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A study to assess the effectiveness of planned teaching programme (PTP) on practices of maintenance of cold chain among health personnel working at selected primary health centre's (PHC)

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Abstract
Introduction: Vaccine is an immune-biological-substance designed to produce specific protection against a given disease. It stimulates the production of protective antibody and other immune mechanisms**.** 'Cold chain maintenance' is the system of storage and transport of vaccines at a low temperature (2-8 ºC) from the manufacturer to the actual vaccine site. Child immunization is the most cost effective ways of preventing premature deaths and the potency of vaccines; crucial for its efficacy is dependent on effective management of cold chain at all levels of vaccines handling. The system used for keeping and distributing vaccine in good condition is called the 'cold chain'. Therefore the study asses effectiveness of Planned Teaching Programme (PTP) on practices of maintenance of cold chain among health personnel working at selected primary health center's (PHC)."
Methodology: A quasi experimental study conducted by using an evaluator approach. 100 Health Personnel were selected from 6 PHCs of karad by Simple random sampling method. Structured questionnaire was administered before and after (PTP) to evaluate data.
Result: The mean score of Pre Test knowledge in health personnel was (15.64) & in Post Test it was (17.51) showed increased in knowledge score by 2 units. ($p < 0.05$).
Conclusion: Though the practices are good, the study stresses the need for such innovative teaching to update the knowledge of Health Personnel.

Keywords: Knowledge, Practices, Health Personnel, Cold Chain

Introduction
Cold chain maintenance is necessary because vaccines failure may occur due to failure to store and transport under strict temperature control. Among the vaccines polio vaccine most sensitive to heat, requiring storage at minus 2^0c to 8^0c vaccines which must be stored in the freezer comportment are polio and measles. Vaccines which must be stored in the cold part but never allowed to freeze are Typhoid, Diphtheria, Pertusis, Tetanus Toxoids, BCG and diluents.
Vaccines are sensitive to biological, substances their exposition to high temperature directly affects the quality of vaccines and safety of immunization. The goal of the study was to assess the safety of cold chain system [3].
Child immunization is the most cost effective ways of preventing premature deaths and the potency of vaccines; crucial for its efficacy is dependent on effective management of cold chain at all levels of vaccines handling [4].
The weak health infrastructure and improper maintenance conditions contribute to the increased incidence of disease like polio, cholera, Hepatitis in rural compared with urban areas. Therefore if we properly maintain the recommended temperature while carrying vaccine, storing vaccine till it is used, 100% we can protect the peoples from occurring major communicable diseases.

Materials and Methods
The study was conducted from 2011-2012 in all the Five selected Primary Health Center of Karad Taluka namely Kale Vadgaon (Haveli), Masur, Umbraj, Supne, Sadashivagad (Hajarmachi).
The sample size considered for the study was 100 Health Personnel in selected Primary health centre. Out of the eleven Primary Health Centres namely Kale, Vadgaon (Haveli), Masur, Umbraj, Supne, Sadashivagad (Hajarmachi). The PHC was selected by lottery method.
A purposive sample of 100 health personnel was taken from the study population for data collection. The data obtained to describe the sample characteristics include Age, sex, Professional qualification, Professional experience, employment (permanent, temporary), and Exposure of cold chain training.
All the above five Primary Health Centers were first visited and necessary information collected such as total number of sub centers under each Primary Health Centers and Health Personnel working in the respective PHC & Sub centers. The data schedule was prepared. Data collected with the help of validated structured questionnaire. A validated structure questionnaire schedule is given to each individual Health Personnel by maintaining privacy and confidentiality after obtaining written consent.
The research investigator obtained etical clearance. Formal permission was obtained from District Health Officer (DHO) Satara and Taluka Health Officer (THO), Karad and Medical Officer in selected Primary Health Centre (PHC) before to

conducting the pilot study.

The structured questionnaire was administered to assess the knowledge on practices of maintenance of cold chain.

The Planned Teaching Programme on practices of maintenance of cold chain among Health personnel working at selected primary health centers. With the help of validated lesson plan. PHC conducted weekly staff meeting on every Saturday in meeting hall. PTP conducted on 30-09-2011 Kale for pilot study & above five PHC's conducted PTP on 30-9-2011 in Vadgaon (H), 1-10-11in Supane, Umbraj PHCs and then next PTP conducted on 08-10-11 in Masur, Sadashivgad PHCs.

The post test knowledge on practices of maintenance of cold analyzed in terms of the objectives of the study using Descriptive chain was assessed by administering structured knowledge questionnaire after 7days on 07-10-11 in Vadgaon (H), Supane, Umbraj PHCs and on 15-10-11 in Masur & Sadashivgad PHCs.

The data obtained was and inferential statistics. The plan of data analysis was developed under the excellent direction of experts in the field of nursing and statistics.

Descriptive statistics

Frequency, Percentage, mean, and standard deviation will be used to describe the knowledge & practices of demographic variables of Health Personnel

Inferential statistics

Paired, t, test value will be calculated to assess the effectiveness of Plan Teaching Programme.

The chi-square test will be used to find the association between the demographic variables and knowledge and practices score regarding practices of maintenance of cold chain.

Major finding of study

Section I: Socio-demographic variables

Table 1: Distribution of health personnel according to socio-demographic variables

S. No.	Socio demographic Variables		frequency	Percentage
1.	Age (in years)	a) 20 to 40 yrs	56	56
		b) 40 to 60 yrs	44	44
2.	Sex	a) Male	36	36
		b) Female	64	64
3.	Professional Qualification	a) Medical officer	08	08
		b) Nursing	61	61
		c) Paramedical	31	31
4.	Professional Experience	a) 1 to 20 yrs	68	68
		b) 20 to 40 yrs	32	32
		c) 40 to above	-	-
5.	Employment	a) Permanent	79	79
		c) Temporary	21	21
6.	Training on cold chain 2 days (duration)	a) Yes	85	85
		b) No	15	15

Table no 1 depicts the following

1. Majority of health personnel 56 (56%) were in the age group of 20-40 yrs, 44 (44%) were in the age group of 40 to 60 yrs.
2. Majority of 64 (64%) were females.
3. Majority of (61%) were in the nursing profession, and 31(31%) were in paramedical and 8% were medical officers.
4. Majority 68 (68%) had1-20 yrs professional experience, 32(32%) were in the 20-40 yrs.
5. Majority of 79(79%) were permanent and 21 (21%) were temporary.
6. Majority of 85 (85%) were undergone for cold chain training, whereas 15(15%) were not exposed for training.

Table 2: Distribution of the all PHC subjects according to mean, median, mode, standard deviation of knowledge and practices regarding maintenance of cold chain (n=100)

S. No	Name of PHC	Area of analysis	Mean	Median	Mode	S.D	Paired 't' value	'p' value
1.	Vadgaon Haveli	Knowledge	15.15	15	15	1.59	48.53	p<0.0001
		Practices	14.00	14	14	0.00		
2.	Masur	Knowledge	16.09	16	16	1.17	62.55	p<0.0001
		Practices	14.00	14	14	0.00		
3.	Supane	Knowledge	16.31	16	16	1.60	42.62	p<0.0001
		Practices	14.00	14	14	0.00		
4.	Umbraj	Knowledge	15.32	15	15	2.00	31.95	p<0.0001
		Practices	14.00	14	14	0.00		
5.	Sadashivgad Hajarmachi)	Knowledge	15.41	15	15	1.41	44.88	p<0.0001
		Practices	14.00	14	14	0.00		

Table 2 depicts the following

5 PHCs of health personnel regarding maintenance of cold chain

1) Mean score pre-test knowledge of first PHC Vadgaon Haveli (15.15 ± 1.59) and 't' value is 48.53, p<0.0001.
2) Second PHC Masur (16.09 ± 1.17) and 't' value is 62.55, 'p'<0.0001
3) Third PHC Supane (16.31 ±1.60) and 't' value is 42.62, p<0.0001.
4) Forth PHC Umbraj (15.52 ± 2.00) and 't' value is 31.95 and p<0.0001.
5) Fifth PHC Sadashivgadh (15.41 ± 1.41) and 't'value is 44.88 and p<0.0001.

Table 3: Distribution of the total subjects according to mean, median, mode, standard deviation and range of knowledge and practices regarding cold chain maintenance (n=100)

Area of analysis	Mean	Median	Mode	S.D	Range (H-L)
Part A: Knowledge regarding cold chain.	15.64	16	16	1.655	7
Part B: Practices regarding cold chain	14	14	14	00	0

Above Table 3 depicts the following

Part A: Mean (15.64) and median (16)

Part B: Mean (14), median (14)

Table 4: Distribution of the total subjects according to mean, median, mode, standard deviation and range of knowledge score regarding cold chain maintenance (n=100)

Area of analysis	Mean	Median	Mode	S.D.	Range (Higher -Lower)
Pre Test	15.64	16	16	1.655	7
Post Test	17.51	18	18	1.560	6
Difference	1.87	-	-	0.095	-

Tables No 4 depicts the following

1) mean scores of pre test knowledge in health personnel mean (15.64 $\pm$ 1.65)
2) Median (16) that of post test it was (17.51$\pm$1.56) and showed increased in knowledge by 2 unit P<0.05 level of significance.

Table 5: Distribution of pre-test and post-test knowledge score of Health Personnel regarding cold chain maintenance (n=100)

Sr. No	Knowledge scored	Pretest		Post Test		Paired 't' test value11.25
		Frequency (f)	Percentage %	Frequency (f)	Percentage %	
1	Poor	06	06	04	04	**(P<0.001)**
2	Average	92	92	26	26	
3	Good	02	02	70	70	

Tables No 5 depicts the following:

Pre test: Majority of Health Personnel 92(92%) had average knowledge.

Post test: Majority health personnel 70(70%) had average knowledge.

Table 6: Association between knowledge and selected socio-demographic variables

S. No.	Variable	Level of knowledge						Total	χ^2	P Value	df
		Poor		Average		Good					
1	**Age (Yrs)**	**freq**	**%**	**freq**	**%**	**freq**	**%**		2.062	0.356	2
	20-40	03	5	51	51	2	2	56		(NS)	
	40-60	04	4	40	40	0	0	44			
2	**Sex**								1.271	0.5298	2
	Male	3	3	33	33	0	0	36		(NS)	
	Female	4	4	58	58	2	2	64			
3	**Prof qualification**								2.251	0.6898	4
	Medical officer	0	0	8	0	0	0	8		(NS)	
	Nursing	4	4	55	55	2	2	61			
	Paramedical	3	3	28	28	0	0	31			
4	**Prof. exp. in (yrs)**								1.321	0.5166	2
	1 to 20	4	4	62	62	2	2	68		(NS)	
	20 to 40	3	3	29	29	0	0	32			
	40 & above	-	-	-	-	-	-	-	-		
5	**Employment**								0.7743	0.6790	2
	Permanent	6	6	71	71	2	0	79		(NS)	
	Temporary	1	1	20	20	0	0	21			
6	**Cold chain Training with 2days (duration)**								1.745	0.4178(NS)	2
	Yes	7	7	76	76	2	2	85			
	No	0	0	15	15	0	0	15			

n = 100

NS: Not Significant

Tables No 6 depicts the following: There is no any association between socio-demographic variables of health personnel and level of knowledge regarding practices of maintenance of cold chain at P<0.05 level of significance.

Conclusion

The result of the study give us some impression about the practices of maintenance of cold chain among health personnel whom seem to have adequate knowledge on cold chain maintenance through it still has to be improved by innovative teaching method, while every vaccine is effective and safe. It is paradoxical that the recipient may get the desired benefit. It is not the efficiency of the vaccine that is important but other factors like storage, proper administration, and safe like storage, proper administration, safe vaccine/ injection practices and ideal age for vaccination which have to keep in mind. Planned teaching programme (PTP) should be an integral part of the in-service education to improve knowledge and practices. Study finding indicates that majority 85% were received cold chain training. It was proved that previous knowledge and Planned Teaching Programme, it helps to increase knowledge and better practices to prevent communicable disease "Safe Immunization, Safe Child".

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