

IMPACT OF VACCINATION COVERAGE ON AEFI RATES: A STUDY IN PANCHKULA

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By

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Under the Supervision and Guidance of

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TO WHOM IT MAY CONCERN

This is certify that, Ms. Simran Sharma, Student of IIHMR University, Jaipur has completed her internship w.e.f. 15-04-2024 till 07-07-2024 in Child Health & Immunization Branch in the O/o National Health Mission, Haryana.

"We wish her every success in life"

Deputy Director-Admin
For Mission Director (NHM),
Haryana

DECLARATION BY STUDENT

I hereby declare that this dissertation titled Impact of Vaccination Coverage on AEFI Rates: A study in Panchkula is the authentic 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 Information derived from the published or unpublished work of others has been duly acknowledged in the text.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)

Simran Sharma

Date July 06, 2024

CERTIFICATE

This is to certify that dissertation titled **"IMPACT OF VACCINATION COVERAGE ON AEFI RATES: A STUDY IN PANCHKULA"** is a record of the research work undertaken by Simran Sharma in partial fulfilment 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.

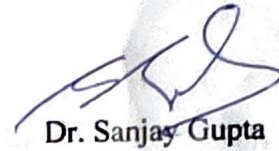


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ABSTRACT

As to the World Health Organization, an adverse event following immunization, or AEFI, is any unfavourable medical incident that occurs after vaccination and is not necessarily linked to the use of the vaccine. Any unfavourable or inadvertent sign, aberrant laboratory result, symptom, or illness might be considered an unpleasant event. One of the most important public health interventions and a cheap and practical means of ensuring child survival is immunization. 2015 saw the government start Operation Indradhanush, which aimed to increase vaccination rates and identify vaccination dropouts.

According to NFHS 5, Overall vaccination coverage in India increased from 62 % in 2015-16 to 77% in 2019-21 (Urban: 63.8% to 75.5%; Rural: 61.2% to 77.0%).

As per the Sample Registration System (SRS), the Infant Mortality Rate (IMR) has reduced from 37 per 1000 live births in 2015 to 30 per 1,000 live births in 2019 at National Level and IMR of Haryana in 2019 is reported to be as 27.

Unaddressed AEFIs or poor AEFI reporting, and surveillance can lead to increased vaccine hesitancy among the public, negatively affecting vaccination coverage. Unaddressed AEFIs or poor AEFI reporting, and surveillance can lead to increased vaccine hesitancy among the public, negatively affecting vaccination coverage. AEFI surveillance helps in detecting changes in the frequency of adverse events, which may be an alert to consider vaccine quality or manufacturing issues. Investigating the causes and factors associated with AEFIs can inform strategies to improve the safety profile of vaccines. Addressing specific barriers to AEFI reporting identified through research can help improve reporting and surveillance.

Objectives: The study would provide insights into vaccination coverage and AEFI rates in the rural and urban areas of Panchkula, respectively. Panchkula is a district of Haryana where we have the second-highest vaccination coverage achieved, next only to Kurukshetra, and thus former urbanization spends. Immunization coverage and AEFI rates are also compared between rural and urban areas in the present study. This study's findings will help inform strategies in improving vaccination programs, thus reducing AEFI rates in the rural and urban areas of Panchkula. Recommendations will flow from the findings toward redressal of the identified factors between these areas and reduction of disparities in vaccination coverage and AEFI rates.

Methodology: This was a retrospective study using HMIS data running from March 2023 to April 2024. HMIS is a data collection system which is used to support planning, management, and decision-making in health facilities and government agencies in this sector, as a means of improving the health sector of our country. An AEFI was defined based on the guideline by the World Health Organization that is, where any immunization causes some untoward medical occurrence.

Results: A cross-sectional study was conducted among the vaccinated children in rural and urban areas of Panchkula for one year. According to the data and statistics Panchkula is supposed to have second highest vaccination coverage. The study found that vaccination coverage was significantly lower in rural facilities compared to urban facilities. The AEFI rate of minor AEFI cases were found to be 51.5%. AEFI rate of severe AEFI cases were 1.12%. AEFI rate of serious AEFI cases were 0.03%. The study found that vaccination coverage was a significant predictor of AEFI rates, with higher vaccination coverage associated with AEFI rates. The findings suggest that improving vaccination coverage, particularly in rural areas, is crucial for reducing AEFI rates and ensuring the safety and effectiveness of vaccination programs.

Discussion: Several Factors may contribute to high prevalence of AEFI in Haryana. Symptoms like fever, diarrhoea, loss of appetite, chills swelling were found to be very common in infants. Due to the large vaccination coverage, AEFI was very prevalent. In the most AEFI cases, Pentavalent vaccine was found to be very common. Since most of the people from rural areas used to get vaccinated in urban facilities, we can say that immunization programs are implemented seriously but at the same time monitoring and reporting of AEFI is crucial for maintaining trust in the immunization programs.

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ABBREVIATIONS

OPV	Oral polio vaccine
PHC	Primary health center
SC	Sub center
CHC	Community health center
DH	District hospital
SDH	Sub district hospital
PV	Pentavalent
AEFI	Adverse effects following immunization
UIP	Universal immunization program
HMIS	Health management information system

CHAPTER 1: INTRODUCTION

Vaccines used in national immunization campaigns are significantly safe and effective. However, like any other biological product, no vaccine can be said to be entirely safe, and there may or may not occur an adverse response to it. Immunization procedures possess a risk of producing an unfavorable reaction.

An Adverse Event Following Immunization (AEFI) is the untoward medical incident following immunization, which does not necessarily have a causal relationship with the use of the vaccine. The way AEFIs result can be into five different types of reactions:

1. Vaccine product-related reaction: An adverse event caused by a vaccine that is directly related to one or more of the components of the vaccine, or intrinsic qualities, resulting from its manufacture. (Example: limb edema localized after immunization).
2. The World Health Organization defines AEFI as vaccine-related adversities that predispose to one or more problems of product quality, such as the incorrect manufacturing process, instructions, or packaging, but are never linked to the fault of the patient's mistakes of immunization. Example: Due to the failure of the manufacturer to completely deactivate a batch of IP, one paralytic polio incidence was caused, he mentioned on his wiki.

With the majority of AEFIs being associated, the errors in immunization could not be inherently there since they may be prevented as they come from improper storage, prescription, or administration of the vaccine. For instance, P33: Infection spread by the contamination of multiple doses by vials.

4. AEFI due to vaccine-associated anxiety: This kind of reaction may happen due to anxieties about the vaccination process itself, and an example of this is when an adolescent develops vasovagal syncope after a vaccination.

5. Or conditional event: coincidental AEFI : · immunization error/immunization anxiety product · other factors, not the vaccination, trigger the problem. For example, a fever may occur due to temporal association during the vaccination period, although malaria actually is the reason of this.

The reported adverse effects may be either true in the sense that they actually result from the vaccination or the immunization process, or they may be accidental events. They have a temporal, but not causal, association with the immunization. Even when vaccine manufacture, handling, and administration has been appropriate, vaccination reaction may occur because of an individual's response to inherent qualities of the vaccine. A medical event may be reported as an AEFI even if not actually an adverse event, provided that it is in fact adverse and began after vaccination. The general main goals of the AEFI Surveillance are

to minimize the morbidity and mortality in the public that is associated with the negative effects of AEFI. It is essential to add that the new guidelines elaborated further on the roles and responsibilities of the different key actors of the AEFI Surveillance System. Thus, it embodies how the guidelines stress that there is a dire need for the inclusion of recording by ASHA, Anganwadi workers, and Health Supervisors in the monitoring system at all levels up to the community and sub-center level. It is not only the medical officer who locates and reports the event, but also manages the case. The Indian experience is with the country's largest immunization program-the "Universal Immunization Program" (UIP)-that aims to immunize around 26 million children annually against the 12 vaccine-preventable diseases.

Facility is a determining factor for children in the age group 12-23 months that have completed their vaccinations; 72.1% children from urban and 84.8% from village areas of India have this facility as per NFHS 5. As per NFHS-5EIAs and Routine Immunization coverage 77% population of Haryana is covered whereas NFHS-4 covers 62%. The greatest progress in the spectrum of immunization services was noted in public facilities post-intervention, 96 recipients enrolled for receiving vaccines.

Vaccines under UIP

The following vaccines are provided under the UIP:

- 1 BCG (Guerin, Bacillus Calmette)
2. Tetanus, Pertussis, and Diphtheria Toxoid
3. Oral polio vaccine, OPV
4. Rubella, measles, MR Vaccine
5. The B hepatitis
6. Tetanus Toxoid, or TT
7. JE immunization---in certain districts with a high illness load.
8. Pentavalent vaccination incorporating Hib --- DPT + Hep-B + Hib
9. Rotavirus Vaccine-RVV
10. T.D. vaccine, adult dose of the tetanus and diphtheria vaccine
11. Inactivated Polio Vaccine (IPV)
12. PCV (Vaccine against Pneumococcal Cell)

Diseases that are prevented under UIP by vaccination

1. Tetanus.
2. Pertussis.
3. Tetanus.
4. Polio.
5. The TB disease.
6. Measles.
7. Hepatitis B
8. Japanese encephalitis, also known as brain fever
9. Haemophilus influenzae type B that causes pneumonia and meningitis
10. Rubella

The NHM is the umbrella national initiative of the country toward universal health coverage, including comprehensive vaccination services. The performance of NHM in improving vaccination rates would therefore hinge on its capacity for addressing the concerns related to vaccine safety. In this context, the present study has assessed the impact of AEFI on the immunization rate of Panchkula, specifically considering the critical factors mentioned:

The importance of high vaccination coverage leading to high AEFI

1. Factors contributing to AEFI occurrence, including vaccine-related, patient-related, and program-related factors.
2. Strategies for enhancing AEFI reporting and investigation, such as improving healthcare worker knowledge and attitudes, and conducting thorough causality assessments.

By understanding the complex interplay between AEFI and vaccination coverage, policymakers and public health authorities can develop evidence-based approaches to strengthen immunization programs and protect communities from vaccine-preventable diseases. (WHO guidelines 2023)

CHAPTER 2: LITERATURE REVIEW

A comprehensive study was conducted by Nishu Nishu C. Gupta¹, Kamlesh Kumar G. Rathod, Lalita R. Garg entitled Assessment of knowledge of multipurpose health workers regarding adverse events following immunization in a rural block of Haryana, India. A cross-sectional study was conducted among the randomly selected 30 MPHWs of Beri block. Verbal consent was taken and then a semi-structured questionnaire was administered. Fever, pain, redness, and swelling at the injection site were recognised as symptoms of AEFI by about 83% of the MPHWs. Furthermore, 93% awareness was found regarding the proper storage temperature, dose, route, and site of vaccines. Only 33% knew about the filling up of an adverse event form for reporting an AEFI. The cause, identification, and reporting of AEFI were poorly known among them.

An extensive assessment regarding the knowledge about adverse effects following immunization among the health care workers of Raipur city was taken by Smita Verma et al. In this specific context, a cross-sectional study had been done among 157 health care workers of primary health care centers, Raipur City. This was after the written informed consents were taken. Predesigned pretested questionnaire was administered. Data collected was compiled and analyzed by using MS Excel. More than 80% of the participants knew vaccine product and quality defect-related reactions as possible causes of AEFI. 7.3% knew about swelling as the commonest AEFI. 59.9% had knowledge of the management routine of common AEFI. 99.3% Health care workers knew anaphylaxis as one of the severe AEFI and 91.08% were knowing that AEFI should be reported.

Extensive study was carried out by Juny Sebastian, Parthasarathi Gurumurthy, Mandyam Dhati Ravi, and Madhan Ramesh entitled Active surveillance of adverse events following immunization (AEFI): the prospective 3-year vaccine-safety study conducted an active vaccine safety surveillance study with active enrollment of eligible children in the age group of 0–5 years receiving vaccination from the immunization center at JSS Hospital, Mysuru. The individuals were monitored at the site for 30 min after vaccination and a telephonic survey was made after 8 days to identify all AEFIs. The incidence of reported AEFIs was 13.7%. The most frequently reported AEFI was fever, n=3095, 93.2 per cent, with an incidence of 109.7 per 1000 doses of vaccine administered, followed by persistent crying, n=69, 2.4 per 1000 doses of vaccine, and diarrhea, n=57, 2.0 per 1000 doses of vaccine administered. The majorly implicated vaccine for AEFIs was Pentavac, followed by BCG. Consistent causal association to immunization was observed in 93.4% of cases. In our study population, a high incidence rate of AEFI was observed when compared with the previous published studies.

Eunice Baiden Laryea John Tengey, Joseph Asamoah Frimpong, Delia Bando, George Sabblah, Charles LwangaNooral, DonneAmeme Kwame Amponsa-Achiano did a research on the Evaluation of the adverse events following immunization surveillance system, Ghana, 2019. They reviewed the surveillance data and procedures from 2014 to 2018 and held interviews with key stakeholders. We applied the CDC's Updated Guidelines for Evaluating Public Health Surveillance Systems in assessing the attributes and usefulness of the system. Summary descriptive statistics were done on quantitative data, and directed content analysis was done on information gathered from interviews. During the period, there was a report of 2,282 AEFI cases including 476, serious 21% cases. In 2018, the highest case detection rate of 61.45

AEFIs per 100,000 surviving infants was recorded. Generally, the AEFI surveillance system at all levels is useful but partially meeting its objective due to underreporting. We recommend training and supportive supervision for AEFI reporting. This will improve timelines of reporting, completeness, and acceptability of data.

Aneena Suresh, Ashna, Karishma Reji, Joel did a detailed study on Awareness of Immunisation Health Care Providers on Adverse Events Following Immunisation: A Multicentre Study in South India. The current study evaluated the knowledge, attitude, and reporting practices regarding AEFI among immunization healthcare providers working in private hospitals and clinics in South India. A semi-structured questionnaire was used to interview 58 IHPs. Few IHPs had good knowledge, but 91.4% had a good attitude. However, this did not influence their having good reporting practices of 25.9%. The overall KAP score was the highest among physicians with 50%, followed by 43.8% among pharmacists and 37.8% among nurses. Inadequate knowledge on AEFI surveillance and filling of the AEFI reporting form were important barriers to effective reporting, together with time constraint and lack of familiarity with electronic reporting.

Few of such elaborate studies include the one by Pragya Dixit, Praveen Prashant, Vivek Gera, and Abhishek Bansal, which is titled: "AEFI (adverse events following immunization) among children less than two years following the Pentavalent vaccine." Other descriptive studies are one on the same topic: "AEFI (adverse events following immunization) among children less than two years following the Pentavalent vaccine," where 209 children were included and vaccinated in the selected subcenters for a period of one year through a cross-sectional study. The investigator collected information through two home visits contacting the mothers of the vaccinated children. Total categorical data was expressed in a percentage (%). The data was collected using a pre-designed, pre-tested, semi-structured schedule. The descriptive analysis of data after statistical analysis was represented in graphs and percentages. AEFI incidence was higher per 1000 doses made out following the first dose of pentavalent vaccine (312.05) than the second dose (290.78) and the third dose (271.42). Among AEFI observed, the largest observed reaction was fever [31.3% (1st dose) and 29.1% (2nd dose and 27.1% (3rd dose)]. Conclusion: All mothers (100%) were explained that the vaccine caused the AEFI in their child and wished to continue vaccination of their child with the subsequent doses.

A study was conducted by Sneha Mittal, Cms Rawat, Amit Gupta, Hariom K Solanki, R K Singh titled Adverse Events Following Immunization Among Children Under Two Years of Age: A Prospective Observational Study from North India. A prospective community-based observational study was conducted from October 2017 to February 2018 in the North Indian state of Uttarakhand. A total of 255 children attending the chosen sub-centres for immunization were enrolled in the current study. Fourteen follow-up home visits on the 8th and 30th days from vaccination revealed a total of 212 cases of AEFIs among the 152 vaccinated subjects. Most AEFIs reported were under AEFIs 0-1-year ages. The mean incidence of AEFIs was 33.0 per 100 doses of vaccines administered. The most commonly reported AEFI was fever, 101 (47.6%), followed by swelling, 53 (25.0%). Amongst the vaccines, the Pentavalent + OPV has majorly been responsible for AEFIs with 48.8 per 100 doses, followed by DPT + MR + OPV with 46.6 per 100 doses. Our findings elucidated the fact that although the incidence of AEFI reported was high, all of them were minor and no serious AEFIs were identified.

Make an effort, and epidemiological investigation of serious and severe adverse events following immunization: a 4-year practical experience in India by Awnish Kumar Singha, Abram L. Wagner b,

Jyoti Joshic, Bradley F. Carlsonb, Satinder Anejaf, and Matthew L. Boultonb for causality assessment of reported serious/severe AEFIs from 1 January 2012 to 7 January 2016. Analysis of causality assessment completed for 1037 reports of serious AEFIs: 499 (48%) were causally associated, 84 (8%) were indeterminate, 323 (31%) were coincidental, and 131 (13%) were unclassifiable. Of the 499 reports in the A category, the events were causally linked to vaccine product for 189 (18%), to immunization error for 135 (13%), and to immunization anxiety for 175 (17%). For the many severe or serious reports, most of which have no causal relationship with the vaccination program, field reporting and the investigation of AEFIs can gain in value.

CHAPTER 3: RESEARCH METHODOLOGY

STUDY TYPE-

A retrospective Cross-sectional study was conducted for a duration for one year (financial year 2023-2024). A retrospective cross sectional study is an observational study that collects data on a population at a specific point in time, while also looking at factors that may be related to an outcome of interest.

SETTINGS OF THE STUDY-

The study was conducted in Panchkula, a district in Haryana. Panchkula is a district in Haryana which shows the second highest immunization coverage next to Kurukshetra. The study shows the association of immunization coverage with AEFI.

DURATION OF STUDY-

April 2023 to March 2024

STUDY POPULATION-

A population-based cross-sectional study was conducted among the 12,128 (live births) infants in rural and urban area population in Panchkula for financial year April 2023- March 2024. One district was selected purposively for the survey (Panchkula, Haryana) based on administrative feasibility and its urban and rural population. Panchkula is a predominantly urban district with 40% rural area in the state of Haryana having a population of nearly 6 lakhs. There are four sub-districts in Panchkula district: Barwala, Kalka, Morni, Panchkula and Raipur rani.

SAMPLE SIZE-

Inclusion period- reported under HMIS and Physical data.

Exclusion period- left out population that is out of the survey, under reported data on indicators, migrated population

SAMPLING METHOD-

The sampling method used is systematic sampling where the population of Panchkula has been observed on specific indicators for one year period for financial year 2023-2024. The vaccination coverage rates have been observed for vaccines like Pentavalent, Oral polio vaccine (OPV), and Rotavirus. The AEFI Rate is also observed to know about the impact of vaccination coverage on AEFI.

RESEARCH QUESTIONS-

1. What is the correlation between vaccination coverage and AEFI rates in rural and urban areas of Panchkula?
2. Are there significant differences in AEFI rates between rural and urban facilities of Panchkula?

OBJECTIVES-

Primary objective - Impact of vaccination coverage on AEFI rates in rural and urban facilities.

The available evidence indicates that vaccination coverage can vary significantly between rural and urban areas, with some rural areas achieving higher coverage than urban areas. However, the reporting and monitoring of adverse events following immunization appears to be suboptimal in many rural settings, despite the high coverage. Targeted efforts to strengthen AEFI surveillance and reporting, especially in rural areas, are required to ensure the safety and success of vaccination programs

Secondary Objective -

- 1.To identify which vaccines are common and are causing AEFI
- 2.To identify the vaccination coverage rate and AEFI rates
3. To identify disparities between rural and urban facilities in terms of vaccination coverage and AEFI

DATA COLLECTION PROCEDURE-

Data will be collected from government health records like HMIS and databases, as well as from healthcare facilities and immunization clinics in rural and urban facilities of Haryana.

DATA ANALYSIS PLAN:

After the collection of relevant data, it was entered into Excel and analysed.

ETHICAL CONSIDERATIONS:

Informed consent will be obtained from the parents, and confidentiality will be maintained throughout the study.

IMPLICATIONS OF RESEARCH:

The findings of this study will inform policymakers and healthcare providers on strategies to improve vaccination coverage and reduce AEFI rates in Panchkula, ultimately contributing to the overall improvement of immunization programs in the region.

CHAPTER 4: RESULTS

It is a retrospective cross-sectional study conducted in the Panchkula district during the period from April 2023 to March 2024. The total live births were 12,128 across all settings—urban and rural—in the period of one year. The data were collected from 98 health centers consisting of DH, SDH, PHC, SC, and CHC. Of the health centers, 40 were rural and 58 urban. We considered the following vaccines for the study. 11,122 live births had taken place in urban institutions, with 5387 females and 5735 men. There were 1006 live births in rural institutions; 477 of those were boys and 529 girls.

PENTAVALENT VACCINATIONS:

Considering Pentavalent vaccine and its three doses.

As it can be seen in figure 1, the vaccinated population of pentavalent 1 is 4360, pentavalent 2 is 4393 and pentavalent 3 is 4346. Since the live births of Rural areas is 1006 which is less than the vaccinated population. So, the assumption we can make is most people of rural areas prefer to give delivery in urban facilities or the one that is near to them.

Figure 1: Infants who got Pentavalent vaccinations doses 1, 2 and 3 in Rural facilities

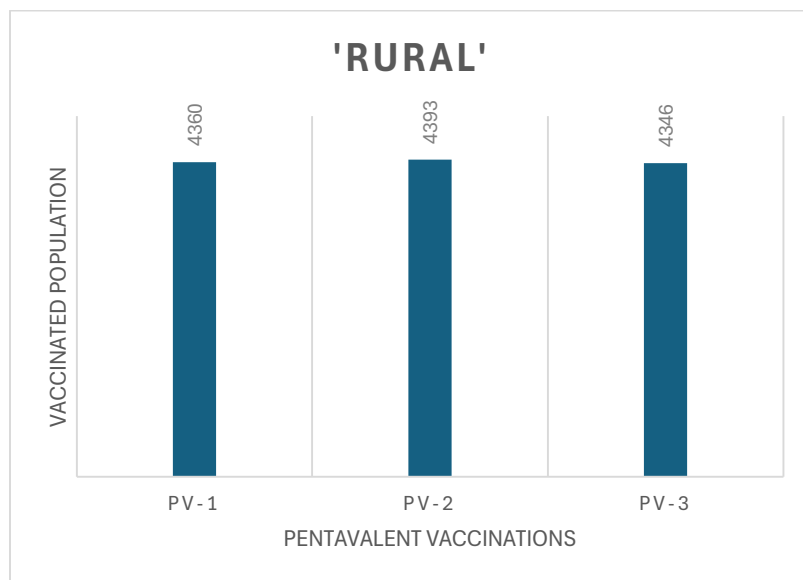
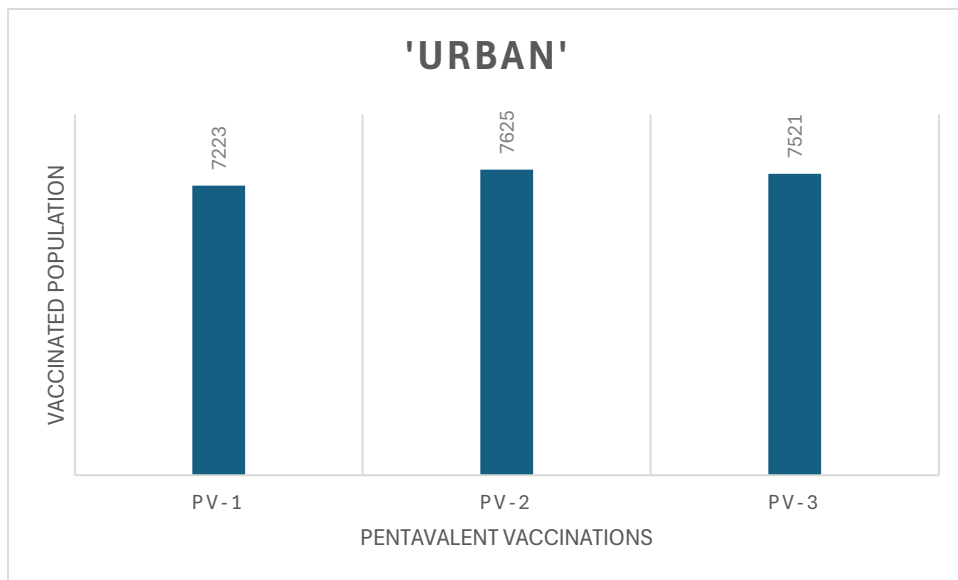
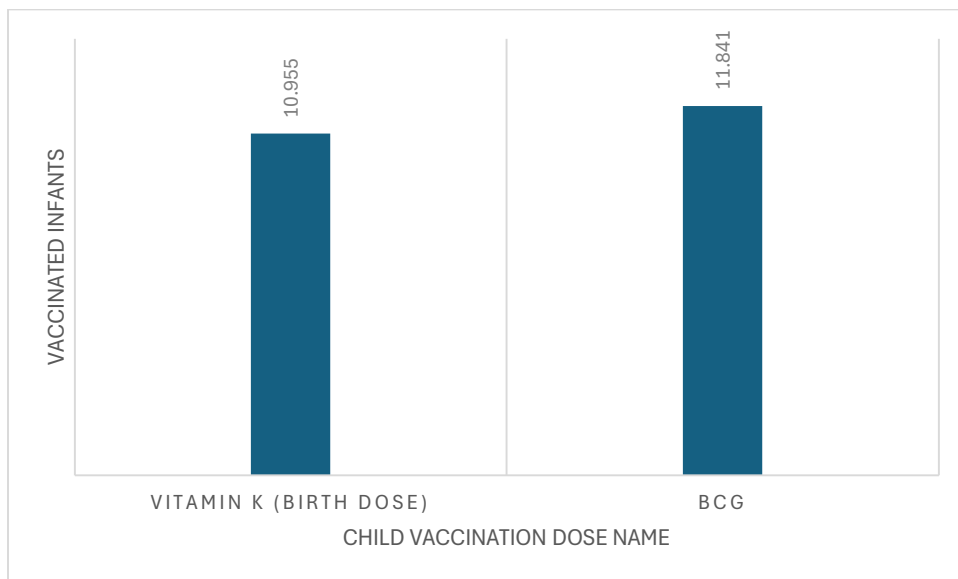


Figure 2: Infants who got Pentavalent vaccines doses 1, 2 and 3 in Urban facilities



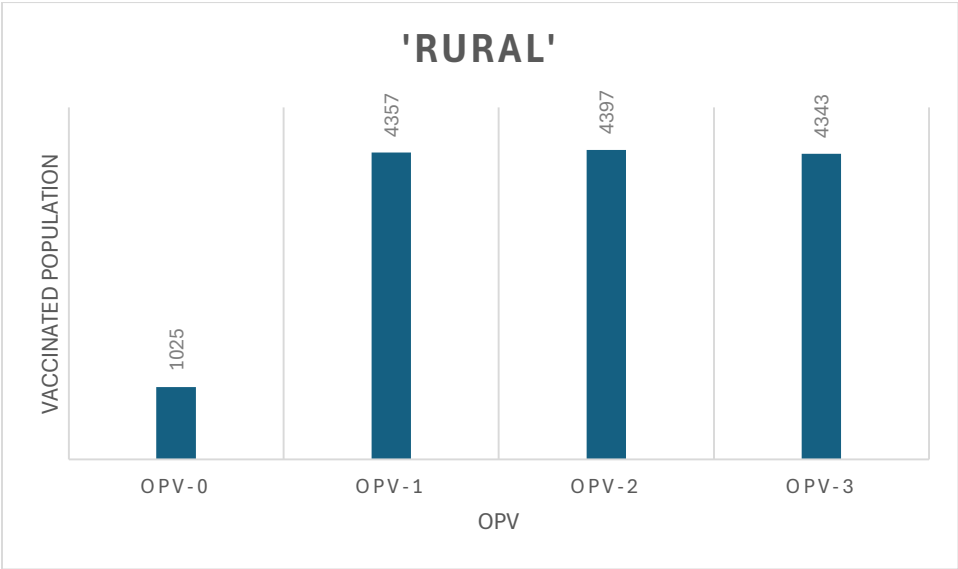
From figure 2, we can see that the pentavalent dose 3 is 7521, which shows that Panchkula has high vaccination coverage.

Figure 3: Infants who got Vitamin K (Birth dose) and BCG



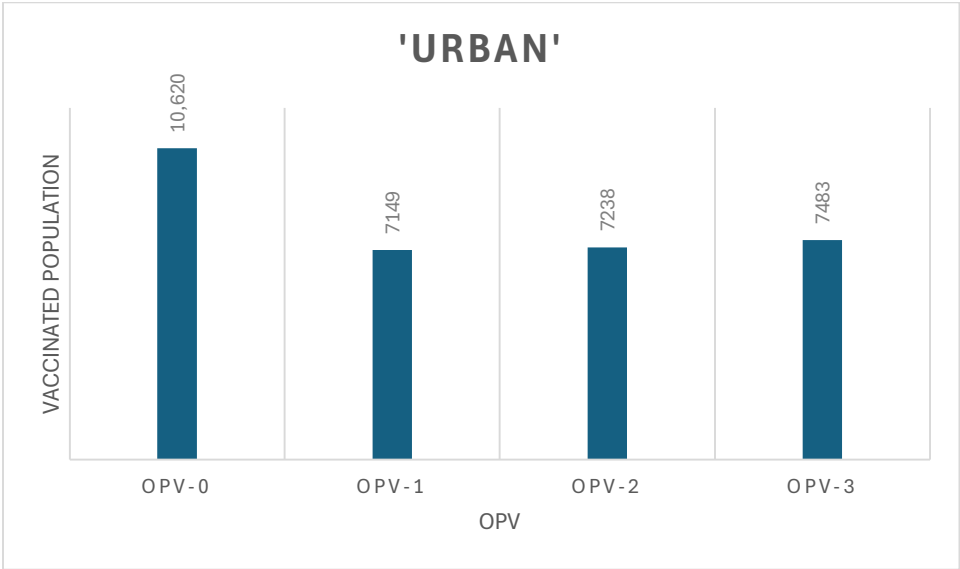
ORAL POLIO VACCINE:

Figure 4: Infants who got OPV doses 1, 2 and 3 in Rural facilities



From figure 3, we can see that 1025 infants got zero dose of OPV since OPV is a birth dose and most of the infants of rural areas were born in Urban facilities. Thereby resulting in increased number of OPV doses.

Figure 5: Infants who got OPV doses 1, 2 and 3 in Urban facilities



ROTAVIRUS VACCINATIONS:

Figure 6: Infants who got Rotavirus vaccination doses 1, 2 and 3 in Rural facilities

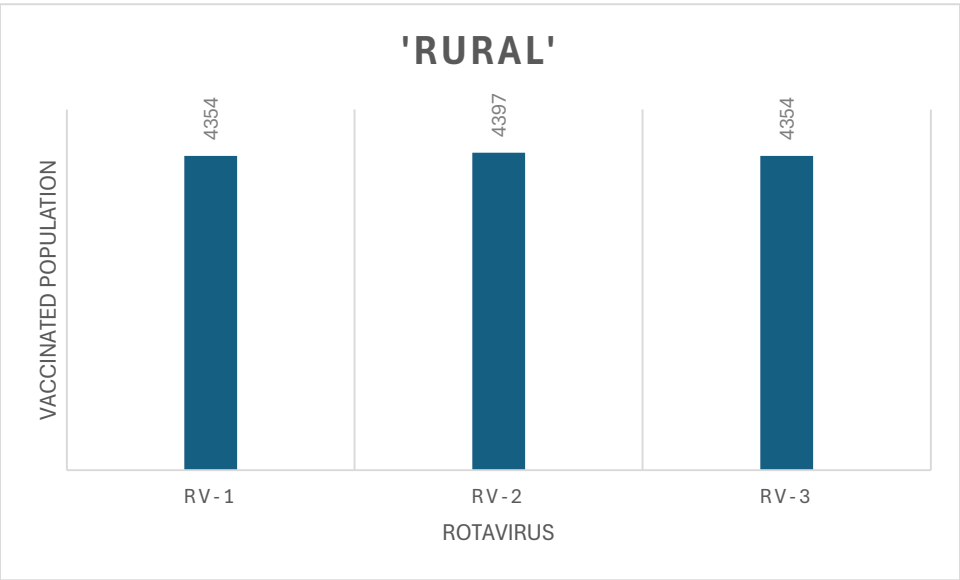


Figure 7: Infants who got Rotavirus vaccinations doses 1, 2 and 3 in Urban facilities

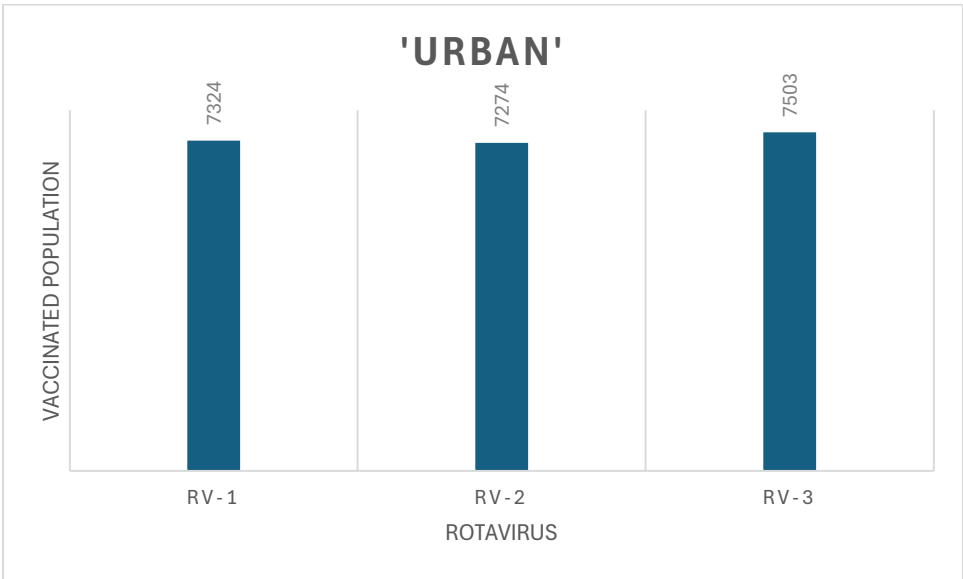


Figure 8: Infants who got Pentavalent vaccinations in Panchkula (including rural and urban facilities)

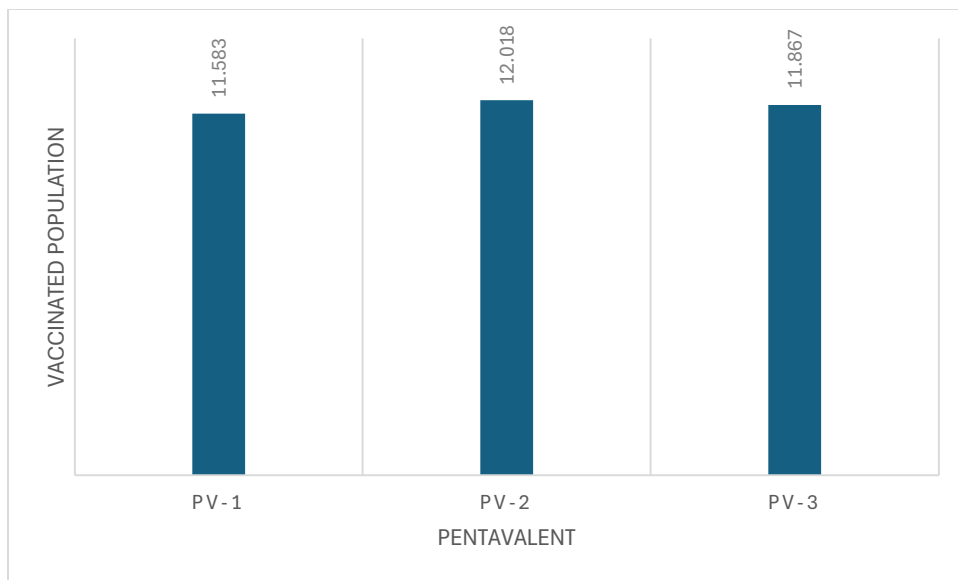


Figure 9: Infants who got OPV in Panchkula

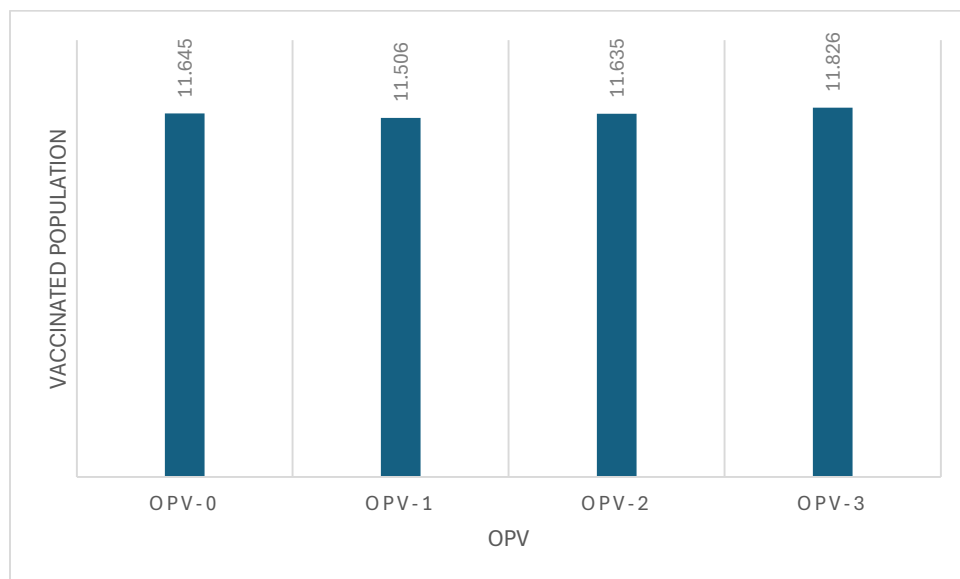
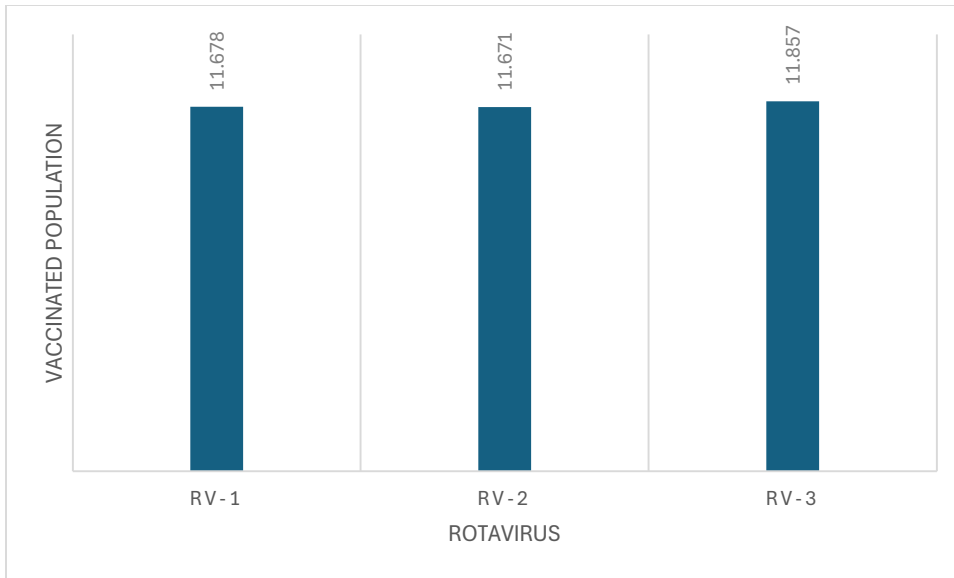


Figure 10: Infants who got Rotavirus vaccinations in Panchkula



From figure 7, 8 and 9 we can see that Vaccination coverage rate is 104% showing high vaccination coverage.

Vaccination coverage rate is defined as number of infants vaccinated * 100 divided by total number of infants.

Figure 11: Fully Immunized aged Children (males and females) between 9 and 12 months

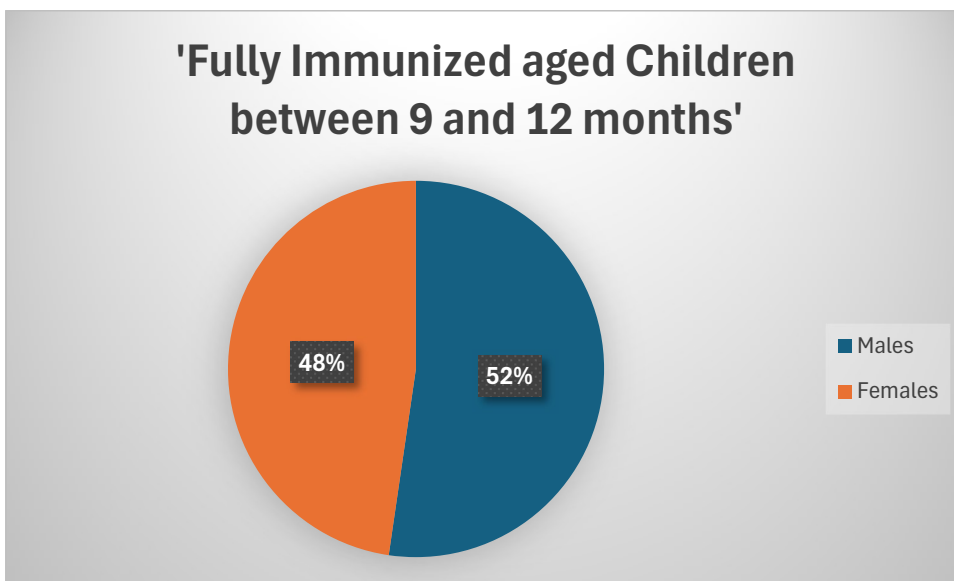


Table 1: Infants who got AEFI in Rural facilities

AEFI	VACCINATED POPULATION WHO GOT AEFI IN RURAL FACILITIES
MINOR	2042
SEVERE	18
SERIOUS	1
TOTAL	2061

Table 2: Infants who got AEFI in Urban facilities

AEFI	VACCINATED POPULATION WHO GOT AEFI IN URBAN FACILITIES
MINOR	4048
SEVERE	115
SERIOUS	3
TOTAL	4166

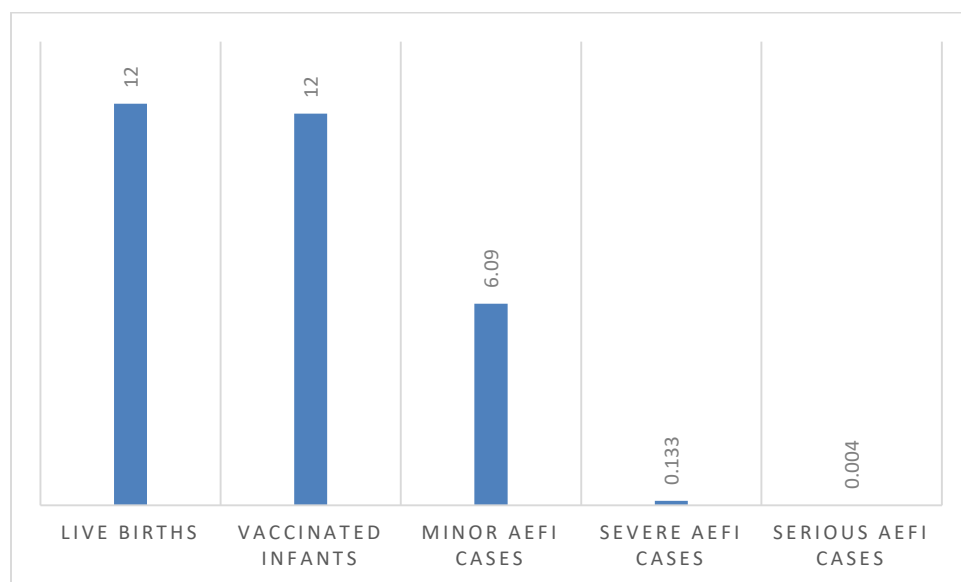
Table 3: Infants who got AEFI in Panchkula (including urban and rural facilities)

AEFI CASES	VACCINATED POPULATION IN PANCHKULA WHO GOT AEFI
MINOR	6090
SEVERE	133
SERIOUS	4
TOTAL	6227

From table 3, AEFI rate is found to be 55%.

AEFI Rate is defined as Number of AEFI Cases registered * 100 divided by Number of vaccinated doses.

Figure 10: Total no. of Live births, Vaccinated infants and AEFI Cases in Panchkula



CHAPTER 5: DISCUSSION

Interpretation of the result: Out of the overall respondents, we can see vaccines like Pentavalent, OPV, Rotavirus were given in all doses making the infants fully immunized. The vaccination coverage rate was found to be 104%. Panchkula district had full immunization coverage, second only to Kurukshetra. The AEFI rate of minor AEFI cases were found to be 51.5%. AEFI rate of severe AEFI cases were 1.12%. AEFI rate of serious AEFI cases were 0.03%. All non serious, severe and serious AEFI's were reported to be around 6227. Minor symptoms like fever, rash, pain etc were found to be more prevalent. Severe symptoms were mostly after some time gap of vaccination which showed adverse effects in a day or later. Symptoms of severe AEFI were mostly anaphylaxis, fever more than 102. Serious AEFI's were rare but were very dangerous. Symptoms of serious AEFI include hospitalization, death, disability cluster etc. In Panchkula, severe AEFI'S caused two to three deaths.

1. **Comprehensive vaccination:** The results indicate that vaccines like Pentavalent, OPV, and Rotavirus were given in all doses, ensuring full immunization of infants.
2. **High AEFI reporting:** The AEFI reporting rate was found to be 55%, with all minor, severe, and serious AEFIs being reported. This suggests a robust AEFI surveillance system in place.
3. **Potential overreporting:** The vaccination coverage exceeding 100% raises questions about the accuracy of the data and may indicate potential overreporting or issues with population estimates used for calculating coverage rates.
4. **Need for further investigation:** The high AEFI reporting rate, while positive in terms of surveillance, may also raise concerns about vaccine safety perceptions. Further investigation is needed to understand the nature and severity of the reported AEFIs.

Limitations of the study:

1. Incomplete data or missing data: the cause of this may be incomplete vaccination records, or the AEFI case report is not fully filled. Such situations may be responsible for inaccuracy in the computation of the vaccination coverage rates and AEFI incidence.
2. Short study period: The study lasted only 12 months, between March 2023 and April 2024. A longer study period would provide more information regarding the completeness in AEFI rates.
3. Underreporting: Passive surveillance for reporting AEFIs was used in the study, likely leading to underreporting of some, especially less severe, events. More AEFI cases might have been detected had active methods of surveillance been used.

4. Inadequate live births: The study needed an exact number of live births in both the rural and urban facilities, but most people from a rural area prefer dispensaries and health centers located in an urban area. As a result, there was adequate comparison in vaccination coverage rate and AEFI rates between the rural and urban areas.
5. Possible confounding factors: Other factors that could be taken as confounding factors, eg, existing medical conditions, nutritional, and socioeconomic status of the people that are known to be very contributing in determining the AEFI rates were not factored in.
6. Inadequate awareness of AEFI by the healthcare providers: Knowledge of healthcare workers in this section on the guidelines of AEFI reporting and reporting adequacy may be low, and will therefore have underreporting.
7. Negative attitudes of some healthcare workers towards the process of the AEFI reporting system are revealing that it is considered as a burden or something superfluous.
8. The lack of precision reporting training for healthcare professionals is responsible for underreporting, and that is further complicated by the surveillance of AEFI.
9. Logistic factors—nonavailability of reporting forms, complexity in procedures for reporting, low access to reporting channels—hinder timely reporting and make it incomplete.
10. Fear of consequences: Healthcare workers may not be willing to report with a fear of potential negative consequences, such as loss of public trust or vaccine drop-outs.
11. Caregivers reluctance: Caregivers will be unwilling to report AEFIs due to fear of stigma, lack of awareness and importance of reporting, or fear for the possibility of denying their child vaccination at subsequent visits.

Strengths of the study:

1. **Highlighting barriers to reporting:** The study identified barriers that impact knowledge, attitude, and reporting of AEFIs, which is important for developing strategies to address these challenges.
2. **Representativeness:** Government datasets often aim to capture data from the entire population or a large representative sample, which can enhance the generalizability of research findings.
3. **Reduced biases:** Using government records can help minimize certain biases that may arise in self-reported or voluntary data collection, such as social desirability bias or selection bias.
4. **Ability to track changes over time:** The longitudinal nature of government data allows researchers to analyse trends, patterns, and changes in outcomes or behaviours over an extended period.

5. **Public Edification:** The study's goal was to learn how vaccination coverage affected AEFI rates and to preserve and improve vaccine coverage in place by public health activities.
6. **Government-based information:** With the use of data in this research from information available in the government records, it is observable that HMIS has usually proven their procedures for collecting data with quality control measures, which boosts the reliability and validity of the known cases.
7. **Identification of the key factor:** The survey revealed vaccination coverage, AEFI cases, AEFI reporting, and previous training. This information would be of immense help to focus interventions to improve AEFI reporting.

CONCLUSION

1. **High vaccination coverage:** The Panchkula health department claims to have achieved 100% vaccine coverage, with a vaccination coverage rate of 104%. The district had the second-highest full immunization coverage in the state.
2. **Comprehensive vaccination:** Vaccines like Pentavalent, OPV, and Rotavirus were given in all doses, ensuring full immunization of infants.
3. **High AEFI reporting:** The AEFI reporting rate was found to be 55%, with all minor, severe, and serious AEFIs being reported, totalling around 6,227 cases.
4. **Improving AEFI reporting systems,** from passive to active surveillance, can help capture more comprehensive data on adverse events.
5. **ANM's can prevent AEFI** by following best immunization practices, treat minor AEFI's symptomatically, not give vaccines in front of other infants, monitor the vaccines and their expiry dates.
6. Share details of all AEFIs (serious/ severe and minor) with the MOI/C in the weekly block level meeting. Ensure details of all serious/severe and minor cases are entered in the AEFI register maintained at the block PHC

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ANNEXURES

Figure 12: National Immunization Schedule



National Immunization Schedule



for PREGNANT WOMEN

Vaccine	When to give	Dose	Diluent	Route	Site
TT-1	Early in pregnancy	0.5 ml	NO	Intramuscular	Upper Arm
TT-2 #	4 weeks after TT-1	0.5 ml	NO	Intramuscular	Upper Arm
TT-Booster#	If received TT doses in a pregnancy within the last 3 yrs.	0.5 ml	NO	Intramuscular	Upper Arm



for INFANTS

Vaccine	When to give	Max. Age	Dose	Diluent	Route	Site
BCG ##	At birth as early as possible	Till one year of age	0.1 ml (0.05 ml until 1 month age)	Sodium Chloride	Intra-dermal	Left Upper Arm
Hepatitis B Birth Dose ###	At birth as early as possible	within 24 Hours	0.5 ml	NO	Intramuscular	Anterolateral side of mid-thigh LEFT
OPV-0*#	At birth as early as possible	within the first 15 days	2 drops	NO	Oral	-
OPV 1, 2 & 3	At 6, 10 & 14 weeks	Till 5 years of age	2 drops	NO	Oral	-
Rota Virus Vaccine*	At 6, 10 & 14 weeks	Till 1 year of age	5 drops	NO	Oral	-
IPV (Inactivated Polio Vaccine)	At 6 & 14 weeks	Up to 1 yr. of age	0.1 ml	NO	Intradermal	Right Upper Arm
Pentavalent** 1, 2 & 3	At 6, 10 & 14 weeks	Till one year of age	0.5 ml	NO	Intramuscular	Anterolateral side of mid-thigh LEFT
Measles - 1 st Dose	9 - 12 completed months	Given till 5 yr of age	0.5 ml	Sterile Water	Subcutaneous	Right Upper Arm
Japanese Encephalities 1 st dose	9 - 12 completed months	Till 15 yrs.	0.5 ml	Phosphate Buffer	Subcutaneous	Left Upper Arm
Vitamin A (1 st Dose)	At 9 completed months with measles	Till 5 years of age	1 ml (1 lakh IU)	NO	Oral	-

for CHILDREN

DPT Booster - 1	16-24 months	7 years	0.5 ml	NO	Intramuscular	Anterolateral side of mid-thigh LEFT
Measles 2 nd dose	16-24 months	Till 5 years of age	0.5 ml	Sterile Water	Subcutaneous	Right upper Arm
OPV Booster	16-24 months	Till 5 years of age	2 drops	NO	Oral	-
Japanese Encephalities 2 nd dose	16-24 months	-	0.5 ml	Phosphate Buffer	Subcutaneous	Left Upper Arm
Vitamin A (2 nd to 9 th dose)	16 months. Then, 1 dose every 6 months	Till 5 years of age	2 ml (2 lakh IU)	NO	Oral	-
DPT Booster - 2	5-6 years	7 years	0.5 ml	NO	Intramuscular	Upper Arm (Left)
TT	10 years & 16 years		0.5 ml	NO	Intramuscular	Upper Arm

Vaccines	Reaction	Time-to-Onset of Event	Frequency per Doses given
BCG ^{9, 10}	<u>Local:</u> Local Abscess, Keloid, Cutaneous skin lesions, Lymphadenitis, Suppuration	Onset 1-6 months	1 per 1,000-10,000 doses
	<u>Systemic:</u> Osteitis, Osteomyelitis, Disseminated BCG disease, Immune Reconstitution Syndrome (HIV patients)	Onset 1-12 months	1 per 80000 doses 1.5-4.29 per 1,000,000 doses 1 per 640,000 doses
OPV ¹¹	Vaccine Associated Paralytic Poliomyelitis (VAPP)	4 – 30 days	1 per 6,400,000 doses
DTwP/ Pentavalent (DTwP+HiB+HBV) ^{12, 13, 14}	<u>Mild adverse events:</u> Fever >38°C and irritability Drowsiness	0 – 24 hours	40-75% 33-62%
	Prolonged inconsolable crying (>1 hr.) High fever >40.5°C	0 – 24 hours	3.5% 0.3%
	HHE	0 – 48 hours	1-291 per 100,000 doses
	Seizure	0 – 72 hours	8-60 per 100,000 doses
	Acute Encephalopathy/ Encephalitis	2-11 days	1 per 310,000 to 5,300,000 doses
	Anaphylaxis/Shock	0 – 1 hour (may be upto 24 hours)	1-2 per 1,000,000 doses

 Monthly Service Delivery Reporting format HWC-Sub Centre (HWC-SC) FORMAT 			
Facility Code	Data Item	Numbers reported during the month (In-facility)	Numbers reported during the month (Outreach)
8.6	Adverse Event Following Immunisation (AEFI)		
8.6.1.	Number of cases of AEFI -Minor (eg.- fever, rash, pain etc)		
8.6.2.	Number of cases of AEFI - Severe (eg.- anaphylaxis, fever>102 degrees, not requiring hospitalization etc.)		
8.6.3.	Number of cases of AEFI - Serious (eg.- hospitalization, death, disability , cluster etc.)		
8.6.3.a	Out of Number of cases of AEFI - Serious , total number of AEFI deaths		

 Monthly Service Delivery Reporting format HWC-Primary Health Centre (HWC-PHC) FORMAT 			
Facility Code	Data Item	Numbers reported during the month (In-facility)	Numbers reported during the month (Outreach)
9.6	Adverse Event Following Immunisation (AEFI)		
9.6.1.	Number of cases of AEFI -Minor (eg.- fever, rash, pain etc)		
9.6.2.	Number of cases of AEFI - Severe (eg.- anaphylaxis, fever>102 degrees, not requiring hospitalization etc.)		
9.6.3.	Number of cases of AEFI - Serious (eg.- hospitalization, death, disability , cluster etc.)		
9.6.3.a	Out of Number of cases of AEFI - Serious , total number of AEFI deaths		