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# A cross sectional study on evaluation of routine immunization sessions in ganjam district of Odisha, India

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**Abstract: Introduction:** Immunization is the most effective preventive measure in reducing mortality and morbidity due to communicable diseases. The success of a universal immunization program depends on the proper conduction of session sites, which in turn relies on proper planning, availability of logistics, and the competence of the manpower involved. This study aims to evaluate the session sites based on the aforementioned aspects.

**Methods:** This cross-sectional study was conducted across 24 randomly selected immunization sessions in 8 districts of Ganjam district. Data on resources-logistics readiness, sociodemographic profile, knowledge, and practice of the Auxiliary Nurse Midwives (ANMs) regarding various aspects of immunization were collected using two structured questionnaires. The collected data were compiled and analyzed using SPSS ver. 17.

**Results:** A total of 24 immunization sessions were observed in 8 blocks of Ganjam district. Immunization sessions were held according to the microplan at all sites, while beneficiary due lists were found at 18 (75%) sites. Only 6 (25%) sites had at least one vial from each vaccine. The date and time of opening the vial were recorded at 17 (70.8%) sites. Beneficiaries were advised to wait for 30 minutes at 11 (45.8%) sites, while 4 key messages were given by 15 (62.5%) of ANMs. Most ANMs were able to correctly interpret the Vaccine Vial Monitor (VVM) and were aware of which vaccines follow the open vial policy.

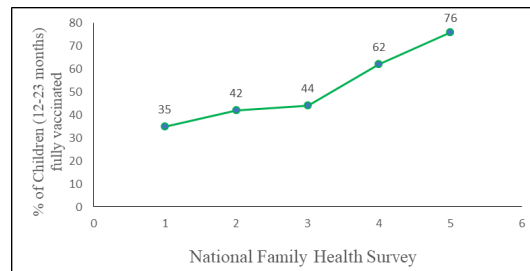
**Conclusion:** Adequate manpower was available at almost all sites, while unavailability of vaccines and logistics was observed at a few sites. The knowledge and practice of vaccinators can be improved through periodic hands-on training.

**Keywords:** Immunization; Vaccine; ANM; Odisha.

## 1. Introduction

**I**mmunization is one of the most effective preventive measures in reducing the mortalities and morbidities associated with the infectious diseases. India through universal immunization program (UIP) provides vaccination to 27 million infants and 30 million pregnant women annually there by saving at least 2-3 million lives [1,2]. The beneficiaries are vaccinated through over 9 million immunization sessions [2]. In 2018, immunization program in India completed 4 decades. Over the ages, newer vaccines have been added to the national immunisation schedule to combat emerging health problems [3].

As per NFHS-1 (1992-93), only 35% of children were fully vaccinated. It was increased to 42% in 1998-99 (NFHS-2) and to 44% (NFHS-3) in 2005-06. But the launch of NRHM in 2005 was a major boost and it helped to increase coverage to 62% in 2015-16 (NFHS-4). But the increase was not uniform; while some districts were performing well others were far below par. To increase coverage in the low performing districts, Mission Indradhanush was launched in 2014 with an objective of increasing full immunisation coverage to 90%. Despite all these efforts, full immunisation coverage was only 76% in 2019-21 (NFHS-5) [4-8]. .



**Figure 1.** Trend of vaccination (fully vaccinated) coverage in India

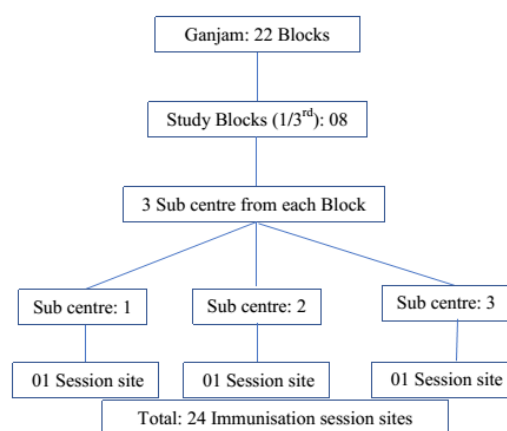
Concurrent monitoring under the routine immunization program indicated operational gaps as the reason for missing vaccination. The Auxiliary Nurse Midwives (ANM), Accredited Social Health Activist (ASHA), Anganwadi Worker (AWW) are the key persons responsible for effective conduction of the sessions. In addition, Vaccine handling, delivery of 4-key messages, documentation (microplanning, reporting) and supervision-monitoring are also essential for the successful conduction of the sessions.

There is very little information available on these issues and since this type of study has not been carried out in this district, this study was carried out to evaluate the human resources-logistics readiness and knowledge & practice of the ANMs on various aspects of immunization.

## 2. Methods

This cross-sectional study was conducted in Ganjam district of Odisha during 2020-21. Ganjam is the most populous district in Odisha. The proportion of fully immunised children in Ganjam was only 54% in 2005-06 (NFHS-4) while it has increased to 89% in 2019-21 (NFHS-5) [7,8]. But it is still less than the desired target of 90% coverage. There are 22 blocks in Ganjam district; one third (8) of the blocks selected randomly were selected for the study. From each block, 3 immunization sessions were selected randomly from 3 different subcentres. Therefore, a total of 24 immunization sessions were selected for observation.

Approval from the institutional ethical committee (No. 936/2020/Chairman IEC, MKCG MCH, Bam) was taken for the purpose of the study. CDM&PHO of the district was contacted and formally informed for the study to be carried out. A team of three members visited the outreach sessions. Data on resources-logistics readiness and practice of the ANMs on various aspects of immunization were collected using a structured questionnaire "Session site Monitoring format for Routine Immunization" developed by National Health Mission (NHM). Data on sociodemographic profile and knowledge of the ANMs on immunization were collected using another structured tool.



**Figure 2.** Process of selection of session sites

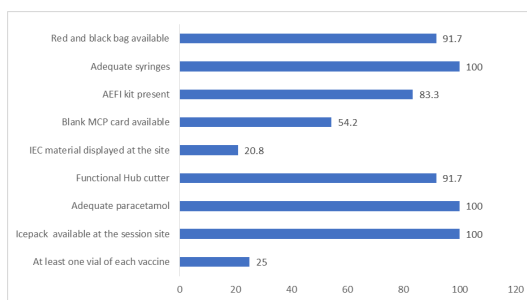
Data collected were compiled and analysed using SPSS ver.17 in the department of Community Medicine, MKCG Medical College, Berhampur.

### 3. Results

A total of 24 immunization sessions were observed from 8 blocks in Ganjam district. Table 1 shows Immunization sessions were held as per microplan at all sites while beneficiary due list was found at 18 (75%) sites. At least one among ASHA and ANM was present at all sites while both were present in 83.3% sites. While adequate waiting area was found at most sites drinking water was available at only 09 (37.5%) sites.

**Table 1.** Organisation of the sessions

Organisational details (N = 24)	n (%)	95% C. I	P
Session held as per microplan	24 (100)	85.8 – 100	
Beneficiary due list available at the session site	18 (75)	53.3 – 90.2	0.000
Adequate waiting area	22 (91.7)	73.0 – 99.0	0.023
Availability of Drinking water	09 (37.5)	18.8 – 59.4	0.000
ASHA present	23 (95.8)	78.9 – 99.9	0.000
AWW present	21 (87.5)	67.6 – 97.3	



**Figure 3.** Availability of logistics at the session sites (%)

As shown in Figure 3, at least one vial from each vaccine was found at only 6 (25%) sites. Adequate syringes and paracetamol were found at all sites. Functional hub cutter and Red-black bag for waste segregation were noticed at 22 (91.7%) sites. AEFI kit and blank MCP card were found at 20 and 13 sites respectively. IEC material was found displayed at only 5 (20.8%) sites.

**Table 2.** Vaccine and syringe handling practices by the ANM

Vaccine and syringe handling practices (N = 24)	n (%)	95% C. I	P
Date & time of opening written on vial	17 (70.8)	48.9 – 87.4	0.064
Vaccines placed correctly on the icepack	08 (33.3)	15.6 – 55.3	0.152
Vaccine carrier kept away from direct sunlight	23 (95.8)	78.9 – 99.9	0.000
ANM giving vaccines in correct sequence	07 (29.2)	12.6 – 51.1	0.064
Not touching needle before administration	24 (100)	85.8 – 100	0.000
Cutting syringes immediately	17 (70.8)	48.9 – 87.4	0.064
Giving 4-key messages	15 (62.5)	40.6 – 81.2	0.307
Asking to wait for 30 minutes	11 (45.8)	25.6 – 67.2	0.839
Whether session supervised today by MO/LHV	03 (12.5)	02.7 – 32.4	0.000

Table 2 focuses on the vaccine and syringe practices by the ANM. Date and time of opening the vial was written at 17 (70.8%) sites. Vaccines were placed according to their sensitivity on the icepacks at only 8 (33.3%) sites. Similarly, only 7 (29.2%) were aware of the correct sequence of vaccination (less painful to more painful). Immediately following immunization, 17 (70.8%) ANMs cut syringes using hub cutter. Beneficiaries are advised to wait for 30 minutes at 11 (45.8) while 4 key messages were given by 15 (62.5) of ANMs. Vaccine carrier was kept away from direct sunlight at 23 (95.8) sites. Only 3 session sites were supervised on the day by MO/LHV.

**Table 3.** Knowledge of ANM on vaccines and vaccination

Particulars (N = 24)	n (%)	95% C. I	P
Which vaccines are heat sensitive	16 (66.7)	44.7 – 84.4	0.152
Which vaccines are freeze sensitive	14 (58.3)	36.6 – 77.9	0.541
Which vaccines are light sensitive	10 (41.7)	22.1 – 63.4	0.541
Temperature range for vaccine storage in ILR	13 (54.2)	32.8 – 74.4	0.839
Correct interpretation of VVM	20 (83.3)	62.6 – 95.3	0.002
Vaccines which follow open vial policy	23 (95.8)	78.9 – 99.9	0.000
Knew how to condition icepacks.	21 (87.5)	67.6 – 97.3	0.000

Coming to knowledge of ANMs on vaccines and vaccination, only 14 (58.3%) correctly answered which vaccines are freeze sensitive. Only 54.2% knew the temperature for storage of vaccines in ILR. Most (20) ANM were able to correctly interpret the VVM. Most (95.8%) of them knew the vaccines that follow open vial policy and 87.5% ANMs could correctly answer how to condition the icepacks.

#### 4. Discussion

This cross-sectional study conducted across 24 outreach immunization session sites revealed that all sessions were held as per microplan. Adequate human resources and logistics are essential for delivery of the services. In our study we found ANM as vaccinator was as present at all sites. Both ASHA and ANM have an important role in mobilising the beneficiaries to the session site. We found at least ASHA or ANM present at all sites which is similar to the findings of a study in Gujarat, where a mobiliser is seen at 83.3% session sites [9]. Updated beneficiary due list is required to track and mobilise the beneficiaries and thereby increase beneficiary turnout. It was available at 18 (75%) sites which is similar to as seen in a study conducted across 27 districts in Bihar, Kerala and Gujarat [10]. Though adequate waiting area was there at most sites, drinking water facility at the session site was found at only 09 (37.5%) sites. Potable water at the session sites will certainly add to beneficiary compliance towards the services.

No beneficiary should be left unvaccinated due to unavailability of vaccines at the session site. Ideally at least one vial from each vaccine should be taken to the session site even if there is no intended beneficiary in the due list. But we found the same at only 6 (25%) sites similar to that found in a study in Uttarakhand [11]. Adequate syringes, Vitamin A, Paracetamol were available at all the session sites. Improper management of bio-medical waste at the session site can be a public health concern. It was good to notice that functional hub cutter and red-black bag for waste segregation were present at most sites. IEC materials on benefits of vaccination should be displayed at the sites. Our study found the same at only 5 (20.8%) sites compared to 89.4% sites in Gujarat as observed by Mehta K et al [12].

Correct immunization practices will lead to decreased immunization error related AEFI (adverse events following immunization) and thereby increase credibility of the program. Vaccines following open vial policy can be used up to 28 days following opening of the vial provided certain conditions are met. Hence it is advised to write the date and time of opening on the vial. We observed that date and time of opening was written at 17 (70.8%) sites comparable to 71.42% in a study in Jamnagar district in Gujarat [13]. Since vaccines are highly sensitive to temperature and light, their correct placement on the icepack can prevent the vaccines from heat and freeze damage and preserve their potency. We found that at 33.3% sites vaccines were placed correctly which was less as compared to that observed by Das MK et al [10]. Appropriate handling of immunisation wastes was observed at 17 (70.8%) sites which was less compared to a report by Mehta K et al who found a functional hub cutter and the vaccinator cutting syringes immediately following vaccination at 89.4% of the session sites [12].

Life threatening anaphylactic reactions though rare can occur. Hence beneficiaries are usually observed for 30 minutes post vaccination. We found at less than half (11) sites the ANM was asking the beneficiaries to wait for 30 minutes. Counselling the mothers/guardians with the 4-key messages is important in adhering

them with the program. Our study revealed 15 (62.5%) of ANMs were giving the 4-key messages which was less when compared to the findings of Sharma DK et al in Kheda district of Gujarat [14]. Only 3(12.5%) sites were supervised by health supervisors and medical officers. Periodic training of the ANMs and regular monitoring and supportive supervision will certainly improve the functioning of the sessions.

Out of the 24 ANMs interviewed, 14 (58.3%) knew all the freeze sensitive vaccines similar to what observed by Ray S et al. in West Bengal [15]. Most of the vaccinators could correctly read the VVM, knew regarding open vial policy and condition the icepacks.

## 5. Conclusion

The vaccine cold chain handler should be advised to send at least one vial from each vaccine so that no beneficiary returns unvaccinated. The knowledge and practice of ANMs on vaccine handling and vaccination needs to be improved through regular supervision by higher authorities and also periodic hands-on training.

## 6. Limitations

Our study is not free from limitations. First, more session sites should have been included from more blocks. Second, a qualitative analysis of the participants should have been done for better understanding of ANMs on various aspects of immunisation.

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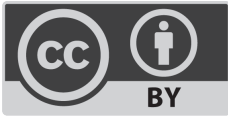
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**Conflicts of Interest:** Authors declare no conflict of interests.

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