

OPTIMIZING NEWBORN VACCINATION RETENTION: TRENDS AND STRATEGIES AT A MATERNITY & CHILD HOSPITAL

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in

Hospital and Health Management

By

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Under the Supervision and Guidance of

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2024

Dated: 1st July 2024

TO WHOM SO EVER IT CONCERN

This is to certify that Dr.Richa Gupta (Emp ID: 15436) is working in our organization as
"Assistant Manager- Operations" from 01 April 2024 to till date.

This letter is issued for the Academics Purpose only.

For Cloudnine

(A Unit of Kids Clinic India Ltd.)

Dr.Lahari V
Business Head
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DECLARATION BY STUDENT

I hereby declare that this dissertation titled “Optimizing Newborn Vaccination Retention: Trends and Strategies at a Maternity & Child Hospital” is the bonafide record of my original research work. I declare that it has not been submitted to any other university or institution for the award of any degree or diploma. Information derived from the published or unpublished work of others has been duly acknowledged in the text.



(Signature)

Dr. Richa Gupta

Date: 04/07/2024

CERTIFICATE

This is to certify that dissertation titled **Optimizing Newborn Vaccination Retention: Trends and Strategies at a Maternity & Child Hospital** is a record of the research work undertaken by Dr. Richa Gupta in partial fulfillment of the requirements for the award of the degree of MBA Hospital and Health Management from the IIHMR University, Jaipur under my guidance and supervision and her approach to the research study has been sincere, scientific, and analytical.

A handwritten signature in black ink, appearing to read 'Dr. Sandesh Kumar Sharma' with a date '14-7-2024' written below it.

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Abstract

This is a study on the vaccination retention rates of Cloudnine Hospital HRBR Unit for newborns from the 6th week up to the 6th month of life. Collection of data was done from December 2022 to March 2024. Vaccinations that were due from June 2023 to May 2024 were included. The vaccination retention rate calculation at the hospital was based on hospital records and pharmacy sales data. The target population involved all newborns who were due for vaccination in the hospital during the period under study, excluding those whose records were incomplete.

Data analysis was carried out on Microsoft Excel, where retention rates were computed, and trend analysis was carried out with an aim of establishing patterns and trends of data. Notably, the results emerged with varying retention rates in vaccinations at different periods and months. Mean rates of retention were 43.92% for the 6th week, 39.67% for the 10th week, 36.92% for the 14th week, and 37.75% for the 6th month, averaging on overall retention of 39.42%.

Follow-up calls were made to the parents/guardians of infants who missed their scheduled vaccinations to identify factors influencing non-retention. Among the important internal factors pertaining to hospital practices and external factors, travel post-delivery by mothers and vaccination costs emerged as significant.

Recommendations are made at the end to improve retention through enhanced communication strategies, cost management, and flexible scheduling options.

From a hospital management perspective, vaccination visit retention drives better outcomes with higher patient satisfaction and growth in revenue. Every vaccination visit represents an opportunity to remind the patient of the commitment of the hospital towards comprehensive care, develop long-term relationships, and encourage the use of additional healthcare services.

Conclusion: This paper aims to understand better ways of improving vaccination retention rates, with a view of improving operational efficiency at a hospital.

Keywords: Vaccination retention, newborns, trend analysis, strategic interventions, revenue optimization.

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Abbreviations

Sr. No.	Abbreviation	Description
1.	DOB	Date of Birth
2.	DMAIC approach	Define. Measure, Analyze, Improve, Control approach
3.	DTaP	Diphtheria, Tetanus, and Pertussis Vaccine
4.	Hib	Haemophilus influenzae type b Vaccine
3.	HMIS	Hospital Management Information System

Chapter 1: Introduction

1.1 Background

Pediatric vaccination assumes one of the important places in public health, aimed at protecting infants and young children from a multitude of infectious diseases. The period from the 6th week to the 6th month of life is especially important concerning immunization since it is the time when infants receive a number of key vaccines.

At 6 weeks of life, infants are usually vaccinated with the Diphtheria, Tetanus, and Pertussis Vaccine; the Haemophilus influenzae type b Vaccine; the Polio Vaccine; and the Hepatitis B Vaccine. These vaccines provide the primary immunity to protect the infants from some killer diseases.

By the 10th week, many of these vaccines will have been given their second dose to reinforce that immunization evoked by the first dose. Booster The booster is very essential to maintain protection and strengthening the baby's immune system.

At the 14th week, infants are given the third dose of the DTaP, Hib, and Polio vaccines. This completes the primary series for these vaccines, which is needed to give long-lasting, satisfactory cover. Moreover, the Rotavirus vaccine is recommended at this age and provides immunity against severe diarrhea resulting from infection by the virus responsible for rotavirus gastroenteritis.

By the 6th month, another set of vaccines is introduced to the baby to fight seasonal flu and other diseases. This will include any catch-up vaccines that may have been missed earlier in the vaccination calendar.

Retaining vaccination schedules from the 6th week to the 6th month is very important to help infants get full protection from these diseases. In the context of hospital management, more so in a maternity and child hospital, improving vaccination retention rates not only plays a critical role in enhancing public health but is also very important in improving hospital retention rates cum revenues. Thus, prime responsibilities rest with the hospitals in respect to the scheduled vaccinations effectively done on infants by availing several services, such as follow-up and education programs.

1.2 Problem Statement

This study is based on a hospital that has witnessed a low pediatric vaccination retention rate. Low pediatric vaccination retention not only poses health complications on the erstwhile patient but also denies a significant opportunity to the hospital, as the retention would have led to increased engagement with the patients and enhanced revenue streams. Challenges that contribute to this low retention rate include probable lapses in the follow-up system, logistical problems, parental awareness and education, and socioeconomic barriers.

1.3 Research Aim and Objectives

1.3.1 Aim: To analyze trends in vaccination retention rates and identify factors influencing non-retention among newborns.

1.3.2 Objectives:

1. Track Monthly Vaccination Retention Rates: Systematically collect and analyze monthly data on vaccination retention rates for newborns over a specified period.
2. To identify Factors Influencing Retention Rates: To examine various healthcare system, socioeconomic, and demographic factors that may influence vaccination retention rates.
3. Provide Recommendations to Improve Vaccination Strategies: Develop and propose evidence-based strategies and interventions aimed at improving vaccination retention rates based on the findings from the trend analysis.

1.4 Research Questions

The study seeks to answer the following research questions:

1. What are the trends in vaccination retention rates for newborns in their first six months of life?
2. What internal and external factors influence vaccination retention in the hospital?
3. What strategic interventions can be implemented to improve vaccination retention rates?

1.5 Significance of the Study

The Significance of this study goes beyond enhancing vaccination retention rates and stretches into various critical aspects from the perspective of both the hospital management and public health.

Firstly, the study will immensely contribute towards the enhancement of operational efficiency and financial health from the perspective of the hospital

High vaccination retention rates are likely to improve patient satisfaction as well as trust in services provided through the hospital. Satisfied patients are more likely to return for other healthcare needs, thus raising patient retention and loyalty. Each vaccination visit could potentially present several opportunities for the hospital to increase its offerings and thereby its revenues. Effective vaccination scheduling and follow-up practices could also enhance the efficient utilization of resources within a hospital, thus obviating wastage and promoting the extents of service delivery. High vaccination retention rates are therefore imperative from a public health perspective to avoid outbreaks of vaccine-preventable diseases in infants.

Age-appropriate vaccinations ensure that infants develop appropriate immunity at the right ages and make them less susceptible to serious infections. Higher vaccination retention rates raise the percentage required for acquiring and sustaining herd immunity, thereby safeguarding the community including those who cannot be vaccinated due to medical reasons. The findings of this study, together with the recommended interventions, can be used as a model for other healthcare institutions that face such challenges. Therefore, the study needs to be very relevant to its setting for the achievements to have an effect that transcends to influence broader public health objectives.

1.6 Scope of the Study

This research work will be based on vaccination retention rates of babies from birth to the first six months of their lives within a maternity and child hospital. The data considered for analysis spans from December 2022 to March 2024, with an appraisal of retention rates for vaccinations due in the months of June 2023 to May 2024. The study

makes use of hospital records and pharmacy sales data to calculate retention rates and trend analysis to identify any trends.

The factors that influenced non-retention were identified through follow-up calls conducted by the facility with the parents/guardians of infants that missed scheduled vaccinations. Key internal factors identified by the analysis were hospital practices, and key external factors were maternal travel post-delivery and costs of vaccination. The findings suggest recommendations toward improvement in retention by use of proper communication strategies, cost management, and flexibility in scheduling. This study therefore questions and suggests improvements in vaccination retention rates to achieve better health outcomes for infants and hospital operational efficiency.

Chapter 2: Literature Review

Smith et al. (2011) guide the analysis in relating the parental beliefs to vaccination behavior with the application of the Health Belief Model. Their findings are such that parents who delay or refuse vaccines tend to have certain beliefs about the benefits and risks associated with vaccination. The vaccination cover of children is therefore enhanced, such that addressing these beliefs with tailored interventions would be essential. As this study points out, pointed communication strategies are needed where the uptake of vaccines is to be improved, especially on the concerns of parents regarding disease prevention.

Opel et al. (2011) developed a multisite collaborative project for the identification of vaccine-hesitant parents with the launching of a survey called the Parent Attitudes about Childhood Vaccines (PACV). The survey measures parental attitudes and concerns about vaccines. It provides a valid measure for the identification of which parents may need further education and support in order to get their children vaccinated. Development of interventions targeted toward such concerns is exceedingly important.

Luthy et al. (2013) investigate the role of parental hesitation in delayed immunization. The authors report that the biggest concerns among parents for not vaccinating their children are fears over vaccine safety and efficacy. The researchers argue that healthcare providers must address these fears directly to decrease delays in childhood immunization. This thus brings out the issue of effective communication and education in improving vaccination rates.

Shrivastwa et al. (2015) point out predictors of vaccination coverage among children aged 12-36 months in India. A significant influence on vaccination rates is obtained from maternal education, household wealth, access to health care, and exposure to mass media. These findings expedite addressing the socio-economic disparities and bettering the access to health care as the loud calls needed towards improving the vaccination coverage in India.

Chaturvedi et al. (2009) review social resistance to the pulse polio campaign in two districts in North India. The review establishes that the misconceptions of the pulse polio vaccine, lack of trust in health functionaries, and many other cultural beliefs support the act of resistance. Culturally sensitive communication strategies and community involvement have been recommended to overcome such kinds of resistance and to enhance vaccination uptake.

Shrivastwa et al. find predictors for missed vaccination among children in India. The authors root out socioeconomic factors, parental education, access to health care, and regional disparities to be the major predictors for missing vaccinations in that study. The study underlined targeted intervention on predictor variables to mop up vaccination rates.

Agrawal et al. (2016) have presented the situation of vaccination coverage among children in the National Capital Territory of Delhi. The total coverage, though found appreciable, had pockets of inadequacy, especially in areas inhabited by socially marginalized groups. Governance and policy actions must therefore be targeted at these pockets if universal vaccination is to be a reality.

Lahariya, 2016 provides a comprehensive historical overview of vaccination programs in India to help trace their evolution, with the role these programs have played in improving urban public health. Improvements in vaccine delivery structures and strategies are brought out to show how challenges specific to the urban situation, related to high population density and diverse socio-economic backgrounds, have been overcome.

Gupta et al. (2017) present private paediatricians' views about routine immunization in urban Delhi. Their findings include the fact that though paediatricians value vaccines, challenges in vaccine availability, parental awareness, and perceptions on vaccine safety are major determining factors of vaccination practices. The engagement of the private sector is very crucial to increase coverage in an urban setup where the huge proportion seeks health care services from private providers.

Vashishtha and Kumar 2013 review the progress and challenges of immunization programs in India, with a focus on urban areas. It discusses successes in vaccine coverage and expansion, along with integration of new vaccines into national programs. Disparities between urban and rural areas are discussed, along with the challenge of vaccine hesitancy in urban populations; also, pointing out that specific strategies need to be tailored for overcoming socio-economic barriers, improvement of infrastructure in terms of health care services, etc.

Chapter 3: Methodology

3.1 Research Design

In this study, a mixed-methods research design will be used, involving both quantitative and qualitative methods in a bid to comprehensively examine vaccination retention rates and related factors involved in non-retention. The calculated vaccination retention rate in this quantitative approach utilizes existing hospital records and pharmacy sales data. On the other hand, a qualitative approach entails the follow-up calls with parents/guardians for an in-depth understanding of reasons for non-retention.

3.2 Study Population

For HMIS data collection:

Sample Size: 7093

The study population includes all newborns delivered at the maternity and child hospital between December 2022 and March 2024. These newborns are tracked for their vaccination schedules to assess retention rates at the 6th week, 10th week, 14th week, and 6th month intervals.

For Patient Follow-up Calls:

Sample Size: 284

Newborns who were due for vaccination in the month of April and didn't get vaccinated at the hospital.

Inclusion Criteria

- Newborns delivered at the hospital between December 2022 and March 2024.
- Newborns who are eligible for the standard vaccination schedule as per the hospital's protocol.

Exclusion Criteria

- Incomplete records or missing data that preclude accurate tracking of vaccination schedules and retention rates.
- Nonresponsive receivers during telephonic interview

3.3 Data Collection

3.3.1 Data Sources:

Data for this study was collected from the hospital's Health Management Information System (HMIS) and patient follow-up calls. The following datasets were utilized:

- **Newborn Reports:** Data on newborns from December 2022 to March 2024, which includes birth records and subsequent follow-up visits.
- **Pharmacy Sales:** Monthly vaccine sales data from the hospital pharmacy for the period June 2023 to May 2024, used as a proxy for vaccine administration.
- **Patient Follow-up Calls:** Identified patients who missed scheduled vaccinations in the month of April 2024, conducted calls to parents/guardians to understand reasons for non-retention.

3.3.2 Data Collection Process:

1. **Newborn Reports:** Extracted birth records and follow-up data from December 2022 to March 2024.
2. **Pharmacy Sales Data:** Collected monthly vaccine sales records from the hospital pharmacy for the period June 2023 to May 2024.
3. **Patient Follow-up Calls:** Identified patients who missed scheduled vaccinations, conducted calls to parents/guardians to understand reasons for non-retention.

3.4 Data Preparation

3.4.1 Cleaning and Organizing Data

1. **Data Cleaning:** Removed duplicates, corrected inconsistencies, and handled missing data to ensure the accuracy of the datasets.
2. **Data Organization:** Organized the data into a structured format suitable for analysis, with columns for Month, Number of Newborns, Number of Vaccinations Administered, and Vaccination Retention Rate, Calls made.

3.4.2 Calculations:

1. **Vaccination due dates** were calculated for the following time points:

- **6th Week:** DOB + 42 days
 - **10th Week:** DOB + 70 days
 - **14th Week:** DOB + 98 days
 - **6th Month:** DOB + 183 days
2. The **vaccination retention rate** for each vaccination set was calculated using the formula:
- Vaccination Retention Rate= (Number of Vaccinations Administered / Number of Newborns) ×100

3.5 Data Analysis

3.5.1 Quantitative Analysis: Vaccination Retention Rates

- **Calculation:** Determined retention rates for 6th week, 10th week, 14th week, and 6th month vaccinations.
- **Tools Used:** Microsoft Excel for data compilation and analysis.

3.5.2 Qualitative Analysis: Identifying Non-Retention Factors

- **Qualitative Analysis:** Analyzed responses from follow-up calls to categorize reasons for missed vaccinations.
- **Common Factors:** Identified recurring themes such as travel, healthcare access, and cost.

3.6 Implementation of Strategic Interventions

Based on the trend analysis and projected targets, strategic interventions will be developed and implemented. These interventions may include:

- Financial incentives in form of vaccination packages.
- Enhanced reminder and recall systems for parents.
- Promoting home vaccination services.
- Improved accessibility and convenience of vaccination services.

3.7 DMAIC Approach

The DMAIC approach, commonly used in Six Sigma methodology, was employed to guide the research and improvement process. This structured approach consists of five phases: Define, Measure, Analyze, Improve, and Control. Each phase is detailed below:

Define Phase

In the Define phase, the primary objective was to clearly outline the problem and establish specific goals for the study. The identified issue centred on a low vaccination retention rate among newborns within their first six months, falling short of desired benchmarks. The overarching goal was to identify trends in retention rates, factors for non-retention and propose strategies aimed at increasing these rates.

Measure Phase

During the Measure phase, the focus shifted to gathering comprehensive data on vaccination retention to establish baseline measurements. Data were sourced from the Hospital's Health Management Information System (HMIS) and pharmacy sales records spanning from December 2022 to May 2024. Key metrics included retention rates at critical intervals: the 6th week, 10th week, 14th week, and 6th month after birth. Additionally, follow-up calls were made to parents/guardians of infants who missed scheduled vaccinations to collect qualitative data on reasons for non-retention.

Analyze Phase

The Analyze phase involved in-depth examination of the collected data to uncover trends, patterns, and root causes contributing to low retention rates. Utilizing descriptive statistics, trend analysis in Excel, and visualization via line charts, monthly retention fluctuations, and factors were explored. Non-retention factors were Categorized and quantified reasons for missed vaccinations. This phase aimed to pinpoint underlying factors influencing vaccination adherence.

Improve Phase

In the Improve phase, strategies were developed and implemented based on insights gained from the analysis. Specific interventions were proposed to address identified issues and enhance adherence to vaccination schedules.

Control Phase

Finally, the Control phase will focus on maintaining and monitoring the effectiveness of changes that are suggested to be implemented to ensure sustained improvement in vaccination retention rates. Continuous tracking and evaluation mechanisms will be established to monitor adherence to new strategies over time, ensuring that improvements are persistent and adjusted as needed based on performance data.

This DMAIC approach provided a systematic framework for addressing challenges in vaccination retention, ensuring a structured and data-driven approach to enhance outcomes.

3.8 Ethical Considerations

This research is in full compliance with ethical standards and protection of patient data about confidentiality and privacy. Data were anonymised to protect identity and all analyses were realised following ethical standards and regulations.

3.9 Summary of Methodology

The current study has adopted a mixed-method approach for analyzing vaccination retention rates at Cloudnine Hospital HRBR Unit.

Quantitative data were obtained from HMIS and pharmacy sales records; the setting of basal retention rates was at 6th-week, 10th-week, 14th-week, and 6th-month post-delivery.

Qualitative data on reasons for non-retention from follow-up calls to parents/guardians who did not visit for scheduled vaccinations were also obtained. Such comprehensive data collection was analyzed: quantitative trends through Microsoft Excel and qualitative trends through thematic analysis. The DMAIC methodology for this study was: define, measure, analyze, improve, and control for the sustained betterment of vaccination retention rates.

Chapter 4: Results

4.1 Overview of Vaccination Retention Rates

This chapter presents the results of the maternity and child hospital on vaccination retention rate analyses. The data covers from June 2023 to May 2024, and retention rates are on 6th week, 10th week, 14th week, and 6th month vaccination intervals. The trends in the data were identified, and mean retention rates was computed with targets set for improvement.

4.2 Monthly Vaccination Retention Rates

The table below summarizes the retention rate against each vaccination milestone for each moth in a period of one year:

*Table 4.1: Month-wise number of newborns vaccinated as compared to number of newborns
due for each vaccine interval*

Months	Vaccination Interval	6th Week	10th Week	14th Week	6th Month	Overall
June'23	Scheduled	145	115	146	148	554
	Vaccinated	67	46	51	65	208
	Percentage	46%	40%	35%	44%	38%
July'23	Scheduled	117	152	123	126	518
	Vaccinated	49	74	53	46	222
	Percentage	42%	49%	43%	37%	43%
August'23	Scheduled	137	123	146	151	557
	Vaccinated	57	40	51	62	210
	Percentage	42%	33%	35%	41%	38%
September'23	Scheduled	143	128	118	139	528
	Vaccinated	53	51	35	51	190
	Percentage	37%	40%	30%	37%	36%
October'23	Scheduled	178	151	127	117	573
	Vaccinated	72	48	45	47	212
	Percentage	40%	32%	35%	40%	37%
November'23	Scheduled	162	172	158	141	633
	Vaccinated	74	53	51	43	221
	Percentage	46%	31%	32%	30%	35%
December'23	Scheduled	178	167	166	117	628
	Vaccinated	77	73	53	46	249
	Percentage	43%	44%	32%	39%	40%
January'24	Scheduled	141	183	180	146	650
	Vaccinated	73	83	83	53	292
	Percentage	52%	45%	46%	36%	45%
February'24	Scheduled	136	128	167	149	580
	Vaccinated	63	56	70	53	242
	Percentage	46%	44%	42%	36%	42%
March'24	Newborns	155	144	139	176	614
	Vaccinated	74	62	58	63	257
	Percentage	48%	43%	42%	36%	42%
April'24	Scheduled	147	151	136	165	599
	Vaccinated	61	54	47	58	220
	Percentage	41%	36%	35%	36%	37%
May'24	Scheduled	159	163	160	177	659
	Vaccinated	70	63	57	73	263
	Percentage	44%	39%	36%	41%	40%

4.3 Analysis of Trends:

4.3.1 6th Week Vaccination Retention: The vaccination retention rate for the 6th week vaccination has varied from 37% to 52% during the study period, while the maximum retention was noted during January 2024 with 52%. The average retention percentage at this frequency has been 43.92%.

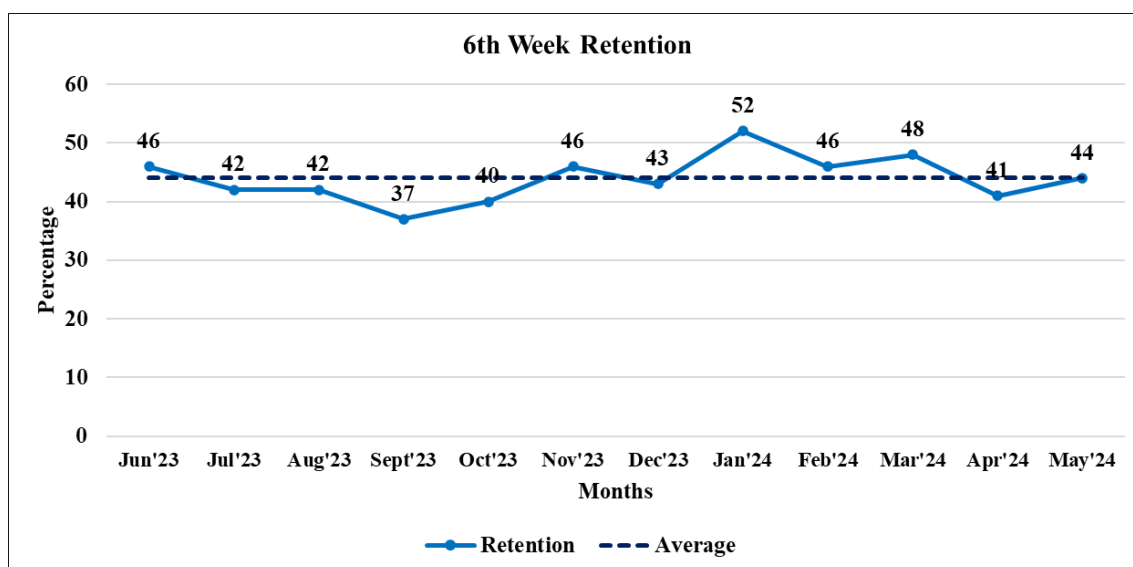


Figure 4.1: Average and month-wise vaccination retention percentage for 6th week vaccination.

4.3.2 10th Week Vaccination Retention: The percentage range of the 10th week vaccination retention goes from the low of 31 per cent in November 2023 down to 49 per cent in July 2023. The average rate of retention for the period was 39.67 per cent.

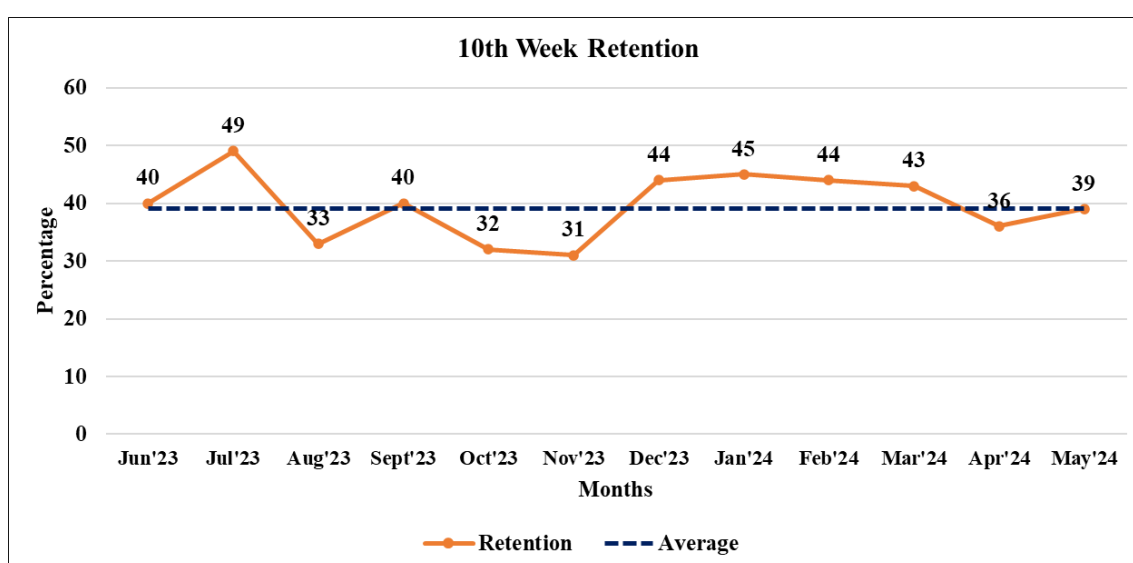


Figure 4.2: Average and month-wise vaccination retention percentage for 10th week vaccination.

4.3.3 14th Week Vaccination Retention: The respective retention rates for the 14th week ranged between 30% to 46%; the highest rate of retention was in January 2024. The mean retention rate was 36.92%.

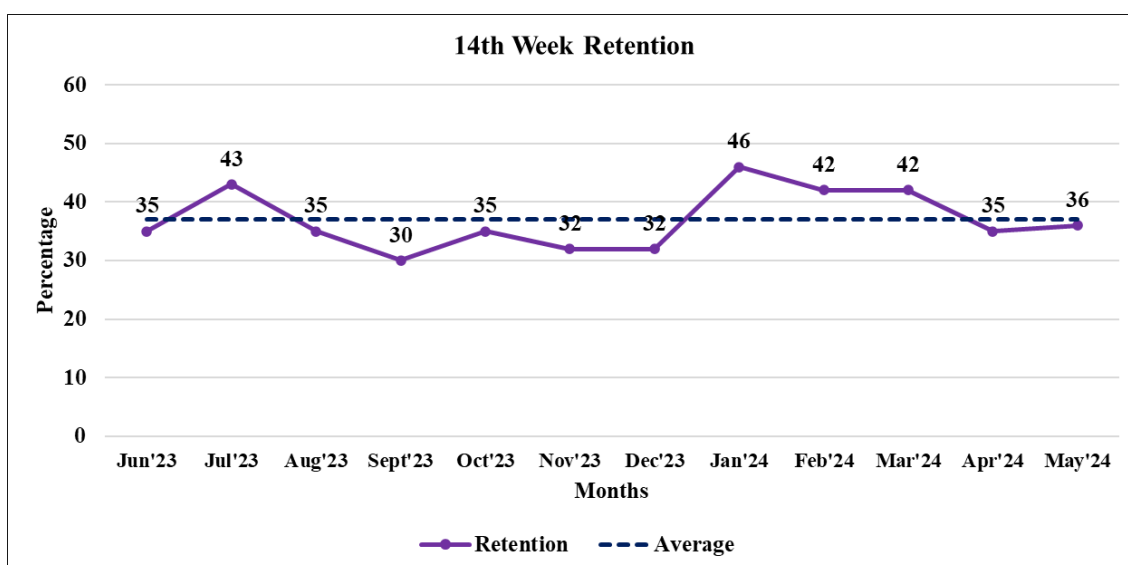


Figure 4.3: Average and month-wise vaccination retention percentage for 14th week vaccination.

4.3.4 6th Month Vaccination Retention The retention rates for the 6th month vaccination varied from 30% to 44%, with the lowest retention in November 2023 and the highest in June 2023. The mean retention rate for this interval was 37.75%.

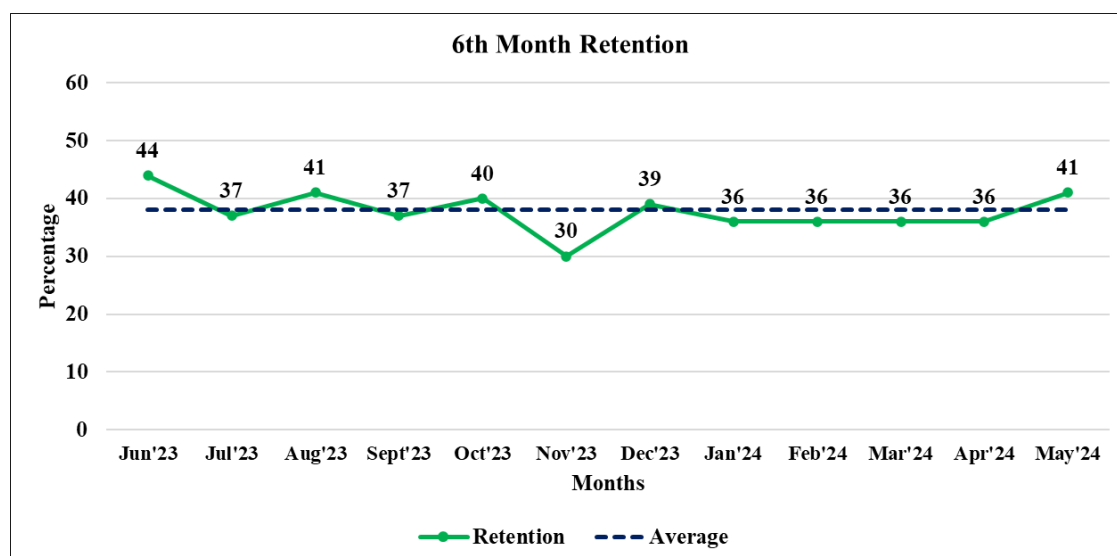


Figure 4.4: Average and month-wise vaccination retention percentage for 6th month vaccination.

4.3.5 Overall Vaccination Retention The retention rate for 6th-month vaccination was between 30% to 44%. November 2023 reported the lowest, while June 2023 had the most. The mean for this period retained rate stood at 37.75%.

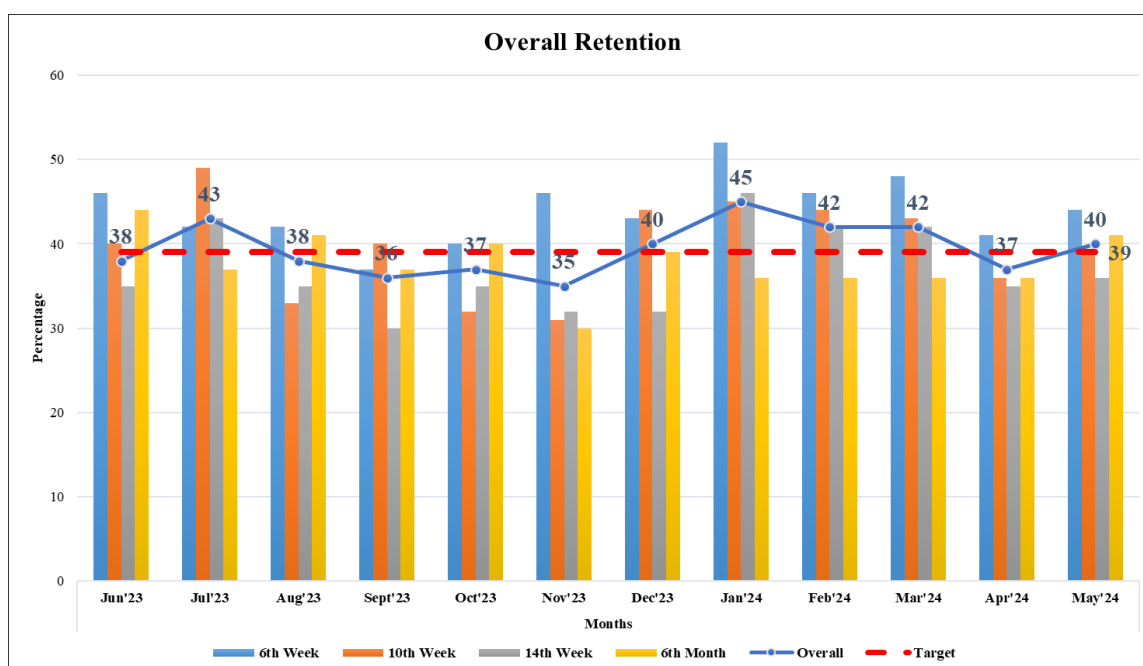


Figure 4.5: Average and month-wise overall vaccination retention percentage.

4.4 Factors for Non-Retention: Sample: 376 (non-vaccinated at hospital for the month of April)

Table 4.2: April no show cases for vaccination by reason

Total Calls Made	376	
Reason for No Show	Number	Percentage
Native	62	16%
Appointment issues	50	13%
Distance	46	12%
Cost	44	12%
Not aware of home vaccinations	29	8%
Missed Schedule	24	6%
Will get vaccinated at Cloudnine	15	4%
Other issues	13	3%
Non-responsive	92	25%

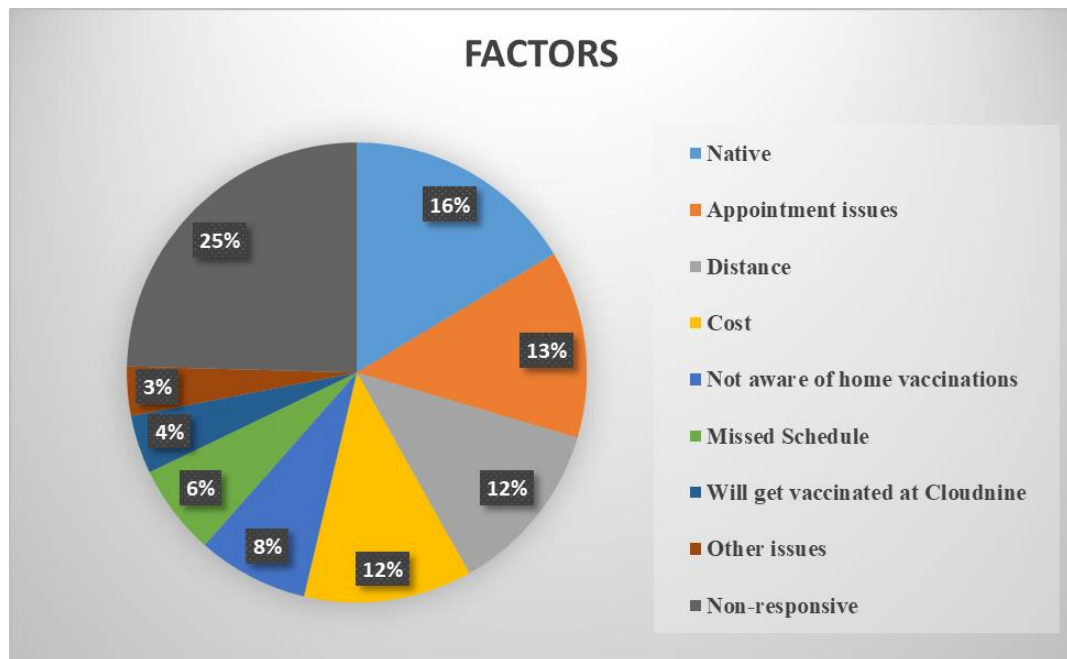


Figure 4.6: Contribution of various factors in non-retention for pediatric vaccination.

4.5 Summary of Results

The analysis indicted a high variability of vaccination retention rates across the various intervals and months. Generally, the retention rates ranged between 35% and 45%, indicating a strong trough in November 2023 and peaks on January 2024. Mean retention rates for the respective intervals of 6th-week, 10th-week, 14th-week, and the 6th-month periods were computed.

The outreach calls made during April have revealed several challenges related to those nonvaccinated individuals. One-quarter of the people called did not respond. Problems in setting up appointments, including availability and transportation arrangements for reaching the hospitals, were another hurdle. Other reasons include fear of cost and being unaware of the house-to-house vaccination facility.

These results clearly interpret present trends in vaccination retention, factors for non-retention at the maternity and child hospital and call for better outreach strategies to help overcome these challenges for better vaccination rates. The next chapter will shed some light on proposed strategies that will go a long way in enhancing vaccination retention rates at the maternity and child hospital.

Chapter 5: Discussion

5.1 Factors Influencing Vaccination Retention

5.1.1 Internal Factors

The internal factors affecting vaccination retention are those hospital-specific practices involving the scheduling of appointments, reminder systems, and staff engagement. A proper management of these modifiable factors holds immense potential for improving retention rates. For example, if automated reminders and follow-up calls are implemented, then retention can be sustained at high levels.

5.1.2 External Factors

Extraneous Factors on vaccination retention mothers travelling from their Native homes to their in-laws' homes after delivery is one of the major reasons of newborns not getting retained at the hospital for vaccinations. Vaccinations are more expensive at the hospital than at other health care facilities and also cheaper elsewhere hence another reason that causes lower retention at the hospital.

5.2 Strategic Interventions

Based on the findings, several strategic interventions are proposed

- **Vaccination Packages:** The idea of comprehensive vaccination packages is that it will bundle multiple vaccinations together and offer it at a fictitious discounted rate. This will avoid missing appointments and motivate parents to commit themselves to the full vaccination schedule more openly.
- **Implementing Reminder Systems:** Automated reminder systems in the form of text messages, emails or even phone calls may be instituted which shall remind the parents of upcoming vaccination appointments.
- ✓ **Automated Text Messages:** Set up HMIS automation to deliver text messages regarding upcoming vaccination appointments. These may be a week prior, one day prior, and on the same day as the appointment.

- ✓ **Phone Call Follow-ups:** For those missing appointments, phone call follow-up may be conducted, and vaccination rescheduled. This way, it will help understand and address the barriers and concerns specifically for parents.
- **Better Accessibility:** Availability and easy access to the vaccines in all clinics, even on weekends and holidays, for working parents and all those leading a hectic life.
- **Promotion of Home Vaccination Services:** As the hospital already provides vaccination services at home, it only needs to promote them more strongly so that it becomes easy for parents to get their children vaccinated on time without visiting the hospital.
- **Staff Training:** Ongoing training of health staff regarding the best practices of follow-up and engagement of patients.
- **Parental Education:**
 - ✓ **Educational Workshops:** Conduct monthly workshops for new parents that cover the importance of vaccination, the vaccination schedule, and address common myths and concerns about vaccines.
 - ✓ **Informational Brochures and Posters:** Distribute brochures and display posters within the hospital that provide clear and concise information about the vaccination schedule, benefits of vaccination, and answers to frequently asked questions.
 - ✓ **One-on-One Counselling:** Offer counselling sessions with healthcare providers where parents can ask questions and receive personalized advice about their child's vaccination schedule.

5.3 Limitations of the Study:

The following limitations are acknowledged concerning this study:

- **History accuracy:** relying on HMIS data with all the possible pitfalls of inaccuracies or inconsistencies.
- **Recall bias in the follow-up calls:** The recall of the parents, and/or effectual reporting, of reasons for missing the scheduled vaccinations would impact the validity of qualitative analysis.

- **Service response rate and sample size:** the number of follow-up calls with a proportionate number of responses from parents/guardians may limit comprehensiveness in the qualitative data.
- **External Factors:** Potential impact of external factors such as outbreak of diseases or public health campaigns that is not measured in the analysis.
- **Single Hospital Study:** Findings cannot be generalized to other settings or populations outside the studied hospital.

Chapter 6: Conclusion

This study conclusively establishes that enhancing vaccination retention rates at Cloudnine Hospital HRBR Unit is critical to hospital performance and health outcomes for the public at large. As noted earlier, different vaccination intervals had varying retention rates. Internal and external factors were operating that influenced missed vaccinations. The major concerns about the need for maternal travel post-delivery, financial constraints, and logistic challenges have been identified in this study using a mixed-methods approach.

The following interventions should be implemented while considering these factors: automated reminders, flexible scheduling, patient education, and cost management. On the qualitative side, follow-up calls made to parents/guardians have yielded very insightful information on the specific reasons for lack of retention that can then be utilized in tailoring interventions.

It means that from the hospital's perspective, improved retention not only improves patient satisfaction and builds trust but also generates revenue through increased patient retention, which in turn leads to an increase in the utilization of hospital services. From a public health perspective, higher vaccination-related retention ensures more children are guarded against preventable diseases, hence reducing the cases of such diseases and the spread of the same.

These findings raise awareness that the improvement in vaccination retention rates can be sustained if there is continuous monitoring and evaluation. Cloudnine Hospital can use these findings to practice and be of better service to its patient population, thus setting a benchmark for other healthcare facilities seeking to improve their vaccination programs.

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