



Original Research Article

Study of Cold Chain Status at Mamta Session of Each Urban Health Centres (UHCs) of Ahmedabad Municipal Corporation (AMC) Area

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ABSTRACT

Introduction: Cold chain is important elements of immunization programme.

Aims & objectives: 1) To evaluate cold chain status at Mamta session site of each UHC. 2) To take necessary corrective measures whenever required and give relevant advices to handlers for improving the system.

Methodology: A cross sectional study was conducted at all the 56 UHCs of AMC area during May2011 to January2012. From each UHC, one working Mamta session was selected for study purpose. Pretested check list was used to evaluate Mamta session of each UHC.

Results & discussion: All the session sites were away from direct sunlight. The lid of vaccine carrier was closed at 47 (83.9%) of sessions but lid belt was covered at 14 (25%) sessions only. None of the session had all 4 icepacks in fully melted condition. Zip pouch was observed at 54 (96.4%) of sessions. None of the vaccine carrier had other items apart from UIP vaccines. At 4(7.1%) sessions OPV was found in VVM stage 3. Time of reconstitution was noted on BCG/ measles vials at 29(51.8%) of sessions. Due list of beneficiary was available at 25 (44.6%) sessions. Session supervision by MO/supervisor was found at 53(94.6%).

Conclusion: Overall findings of vaccine carrier were satisfactory. Universal foam pad supply is recommended. Practice of noting time of reconstitution on the vaccine vial was need to be improved. Regular cold chain training for handlers should be organized by the health authority of the AMC.

Key words: cold chain, Mamta session, UHC

INTRODUCTION

Cold chain is a system of storing and transporting vaccine at the recommended temperature range from the point of manufacture to point of use. [1-3] cold chain is backbone of immunization programme. Immunization is one of the most well-known and effective methods of preventing childhood diseases. With the implementation of Universal Immunization Programme (UIP), significant achievements

have been made in preventing and controlling the Vaccine Preventable Diseases (VPDs). [4,5] Ample amount of expenditure on immunization program is done by Government of India, so it is key issue to maintain potency of all vaccines at every level of transportation from the manufacture sites, during storage at different levels and also during the vaccination sessions at field level. [5] Once vaccine potency is lost, it cannot be regained. [6] So

for better cost effective immunization programme, we have to provide potent and effective vaccines by maintaining cold chain system at all levels.

Among the all level, maintaining the cold chain system at field sessions is very difficult. Due to unavailability of electrical equipments, risk of cold chain failure was higher at field/Mamta sessions. Only vaccine carrier with 4 icepacks is used at field session to maintain cold chain. [2,7] Vaccine carriers are used for carrying small quantities of vaccines (16-20 vials) to the sub-centres or session sites. [7] Ice packs are key component of the cold chain. The ice packs are frozen inside the deep freezer and used with cold box and vaccine carrier. Ice packs should be conditioned before use in vaccine carrier or cold box. [8] conditioning of icepacks is to keep them at room temperature for period of time to rise their temperature to near 0 °C. [2, 8] As the AMC covers the many slum areas through Mamta sessions, maintenance of cold chain system for effective immunization at such sessions is essential. So study was conducted at Mamta session of each UHC of AMC with following objectives.

Aims & objectives:

- To evaluate cold chain status at Mamta session site of each UHC.
- To take necessary corrective measures whenever required and give relevant advices to handlers for improving the system.

MATERIALS AND METHODS

Ahmedabad Corporation is divided in 6 zones and has total 57 wards with a city population of 5,570,585. [9] Zone wise distribution of fifty seven UHCs shoes that West Zone (WZ), New west Zone (Nwz), East Zone (Ez) and North Zone (Nz) having 10 UHCs in each zone. While Central Zone (Cz) having 09 UHCs and South Zone (Sz) having 08 UHCs. The present cross

sectional study was conducted at all 56 UHCs of AMC area during May2011 to January2012. As far as the cold chain system of UHC is concern, there are fifty six UHCs, because 2 UHCs of East zones (Rajpur and Rakhiyal) are working as a single unit for immunization coverage and there is single set of all cold chain equipments for both UHCs. In AMC area Responsibility of cold chain and vaccine management at all UHCs is under RBD department. Due permission was taken from Registrar of birth & death department (RBD department), Health sector, AMC. Institutional Review Board (IRB) of Smt. N.H.L. Municipal Medical College, Ahmedabad approved the study and gave ethical clearance. Fully structured checklist, which was specially designed and pre-tested was used for data collection purpose at all UHCs. The check list contains details of various components of cold chain. Among them one of the important component is to evaluate cold chain status at Mamta session of each UHC, Which covers the detail about vaccination site, vaccine carrier, vaccines handling, supervision of sessions etc. From each UHC, information of working Mamta session on the day of UHC visit was taken. Cold chain findings of Mamta session were filled as per check list and corrective measures were taken wherever necessary. Data entry was carried out and data analysis was done by using appropriate statistical software and applying suitable statistical tests.

RESULTS

At each Mamta session vaccination site was away from direct sunlight. There are only non electrical cold chain equipments to maintain recommended temperature at session site. That is vaccine carrier along with 4 ice packs. Evaluation of vaccine carrier was carried out both externally and internally (Table-1). External

findings were satisfactory except for proper covering of belt (14, 25%) to vaccine carrier. None of the vaccine carrier had foam pad inside the carrier. Majority (54, 96.4%) had zip pouch to avoid the direct contact between vaccines and icepacks. However it was observed that only 1 (1.8%) Mamta session had thick paper to wrap vaccines & diluents inside the zip pouch. Among 227 total icepacks, majority (112, 49.3%) were found in Semi Frozen (SF) condition. Around (42, 18.5%) icepacks were found in Fully Melted (FM) condition, however none of the session had all 4 icepacks in fully melted condition. Comparison between fully melted icepacks status of UHC level and field level was done (Table-2). Among 42 fully melted icepacks, 16 (38.1%) icepacks showed leakage. The reasons of the leakage were as per Table-2. After the evaluation of

vaccine carrier, vaccines handling at Mamta sessions were observed (Table-3). None of the session showed reconstitution of BCG/Measles irrespective of their requirement. However time noted at time of vaccine reconstitution on BCG / measles vials was found at (29, 51.8%) sessions. Poor results were observed in placement of freeze sensitive ('T'-series) vaccines over icepacks (Table-3). None of the vaccines showed visible precipitate or other findings of freeze damage. Due list of beneficiary was available at 25 (44.6%) sessions only. All vaccines were found within expiry date period. Mamta sessions monitoring findings were satisfactory (53, 94.6%) for internal checking but external cross checking showed average (36, 64.3%) results (Table-3).

Table-1: Evaluation of vaccine carrier at Mamta session site of each UHC.

Sr. No.	Findings of vaccine carrier at Mamta session (N=56)	Yes (No.)	Percentage (%)
1	External findings related to Vaccine Carrier		
1.a	Vaccination site away from direct sunlight	56	100
1.b	Cleanliness of Vaccine carrier (Externally)	56	100
1.c	Any visible cracks in Vaccine carrier	00	00
1.d	Proper lid closed without any visible gap	47	83.9
1.e	Vaccine carrier covered with belts properly	14	25
1.f	Heavy materials noted over carrier.	00	00
2	Internal findings related to Vaccine Carrier		
2.a	Cleanliness of Vaccine carrier (Internally)	56	100
2.b	Foam pad available in Vaccine carrier	00	00
2.c	Vaccines & diluents wrap in thick paper (in zip pouch)	01	1.8
2.d	All Vaccines & diluents inside the intact zip pouch	54	96.4
2.e	Status of Ice packs in the carrier (N=227)		
	In Hard Frozen (HF) condition/state	73	32.2
	In Semi Frozen (SF) condition	112	49.3
	In Fully Melted (FM) condition	42	18.5
2.f	Any other items in carrier	00	00

Table-2: Comparison of Fully Melted (FM) ice packs status between UHC and Field level.

Sr. No.	Ice packs related details in Fully Melted (FM) condition	At UHC level	At Field level	Chi-square value	P value
1	Water level in Ice packs	(N=280 FM)	(N=42)		
1.a	At the mark level	137	14	6.09	0.014
1.b	0-2 cm below	104	20	1.69	0.19
1.c	2-4 cm below	027	06	0.85	0.35
1.d	4-6 cm below	009	02	0.003	0.95
1.e	>6 cm below	003	00	0.45	0.50
2	Water leakage found	(N=41/280)	(N=16/42)		
2.a	Total Leakage	41	16	13.8	0.0002
2.b	Leakage due to No Cap	15	08	0.39	0.53
2.c	Leakage due to Crack	17	06	0.07	0.78
2.d	Leakage due to Both	09	02	0.19	0.66

Table-3: Evaluation of vaccines status & supervision activity at Mamta session site of each UHC.

Sr. No.	Findings of Mamta session (N=56)	Yes (No.)	Percentage (%)
1	Findings related to Vaccine		
1.a	Vaccines taken out irrespective of requirement noted	00	00
1.b	Freeze sensitive vaccines observed in wells of ice packs	11	19.6
1.c	Freeze sensitive vaccines in direct contact with ice packs	33	58.9
1.d	Reconstitution done irrespective of requirement noted	00	00
1.e	Time noted at time of vaccine reconstitution (on BCG / measles vials)	29	51.8
1.f	OPV vaccine with VVM status 3 or 4	04	7.1
1.g	On Shake test result, freeze damage present	00	00
1.h	All vaccines within Expiry date	56	100
1.i	Vials taken according to Due list of beneficiary	25	44.6
1.j	Whether BCG given in the field sessions	55	98.2
2	Supervision/Monitoring related points		
2.a	Internal Supervision by MO/HV in last month	53	94.6
2.b	External Cross checking by AMC in last 3 month	36	64.3

DISCUSSION

Vaccine carriers are used for carrying small quantities of vaccines (16-20 vials) to the sub-centres or session sites. The vaccine carriers are made of insulated material, the quality of which determines the cold life of the carrier. [2,3] The session site, external condition & cleanliness of the vaccine carrier and its placement were satisfactory at all the field session sites. However, vaccine carrier were properly closed at 47 (83.9%) & secured with belt at 14 (25%) sites. Vaccine carriers were also properly cleaned internally (Table- 1). Four ice packs are laid in the vaccine carrier as per manufacturer's guidelines. [5] There is foam pad just beneath the lid of vaccine carrier to protect vaccine from direct contact to external environment. [3] However foam pads were uniformly absent as they are not supplied as a standard set of vaccine carrier. To avoid direct contact between vaccines and icepacks, all UIP vaccines and diluents should wrap inside the thick paper and place in zip pouch. [2] Study reveals majority (54, 96.4%) had zip pouch to avoid the direct contact between vaccines and icepacks. However it was observed that at only 1 (1.8%) Mamta session, thick paper was present to wrap vaccines & diluents inside the zip pouch. To maintain cold chain system at field level, ice packs are key

component of the cold chain. Only conditioned icepacks with proper water level and without any leakage should be used during preparation of vaccine carrier for field session. [3,4] Icepack status was found to be satisfactory at all the session sites. Fully melted icepacks were seen depending on time of visit after starting the session, duration of session & distance from the UHC. No session site had all the icepacks in fully melted condition (Table- 1). Comparison of water level & reason of water leakage of icepacks between UHC and field level was done (Table- 2). Significant difference between UHC and field level was found for water at mark level and for leakage icepacks. T series vaccines should not be kept in wells of ice packs or in direct contact of the icepack as per the guideline. [6] however, such practices were found at many sessions (Table- 3). For freeze dried vaccines, to know the point of discard after reconstitution, it is important to note the time of reconstitution on the vaccine vial. [1,7] Such practices were followed at 29 (51.8%) of field sites only. Vaccine vial in VVM stage 3 or 4 should be discarded immediately and should not be used for vaccination. [5] At 4 (7.1%) field site, OPV vials showed VVM stage 3 and they were immediately discarded as per the guideline. The estimation of vaccines and other

logistics are based on the number of the beneficiaries, calculated in advance for the next session. Such type of due list are important to take out appropriate vaccines in required quantities for the field session. Only 25 (44.6%) session sites were following due list practices. Supervision or session monitoring was satisfactory at internal level (MO/Health Visitor) only. Average external monitoring was noted at field level (Table- 3).

CONCLUSION

Overall condition of vaccine carrier at each Mamta session was satisfactory. Universal foam pad supply is recommended. None of the session had all 4 icepacks in fully melted condition. Condition of icepacks was properly checked during the preparation of vaccine carrier to avoid cold chain failure at field level. Poor results were observed for placement of freeze sensitive over icepacks. Practice of noting time of reconstitution on the vaccine vial was needed to be improved. It is recommended to regularly maintain due list of beneficiary at field sessions to know average vaccine requirement. External supervision need to be strengthened. Regular cold chain training for handlers should be organized by the health authority of the AMC.

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