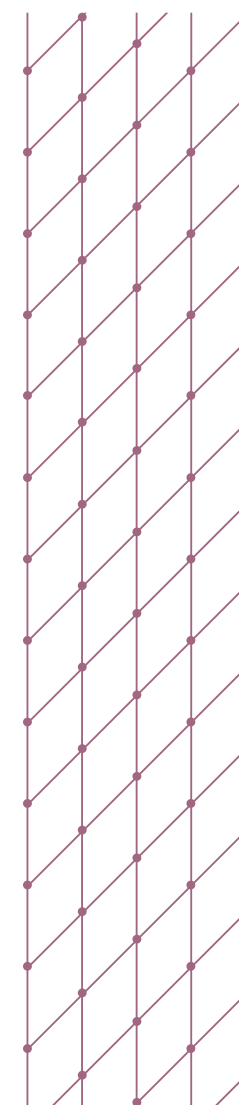


Recommendations

- Improving the durability of the wheel by changing the material used. A few frontline workers reported to have broken/torn/damaged wheels due its paper getting damaged easily.
- The size of the wheel can be increased marginally to enhance font size of the key messages. Some ASHAs and ANMs reportedly faced difficulty in reading the dates on the wheel correctly as they found print too small to be easily legible.
- Decentralise the purchase and storing of the availability of the wheel to reduce logistics delays in case the replacements are required.
- Introduction of modified versions of the wheel, in local languages/dialects for better comprehension across various populations, should be tried.
- Digital version of the RI Wheel, for smartphones such as a mobile app or digital calculator version of the wheel could be introduced.
- A bigger version of the wheel can be installed as a permanent fixture at the SHC and PHC level health facilities, as well as the R.I session sites. These can be used a demonstration tool, and an interactive IEC tool, to better engage the community members.
- Development of a similar visual aid for other health programs can also be tried.

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Thank You

The logo for LIIHMR UNIVERSITY, featuring the text "LIIHMR" in a large, bold, serif font, with "UNIVERSITY" in a smaller, sans-serif font to its right, all contained within a maroon rectangular border.

Aditi Kashyap Thakan

Under the guidance of Dr. Dhirendra Kumar **1665 MBA-HM 28**