



EVALUATION OF VACCINE STORAGE PRACTICES IN PRIMARY HEALTH CENTRES OF BIJAPUR DISTRICT OF KARNATAKA

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ABSTRACT

Proper storage and handling of vaccines has pivotal role in maintaining the quality of vaccines. This study was done to assess various components of Vaccine storage practices and the cold chain system. Methodology: A cross-sectional study was done using a structured questionnaire. Data was collected from 46 Primary Health Centres of Bijapur District.

Only in 35(76.1%) Primary Health Centres (PHC), Ice Lined Refrigerator(ILR) and Deep Freezer (DF) were properly positioned with a functional thermometer placed inside them. The Correct placement of ice packs inside Deep Freezer was observed in 34(73.9%) PHC. No T-series vaccine vials were placed in the bottom of ILR in 39(84.8%) PHC. Proper arrangement of vaccines in ILR was seen in 27(58.7%) PHC. Record of power failures and Defrosting were noted in temperature log books in 30(65.2%) PHC. Conclusion: The quality of vaccination programme can be increased by proper storage and management of vaccine in cold chain at PHC.

KEY WORDS: Cold chain, evaluation, immunization, storage, vaccine



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INTRODUCTION

Vaccines produce active immunity to the body by stimulating the immune system which produces antibodies against disease producing organisms¹. Vaccines are cost-effective method of preventing many infectious diseases. Several deaths in premature children can be prevented by immunization². In 1974, WHO launched Expanded Programme on Immunization (EPI) against six most common preventable childhood diseases. The Government of India launched EPI in 1978 with objective of reducing mortality and morbidity from vaccine preventable diseases of childhood³. The quality of vaccines is one of important factor for success of immunisation programme which in turn depends on proper storage and handling of vaccines⁴. If vaccines are stored outside the recommended temperature for considerable time, its potency will be adversely effected thereby reducing protection from vaccine preventable diseases⁵. The studies have indicated that improper storage of vaccine have led to localized outbreak of measles in US and resurgence of pertussis in Australia⁶. Since most of the vaccines lose their potency within short time when exposed to room temperature, cold

chain is an essential component for maintaining the quality of vaccine. The principles vaccine storage consists of proper installation of thermometers, maintenance of appropriate temperatures, recording temperatures, location of the vaccines inside a refrigerator, using the refrigerator exclusively for vaccine storage⁷.

This study was conducted to evaluate vaccine storage and handling practices in primary health centres of Bijapur District.

MATERIALS AND METHODS

This was a cross sectional study conducted in Bijapur district between September 2011 to March 2013. This study was part of a project on Strengthening Routine Immunisation Programme. The authors of study worked as Routine Immunisation Monitors for Bijapur District. A total of 46 PHCs were visited by authors. Data was collected as per the questionnaire prepared by WHO/Government of India¹ and analysed using percentages and proportions.

RESULTS AND DISCUSSIONS

Table No 1
Vaccine storage and handling Practices in PHC n=46

	YES	NO
A) ILRs and DFs		
a. Placed on wooden blocks and at least 10 cm away from walls and surrounding equipment	35(76.1%)	11(23.9%)
b. Each equipment is connected through functional Voltage Stabilizer	42(91.3%)	4(8.7%)
c. Functional thermometer placed inside every ILR and DF	35(76.1%)	11(23.9%)
d. No frost OR frost less than 5mm on inside walls of every ILR	46(100%)	0
B) Temperature Log Books		
a. Twice daily monitoring of temperature in respective log books	44(95.6%)	2(4.4%)
b. Record of power failures/cuts (if any) and Record of Defrosting ILRs & DFs	30(65.2%)	16(34.8%)
c. Periodic checks of Temperature Log Books by Facility in-charge (see evidence of signatures)	40(86.9%)	6(13.1%)
C) Ice Lined Refrigerator (ILRs)		
a. Cabinet Temperature between +2 to +8°C	43(93.5%)	3(6.5%)
b. All vaccine vials correctly arranged inside labeled cartons (expiry date, batch)	27(58.7%)	19(41.3%)

	c. No T-series or Hepatitis B vaccine vials placed in the bottom of ILR	39(84.8%)	7(15.2%)
	d. Diluents placed in ILR, at least 24 hours before distribution (observe and/or consult)	44(95.6%)	2(4.4%)
D) Deep Freezer (DF)			
	a. Cabinet Temperature of DFs between -15 to -25°C	42(91.3%)	4(8.7%)
	b. Correct placement of ice packs inside DF (in crisscross manner, while freezing)	34(73.9%)	12(26.1%)
	c. No RI vaccines stored inside DFs (including reconstituted vaccines)	46(100%)	0

It was observed from the study that in 35(76.1%) PHC, ILR and DF were placed on wooden block and least 10 cm away from walls and surrounding equipment. The proper positioning was not seen in 11(23.9%) PHC. ILR and DF were connected to functional Voltage Stabilizer in 42(91.3%) PHC whereas 4(8.7%) PHC had no stabilizer. A functional thermometer was placed inside every ILR and DF only in 35(76.1%) PHCs. It was good to observe that there was no frost or frost less than 5mm on inside walls of ILR in all the 46(100%) PHCs visited. Goel NK et al⁸ in their study on Cold-chain Maintenance in Chandigarh in 2006 observed that all (100%) the ILR and DF were correctly installed with functional thermometer. A study by Saerom Lee et al⁷ in Korea reported that 87.2% of refrigerators had its own thermometer where as Yuan et al⁹ noted that only 10% of medical institutions had thermometers inside refrigerators. The proper positioning of ILR/DF is important for correct functioning and improving durability of the equipments. Temperature log books were monitored twice daily by faculty in charge in 44(95.6%) PHC. Record of both Power failures/cuts (if any) and Defrosting ILRs & DFs were maintained by only 30 (65.2%) PHC. The most faculties were not aware about record keeping of defrosting. Periodic checks of temperature log books by medical officers were observed in 40(86.9%) PHCs. These observations are similar to Goel NK et al⁸ where they reported that temperature chart was updated in 97.5% and record of breakdown was noted in 80% of health centres. The temperature log book was countersigned by 95.3% Supervisor/Medical officers. 43(93.5%) PHC had maintained the Cabinet Temperature

of ILR between +2 to +8⁰ C. T-series or Hepatitis B vaccine vials were not placed in the bottom of ILR in 39(84.8%) PHC. It was observed that in only 27(58.7%) PHCs, vaccine vials were correctly arranged inside Labeled cartons. In 44(95.6%) PHCs, diluents were placed in ILR, at least 24 hours before distribution.

Tushar Patel et al¹⁰ study in rural areas of Gujarat reported that ILR temperature was maintained in 90.9% and vaccines were correct stored in 93.2% PHC. Goel NK et al⁸ observed that 5% of ILR/DF were used for keeping food item and drugs other than RI vaccines and Vaccines stacked neatly in 100% ILR. Arun Aggarwal et al¹¹ reported that most institutions had stored vaccines correctly in ILR with a proper cabinet temperature. Saerom Lee et al⁷ noted that refrigerators were maintained at the appropriate storage temperature in 92.3%, other medicines and nonmedical items (e.g., foods) being stored in the refrigerator in 35.9% ,vaccines properly arranged in 56.4 % and refrigerator being used exclusively for vaccine storage only in 7.7% of medical institutions. It is noted in our study and also other studies that items other than vaccines (food, drugs and laboratory reagents) were placed in ILR. It is not a good practice because these items can pollute vaccines and frequent opening of ILR will lead to temperature variation and thermal shock of vaccines. The reasons for keeping other items were either ignorance or non availability of domestic freezer in PHC. Keeping vaccines properly in labeled cartoons is important prevent any mixing of different vaccines and use of expired vaccines. T series vaccines are freeze sensitive hence they should not be kept at the bottom of ILR. Diluents needs

to be kept in ILR for atleast 24 hours before vaccination because vaccine and diluents should be of similar temperature during reconstitution. It was revealed from the study that the Cabinet Temperature of DFs was maintained between -15 to -25°C in 42(91.3%) PHC. The Correct placement of ice packs inside DF (in crisscross manner, while freezing) was observed only in 34(73.9%) PHC. It was good to see that none of PHC had vaccines stored inside DFs. A study by Goel NK et al⁸ in Chandigarh noted that all the icepacks were properly stalked in Deep freezer. Good quality icepacks are requisite for field transportation of vaccine in vaccine carrier and these can be

obtained from DF only if proper temperature is maintained with correct placement of ice packs.

CONCLUSION

The quality of vaccination programme can be increased by proper storage and management of vaccine in cold chain at PHC. There is a need to improve methods of ILR and DF maintenance in terms of installation, temperature, regular defrosting with record keeping. The correct placement of vaccines in ILR and exclusive use of ILR for storage of vaccine is vital factor for successful immunization programme.

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