

## Original Research Article

# Awareness of vaccine cold chain handlers about vaccine cold chain in district Etawah

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### ABSTRACT

**Background:** Vaccine potency can be lost when exposed to non-recommended temperatures. Hence for the proper running of the universal immunization programme (UIP) factors like vaccine cold chain and vaccine management wants great focus and attention skills and knowledge of the vaccine cold chain handlers so for good implementation of UIP vaccine cold chain handlers are important.

**Methods:** This was an observational cross-sectional study. Study duration was carried out from October 2017 to March 2018. All the 16 cold chain handlers of district Etawah were interviewed.

**Results:** All 16 (100.0%) were male and 1 (6.3%), 2 (12.5%), 8 (50.0%) and 5 (31.3%) of the respondents were high schools, intermediate, graduate, and post-graduate respectively. It had been observed that the hundred percent of the cold chain handlers with the knowledge of vaccine cold chain. It has been observed from the study that 15 (93.7%) cold chain handlers had knowledge of temperature range for vaccine storage.

**Conclusions:** Quality of immunization program depends upon cold chain management at peripheral health institutions. In our study, we have found that most of the vaccine handlers were reported to have appropriate knowledge regarding the cold chain.

**Keywords:** Cold chain handlers, Immunization, Vaccines, Holdover time

### INTRODUCTION

Early, it is estimated by the World Health Organization (WHO) that near about 5.9 million children die before celebrating their fifth birthday.<sup>1</sup> More than 2/3rd of this mortality is due to conditions that could be aborted or managed with simple measures and cost-effective interventional methods.<sup>2</sup> One such well known cost-effective preventive health intervention method is immunization. It can prevent under-five child mortalities, morbidities, and disabilities.<sup>3</sup> Smallpox eradication in 1974 showed the world that vaccination against vaccine preventable diseases is the greatest and cheap sword against vaccine preventable diseases. Every year 2-3 million lives can be saved by immunization against

vaccine preventable diseases. Routinely used immunizing agents are the vaccines. A vaccine is an immuno-biological preparation that could be live, killed designed to produce specific protection against a specific vaccine preventable disease. Vaccine preparation is delicate biological substance. Some vaccines are delicate to high temperatures, some too low temperature and others to sunlight. Vaccine ability to adequately protect the vaccinated person is called vaccine potency. Vaccine potency can be lost when exposed to non-recommended temperatures. The denatured vaccine cannot be renatured.<sup>4</sup> Hence for the proper running of the Universal Immunization Programme (UIP) factors like vaccine cold chain and vaccine management wants great focus and attention skills and knowledge of the vaccine cold chain

handlers so for good implementation of UIP vaccine cold chain handlers are important.<sup>5,6</sup> Our country India spends near about 20,000 million rupees each year on the various immunization programmes. Ministry of Health and Family Welfare, Government of India publishes vaccine and cold chain handlers handbook to guide cold chain handlers so that they can effectively manage the vaccines and vaccine cold chain system by providing them with the required technical and practical guidance.<sup>7</sup> Cold chain handler is the most crucial person at a cold chain point as his/her awareness and skills regarding vaccine cold chain practices, vaccine management, and handling are vital for the success of UIP. Hence the present study was carried out with the objectives to assess the awareness and skills of the vaccine cold chain handlers regarding cold chain and vaccine management practices in district Etawah and to identify any shortcomings and suggest recommendations for improvement.

**METHODS**

This was an observational cross-sectional study. Study duration was carried out from October 2017 to March 2018. All the 16 cold chain handlers of district Etawah from all the eight vaccine cold chain points were face to face interviewed on predefined time by telephonically arranged time and their awareness over vaccine cold chain

was assessed using predesigned and pretested questionnaires. All the cold chain handlers of Etawah district were included in the study. Patients who did not gave consent were excluded.

Pretesting was done on cold chain handler of Kanpur regional vaccine store center cold chain handler. Data was compiled in MS-excel and analyzed using proportions and percentages. For statistical analysis SPSS version 23 was used.

**RESULTS**

The study included 16 cold chain handlers of various government health facilities from district Etawah. All 16 (100.0%) were male and 1 (6.3%), 2 (12.5%), 8 (50.0%) and 5 (31.3%) of the respondents were high schools, intermediate, graduate, and post-graduate respectively. Mostly 7 (43.5%) had service experience of between 6-10 years followed by 5 (31.25%) <1 year. All respondents in the study were male and all of them were Hindu by religion.

From this study, it had been observed that the hundred percent of the cold chain handlers with the knowledge of vaccine cold chain. 15 (93.7%) cold chain handlers had knowledge of temperature range for vaccine storage.

**Table 1: General profile of the cold chain handlers.**

Questions	Variables	Frequency	%
<b>Sex</b>	Male	16	100.0
	Female	0	0.0
<b>Level of education</b>	High school	1	6.3
	Intermediate	2	12.5
	Graduate	8	50.0
	Postgraduate	5	31.3
<b>Religion</b>	Hindu	16	100.0
<b>Duration of service</b>	1-5 years	4	25
	6-10 years	7	43.5
	>10 years	5	31.25

**Table 2: Training of cold chain handlers.**

	Variables	Frequency	%
<b>Any training in cold chain</b>	Yes	14	87.5
	No	2	12.5
<b>Training attended</b>	<6 months	8	-
	6-12 months	2	-
	1-2 years	2	-
	>2 years	2	-
<b>Number of training in cold chain management</b>	1	3	-
	2	4	-
	3	2	-
	4	4	-
	4	1	-

**Table 3: Response of cold chain handlers on questions related to knowledge of vaccine cold chain.**

Questions	Variables	Frequency	%
Knowledge of cold chain	Yes	16	100
	No	0	0
Temperature range for storing vaccines	Know	15	93.7
	Don't know	1	6.3
Knowledge of shake test	Yes	12	75.0
	No	4	25.0
On which vaccine shake test can be performed	Know	10	62.5
	Don't know	6	37.5
Knowledge of what to be kept in the deep freezer	Yes	15	93.7
	No	1	6.3
Knowledge of what to be kept in ILR	Yes	16	100.0
	No	0	0.0
Knowledge of VVM	Yes	16	100.0
	No	0	0
Most heat sensitive vaccine	Know	12	75.0
	Don't know	4	25.0
Vaccine most sensitive to freezing	Know	13	81.3
	Don't know	3	18.7
Number of times the temperature of the refrigerator is monitored and recorded	Know	15	93.7
	Don't know	1	6.3
Which vaccine is kept at the lowest part of ILR	Know	16	100.0
Number of ice packs in the vaccine carrier	Know	16	100.0
Number of vials of vaccine stored in vaccine carrier	Know	5	31.3
	Don't know	11	68.7
What is the holdover time	Know	12	75.0
	Don't know	4	25.0
Hold over time of 20-22-liter cold box	Know	5	31.3
	Don't know	11	68.7
What is EEFO?	Know	12	75.0
	Don't know	4	25.0
What is FIFO?	Know	14	87.5
	Don't know	2	12.5

When the cold chain handlers were asked if they had the knowledge of shake test it was observed that 12 (75.0%) of the cold chain handlers replied that they had the knowledge of shake test and 4 (25.0%) of cold chain handlers had no knowledge about it (Table 2). When the cold chain handlers were asked if they had the knowledge on which of the following vaccine shake test is carried out, it was observed that 10 (62.5%) cold chain handlers had the knowledge of shake test as compared to 6 (37.5%) cold chain handlers who had no knowledge about it (Table 3). When the cold chain handlers were asked if they had the knowledge of what to be kept in deep freezer it was observed that 15 (93.7%) of all the respondents replied that they knew what to be kept in deep freezer, had the knowledge of what to be kept in ice lined refrigerator (ILR), it was observed that all the respondents knew what to be kept in ILR, had the knowledge of what vaccine vial monitor (VVM) is, it was observed that all of the

respondents knew about VVM. Indicating that the cold chain handlers were given proper training about the cold chain management of the vaccine. Comparatively weak areas about awareness were early expiry first out (EEFO), first in, first out (FIFIO) and holdover time.

## DISCUSSION

In the current study, it was found out that all cold chain handlers were males whereas in a similar type study done by Choudhury et al in Chirang, Assam majority of the cold chain handlers were females.<sup>8</sup> The present study revealed that a maximum number of the cold chain handlers in district Etawah was educated up to graduation or above (50.0%). However, the study by Immunisation Technical Support Unit (ITSU) in Bareilly and Shahjahanpur districts of Uttar Pradesh revealed that most (52%) of the cold chain handlers were educated up to intermediate (12th class).<sup>9</sup>

The present study concluded that most of cold chain handlers were having a work experience of more than 5 years similar to the results by Choudhury et al, the present study revealed that all cold chain handlers had knowledge about VVM, open vial policy, freeze sensitive vaccines, correct temperature range and diluents which is a quite commendable finding.<sup>8</sup> It was found in the present study that knowledge of “Shake Test” was present in only 75.0% of cold chain handlers which is more than as observed by Sinha et al in Durg (52.63%), Naik et al in Surat (66.7%) and Gupta et al in Madhya Pradesh (66.7%).<sup>5,10,11</sup>

## CONCLUSION

Quality of immunization program depends upon cold chain management at peripheral health institutions. In our study, we have found that most of the vaccine handlers were reported to have appropriate knowledge regarding the cold chain. Most of the cold chain handlers have encountered training in the cold chain.

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