

Research Study on Vaccine Management in Public Sector of Tribal Area of Gujarat



Medical Science

KEYWORDS : vaccine management, cold chain sickness, vaccine stock maintenance

Dr. Shikha Bansal

Health Consultant, Valsad, Gujarat

Dr. Sudarshan Gupta

Assistant Professor, Department of Anatomy, GMERS Medical College, Valsad

ABSTRACT

Introduction:- India was one of the first countries to adopt Expanded Programme of Immunization and now has one of the largest immunization programs in the world in terms of number of beneficiaries covered, amount of vaccine used and geographical spread. The network of health facilities acting as cold chain points for vaccine storage is the fundamental cornerstone to ensure potent and quality vaccines reaches to the beneficiaries. Therefore, all efforts should be made to ascertain vaccine safety in cold chain system of these facilities. The present study is aimed at understanding the vaccine management practices in Valsad district of Gujarat state of India. **Methodology:-** This study was a descriptive analytical study where data from all the cold chain points where vaccines were stored was collected using a structured checklist and data was analysed using Microsoft Excel 2007. **Results:-** The cold chain sickness rate was 28%. 75.7% facilities practiced twice daily monitoring of vaccine temperature. Functional thermometer was available in 76.5% DFs and 83.8% ILRs. Vaccines in 97.3% ILR were found to be in usable form. Records of vaccines distributed for field use correlated with vaccine stock register in 36.8% health facilities. **Conclusions:-** Gaps in vaccine management need to be bridged through capacity building of health staff, repair and replacement of equipments, introduction of vaccine management assessment tool and supportive supervision of the vaccine management etc.

Introduction

Immunization is known to be one of the most cost effective methods of combating childhood diseases thereby reducing under-5 deaths due to vaccine preventable diseases. ⁽¹⁾ India was one of the first countries to adopt Expanded Programme of Immunization and now has one of the largest immunization programs in the world in terms of number of beneficiaries covered, amount of vaccine used and geographical spread. ⁽²⁾ Huge amount of funds are spent each year in our country to immunize children and protect them against vaccine preventable diseases like Tuberculosis, Polio, Diphtheria, Pertussis, Tetanus, Meningitis, Hepatitis B and Measles. The immunization services are provided to beneficiaries through outreach sessions and health facilities including district hospitals, community health centres and primary health centres which also act as storage points for these vaccines. This network of health facilities acting as cold chain points for vaccine storage is the fundamental cornerstone to ensure potent and quality vaccines reaches to the beneficiaries. Therefore, all efforts should be made to ascertain vaccine safety in cold chain system of these facilities. It is a universal fact that all vaccines are sensitive to heat & light and some are sensitive to freezing. Hence, vaccines should be kept at an appropriate temperature range from the time of manufacture to the time of use. ⁽⁴⁾ The vaccines lose their potency if they are not stored or transported at an appropriate temperature and condition thereby making them inappropriate for use. Once vaccine potency is lost, it cannot be regained and the damaged vaccines must be destroyed. This may lead to frequent vaccine stock outs, wastage of expensive vaccines and shortage of vaccines for beneficiaries ^{(3) (4)}. Further the safety of the vaccine is linked to the adverse event following immunization programme as well. Damaged vaccines if given to the child may even cost his life. This exacerbates the need for efforts to retain the safety of the vaccine.

The present study is aimed at understanding the vaccine management practices in Valsad district of Gujarat state of India. Valsad is the southernmost tribal district of the state bordering Maharashtra state, Union territory of Daman and Diu and Dadar and Nagar Haveli. The district is a home to over 1.7 million people of which over 12% are children under the age of 5 years. ⁽⁵⁾ Valsad has one district hospital, one state hospital, ten community health centres and forty one primary health centres which form its public health infrastructure.

Methodology

Study design and settings

The study was a descriptive analytical study where data from all the cold chain points where vaccines were stored (41 PHCs, 10

CHCs, one state hospital and one district hospital) was collected using a structured checklist. Checklist included data regarding working condition of ILR and DF, voltage stabilisers were working or not, temperature monitoring charts, placement of vaccine, label on vaccine and their expiry dates, vaccine stock registers.

The data was collected using structured checklist during concurrent monitoring of routine immunization program over a period of two months (July- August 2012)

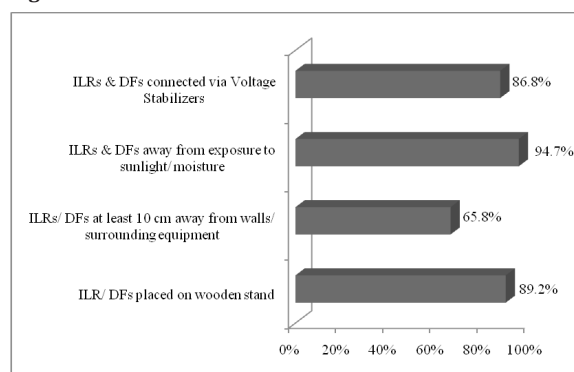
The data was entered and analysed using Microsoft Office Excel 2007

Results

Of all the 53 public health facilities which were visited, 38 were functional as cold chain points (71.6% approximately). Remaining facilities kept their vaccines at other nearby health facility. The cold chain sickness rate which ideally should be less than 2% at any given point in time was 28% at the time of study in Valsad district. ⁽³⁾

When analysed about the placement of Iced lined refrigerator and deep freeze in the health facility, it was seen that in 86.8% facilities, ILR and DF were connected through voltage stabilizers, 65.8% maintained appropriate distance between walls and equipments and in 89.2% facilities, ILR and DF were placed on wooden stands as required. (Fig: 1)

Fig:1 Placement of ILR and DF in Cold Chain Room

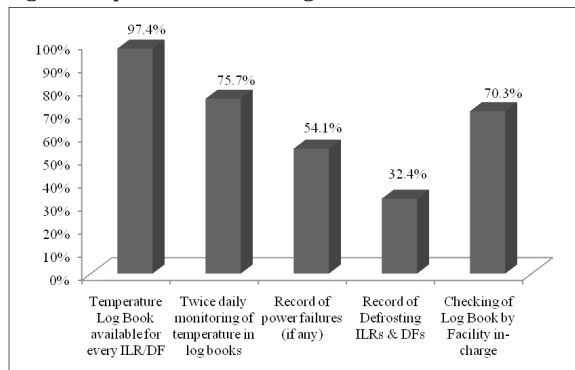


Temperature monitoring of vaccines

The temperature log book was available at 97.4% health facilities.

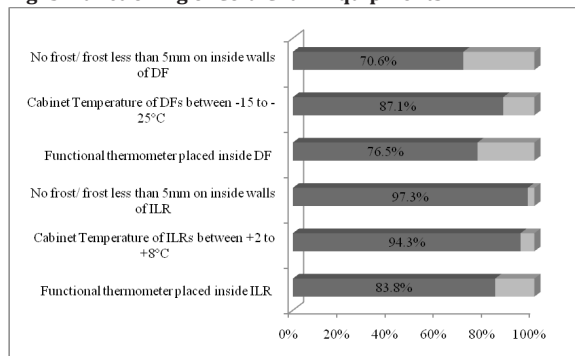
ties while 75.7% facilities practiced twice daily monitoring of vaccine temperature. Record of power failure was available at 54% health facilities, 32.4% had record of defrosting ILR and DF and at 70.3% facilities temperature log book was signed by facility in-charge. (Fig: 2)

Fig: 2. Temperature monitoring of Vaccines



When the functionality of cold chain equipments was seen, DFs at 87.1% facilities had appropriate cabinet temperature of -15°C to -25°C where ILR at 94.3% facilities had appropriate cabinet temperature of 2°C to 8°C. Functional thermometer was available in 76.5% DFs and 83.8% ILRs. (Fig: 3)

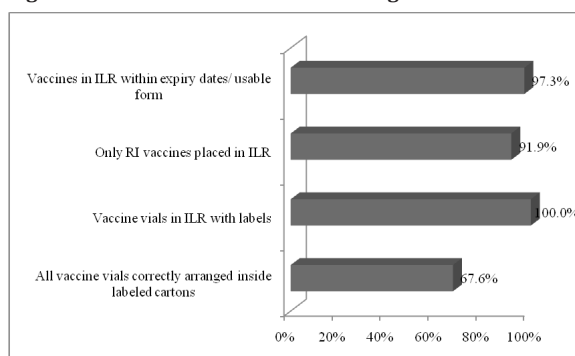
Fig: 3. Functioning of Cold Chain Equipments



Vaccine status in Iced lined refrigerator

Vaccines in 97.3% ILR were found to be in usable form and all the vaccines had labels on them. ILR is meant only for storage of routine immunization vaccines but 8.1% ILR had other vaccines/ drugs stored in them apart from routine immunization vaccines. Further, in 67.6% ILR, the vaccines were correctly arranged in labelled cartons/ boxes while in rest the vaccines were loosely placed.

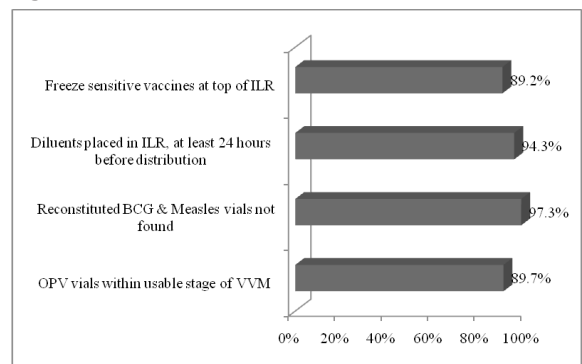
Fig: 4.a Vaccine Status in Iced line refrigerator



In 89.2% ILRs, the freeze sensitive vaccines were stored at the top (T- series vaccines like DPT, Hepatitis B, Tetanus vaccines) and in 89.7% ILRs, OPV was found to be within usable stage of

vaccine vial monitor. Reconstituted vaccines which should be discarded after 4 hours of reconstitution were found in 2.7% health facilities. (Fig: 4 a & b)

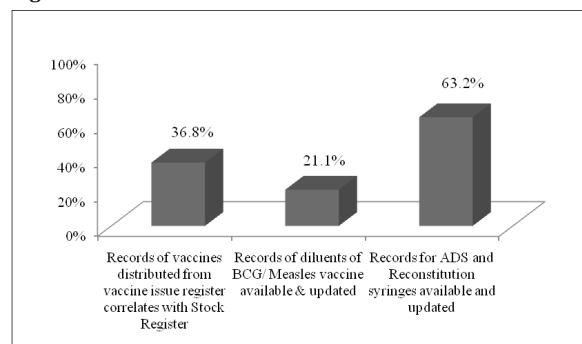
Fig: 4.b



Record maintenance

Records of vaccines distributed for field use correlated with vaccine stock register in 36.8% health facilities only. The record of BCG and Measles vaccine diluents was available in stock registers of 21.1% health facilities while record of AD syringes and reconstitution syringes was available and updated at 63.2% health facilities. (Fig: 5)

Fig: 5. Vaccine Record Maintenance



Discussion

The global recognition of immunization as one of the most cost effective methods to reduce child mortality and its overall coverage is major area of concern which is well reflected in country's health policy and programs. Since the inception of immunization programme in India, considerable progress has been made in reduction of vaccine preventable diseases. Vaccination coverage data released by Ministry of Health and Family Welfare and Indian Council of Medical Research suggests high coverage of vaccination in our country. ⁽⁶⁾⁽⁷⁾ But despite the high coverage, making potent and safe vaccines available to the target population remains a challenge. The current study reveals cold chain chain sickness rate as 28% which is much higher than the prescribed limit of less than 2%. Similar findings were quoted in VMAT Study conducted by UNICEF in state of Orissa ⁽⁸⁾

MoHFW guidelines quote that temperature monitoring of all cold chain equipments should be done twice daily but the current study revealed at only 75% facilities in Valsad district followed the practice. This has implications leading to adverse events following immunization (AEFI). The challenge of regular monitoring of temperature is found not only in tribal area like Valsad but even in developed areas as revealed in similar study done in Michigan where 76% health workers exposed vaccines to inappropriate temperatures and study in Cameroon where 59.3% facilities reported twice daily monitoring of temperature ^{(9) (10)}

Our study emphasizes the need for appropriate sorting and safe disposal of expired and unusable vaccines as vaccines in 2.7% ILRs were found to be unfit for use. Further, OPV in 10.3% ILR

already reached stage 4 of the VVM. Similar concerns have been quoted in other studies done in Orrisa where urban health centres showed gaps in use of vaccine vial monitor as well as study done in USA where some health providers stored expired vaccines with non expired ones thereby increasing the risk of mistakenly administering expired vaccine to the beneficiary.⁽⁸⁾⁽¹¹⁾

As far as vaccine stock management is concerned, we see a huge gap in Valsad district as records of vaccines distributed for field use correlated with vaccine stock register in 36.8% health facilities only. Also, separate stocks for diluents were maintained at 21.1% health facilities. The assessment done in Orrisa also brought out stock maintenance of vaccines as an unresolved issue⁽⁸⁾

Conclusions and Recommendations

Galvanized efforts are needed to ensure vaccine safety at all levels to ensure potent vaccines reach out to all beneficiaries and they are protected against major vaccine preventable diseases. Capacity building of all pharmacists and health supervisors who deal with vaccine management needs to be done in Cold chain handlers module designed by Ministry of Health and family welfare. Preventive maintenance of all cold chain equipments is also one area which needs attention along with a cold chain

contingency plan for each facility. Since the cold chain equipments at many facilities are old models which do not function as required, a special drive for replacement/ repair of old equipments needs to be undertaken. Valsad is a tribal district which witnesses interrupted power supply in some areas, placement of solar cold chain equipments or installation of separate transformers for facilities with interrupted power supply may also be considered as suggested by Tanzania Model for Cold Chain and Logistics Management.⁽¹²⁾ Backup generators for each cold chain point with interrupted power supply can also be made available.⁽⁸⁾ The findings also emphasize the need for placement of standardized functional thermometers in all ILR and DF and timely monitoring and recording of temperature which is extremely essential in order to ensure vaccine potency is maintained. Inclusion of vaccine management in supportive supervision by health supervisors may also address the issue of gaps in vaccine maintenance. The findings also necessitate the capacity building of cold chain handlers on stock maintenance and data management which would be beneficial in avoiding inequitable distribution of vaccines thereby combating vaccine wastage. The adaptation of WHO/ UNICEF Vaccine management assessment tool for systematic review of vaccine management practices and capacity development of health staff may be taken into consideration.

REFERENCE

1. Handbook for Vaccine and Cold Chain Handlers. Department of Health and Family Welfare, Ministry of Health and Family Welfare, Government of India. 2010 | 2. Mathew Joseph L. Inequity in Childhood Immunization in India: A Systematic Review. Indian Pediatrics. Volume 49- March 2012. | 3. Immunization Handbook for Medical Officers. Ministry of Health and Family Welfare, Government of India. | 4. World Health Organization. (2001). "Study Protocol for Temperature Monitoring in the Vaccine Cold Chain." WHO/ IVB/05.01. Geneva: World Health Organization, Cited [2012-09-10] | 5. Census 2011. Office of Registrar General and Census Commissioner. Ministry of Home Affairs, New Delhi. Government of India. 2011. Available from: <http://www.censusindia.gov.in.html> | 6. Multi Year Strategic Plan 2005-2010. Universal Immunization Programme. New Delhi: Department of Family Welfare, Ministry of Health and Family Welfare Government of India; 2005. | 7. Singh P, Yadav RJ. Immunization status of children of India. Indian Pediatrics. 2000; 37: 1194-99 | 8. Assessment cum Training of Vaccine and Cold Chain Management in Orrisa- A VMAT Study. UNICEF. December 2007. | 9. MI Immunization Timely Tips. Special Issue: Vaccine storage and Handling Report Released. Michigan Department of Community Health. Special Edition. June 2012. | 10. Jérôme Ateudjieu et al. Program on Immunization and Cold chain monitoring: the status in eight health districts in Cameroon. March 2013. | 11. Vaccine for Children Program: Vulnerabilities in Vaccine Management. Department of Health and Human Services, Office of Inspector General. USA. OEI-04-10-00430 June 2012. | 12. Cold Chain Management in Vaccine Logistics- A Review. Journal for Clinical Studies. Volume 5, Issue 3. June 2013. |