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## Knowledge, Attitude and Practice of Maintenance of Cold Chain in Immunization

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Immunization is an important cost effective strategy for child survival(1,2). With the inclusion of heat labile oral polio and measles vaccine in the Universal Immunization Programme, maintenance of cold chain is of paramount importance(3). Inadequate management of cold chain may reduce the potency of the oral polio vaccine to almost zero. In India 15 to 30% cases of poliomyelitis, occur in children who have received primary immunization with the oral polio vaccine(4,6).

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In order to assess the knowledge, attitude and practice regarding maintenance of the cold chain among medical personnel, we interviewed qualified family physicians, final year medical students, interns and non-pediatric residents.

### Materials and Method

One hundred and sixty four family practitioners randomly selected from Ahmedabad, Gandhinagar and Baroda; 324 final MBBS students, 138 interns and 105 non-pediatric residents from B.J. Medical College and Smt. N.H.L. Municipal Medical College, Ahmedabad, Government Medical College, Baroda and M.P. Shah Medical College, Jamnagar, were studied.

Information was sought in the questionnaire about the place of storage of vaccines, how they are storing vaccine in the refrigerator, how they are carrying vaccines in the field, how many days they are using the same vaccine bulb, what do they do to the frozen Diphtheria, Pertusis, Tetanus (DPT) and Oral Polio Vaccine (OPV).

In the analysis, persons who answered all the questions correctly were tabulated in 'correct answer' group, who answered correctly for more than 2 vaccines were tabulated as 'partially correct' answer, those who gave wrong answers were tabulated as 'incorrect knowledge' and those who did not give answer as 'no knowledge' group.

## Results

### Family Practitioners

Of the total 164 family practitioners, 146 (89%) were storing the vaccines of which 52 (31.7%) had refrigerator at the clinic, 80 (42.7%) stored the vaccines at their residence and 32 (25.6%) at Chemist's shop. All the practitioners were administering Diphtheria, Pertussis and Tetanus (DPT) and Tetanus Toxoid (TT) vaccines, 89% Oral Polio-vaccine (OPV), 86.8% Measles/Measles, Mumps and Rubella (MMR) and only 18.3% BCG vaccine.

Only 14.6% of the practitioners were not carrying their vaccines in thermos/thermocool box with ice but either in plastic bags with ice or in their visit bags. Majority of the practitioners did not have knowledge of storing vaccines in the refrigerator. Only 4 (2.45%) had knowledge about all the vaccines, 32 (19.5%) had knowledge about more than 2 vaccines, 12 (7.3%) did not have any knowledge while 116 (70.8%) had incorrect knowledge (Table I). Forty eight (29.3%) practitioners had correct knowledge of storing DPT and 62 (42.5%) of

OPV (Table II). Only 6 (3.7%) were knowing what should be done to frozen DPT and OPV vaccines. One hundred and four (63.4%) were using DPT vaccine after thawing it, while 30 (18.2%) were discarding frozen OPV in the thermos for more than 6 hours, 60 (36.6%) practitioners were carrying the same OPV vial for 4 days or more, 22 (13.4%) were carrying for 3 days and 56 (34.1%) for 2 days.

### Medical Students/Interns/Non-Pediatric Residents

Amongst these subjects 15%, 10% and 12%, respectively of the three groups did not know why the vaccine need cold chain and 23%, and 22%, 25%, respectively did not know who to carry vaccine in the field. Out of 324 Medical Students, 4 (1.2%) had correct knowledge and 22 (6.8%) had knowledge of storage of only 2 vaccines. Out of 132 interns 7 (5.3%) had correct knowledge and 17 (12.9%) had knowledge of storage of more than 2 vaccines and of the 105 non-pediatric residents none (0%) had knowledge of storage of vaccines, only 9 (8.6%) had knowledge of storage of more than 2 vaccines (Table I).

TABLE I—Knowledge of Storage of Vaccine in Refrigerator

Category	No.	Fully correct	Partially correct	Incorrect knowledge	No knowledge
General practitioners	164	4 (2.4)	32 (19.5)	116 (70.8)	12 (7.3)
Medical students	323	4 (1.2)	22 (6.8)	168 (51.9)	130 (40.1)
Interns	132	7 (5.3)	17 (12.9)	75 (56.8)	33 (25.0)
Non-pediatric residents	105	0 (0.0)	9 (8.6)	87 (82.8)	9 (8.6)
Total	725	15	80	446	184

Figures in parentheses indicate percentages

**TABLE II—Knowledge Among Family Practitioners Regarding Storage of Vaccine in Refrigerator**

Vaccine	No. of respondents	Correct		Incorrect	
		No.	%	No.	%
1. BCF	30	18	60.0	12	40.0
2. DPT/TT	164	48	29.3	116	70.7
3. OPV	146	62	42.5	84	57.5
4. Measles/MMR	144	120	85.0	22	15.0

In the use of frozen vaccines 32 (9.9%) medical students, 10 (9.5%) non pediatric residents and 33 (25%) interns had correct knowledge.

### Discussion

Correct knowledge, attitude and practice of cold chain among family practitioners who are engaged in the immunization work is of paramount importance(1). It has been noticed that a sizeable number of children are vaccinated by private family practitioners. From this study it is evident that the knowledge and practice of family practitioners about cold chain is unsatisfactory. Proper reorientation training and periodic reassessment to all those who are engaged in immunization is, therefore, a must for any successful immunization programme.

Practical training of medical students and interns for immunization programme is virtually nil. Their knowledge of maintenance of cold chain is far from satisfactory. In an earlier study(7), the knowledge of interns about cold chain was zero. In the present study it is 18%, which is only a marginal improvement in 2 years. Knowledge of cold chain in medical students and interns is of most importance. If we want to reach the commitment of Polio-free India by

the year 2000, we will have to increase our stress to the training of medical students and interns for immunization programme. They should be involved in the programme itself for gaining practical knowledge.

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## **Klebsiella Pneumoniae Osteomyelitis in Sickle Cell Anemia**

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Sickle cell anemia is a hereditary hemolytic disorder with an autosomal recessive pattern of inheritance. Cases of sickle cell anemia have been reported from our country since 1952(1) with an increased incidence in certain communities like Mahar, Chamar, Agri and other tribal people(2).

Pyogenic infection is the single com-

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monest cause of morbidity and mortality in these patients, particularly in children below the age of 5 years. Functional hyposplenism leading to decreased opsonic activity which is required to phagocytose organisms such as *Salmonella*, *Staphylococci*, *Pneumococci* and *E. coli* has been postulated as the incriminating factor towards increased frequency of infections as microinfarcts in the bones act as a nidus for infection. However, the association of sickle cells anemia and multiple osteomyelitis due to organisms like *Klebsiella pneumoniae* is very rare, and we report one such case.

### **Case Report**

A six-year-old-male child, born of a 2nd degree consanguineous marriage, belonging to the Mahar community was hospitalized with a history of high grade fever with chills and pain in the small joints of hands and feet of 15 days duration. There was no past history except for having received One blood transfusion at a peripheral centre. Family history was non-contributory. Examination revealed an averagely nourished, highly febrile child with tachpnea and tachycardia. There was pallor but no icterus, cyanosis, ptechieae or lymphadenopathy. Systemic examination revealed a moderate spleno-hepatomegaly. On local examination of the small joints of hands and feet, there were acute signs of inflammation with restriction