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Original Article

Knowledge and Practice Regarding Pentavalent Vaccination and use of Multi Dose Open Vial Policy: Assessment of Mothers and Health Workers of a Rural Area of North, Haryana

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ABSTRACT

Context: Immunization is one of the most important preventive health actions against the most childhood diseases. Advent of combination vaccines in immunization schedule such as Pentavalent Vaccine has given many benefits. **Aim:** To assess knowledge of mothers/ caregivers and health care workers regarding Pentavalent vaccine and side effects of vaccine. **Settings and Design:** This cross-sectional study was conducted in Raipur Rani Block in Panchkula, Haryana. All four PHCs and one SC from each PHC of this block were selected. A total 80 mothers attending immunization clinics and 10 health workers (8 ANMs and 2 LHVs) from PHCs and SCs were enrolled in the study. **Methods and Materials:** Predesigned, pre-tested and semi structured questionnaire was used to collect information of mothers/caregivers of children and health workers regarding pentavalent vaccine. **Statistical analysis used:** Data was entered into excel sheets and analyzed using SPSS version 23 utilizing appropriate statistical methods. **Results:** In the present study 38.8% of mothers correctly knew about what vaccine was given to the baby on the day of immunization. Also 70% of mothers knew about side effects of the vaccine. 83.3% of health workers were aware of the diseases prevented by pentavalent vaccine. All of them had very good knowledge regarding VVM benefits, its uses and working. **Conclusion:** Present study indicates that lack of knowledge about the serious AEFI, inability to communicate with the clients and not adhering to open vial policy increases the chances of adverse events that can impact vaccination coverage.

Key words: AEFI, Immunization, Pentavalent, Knowledge, Practice, Open Vial Policy.

Key Message: Vaccination is a cost-effective intervention to prevent morbidity and mortality of various childhood illnesses. India's U.I.P. launched by Government of India in 1985, is one of the largest in the world in terms of quantities of vaccine used, number of beneficiaries and number of Immunization session organized.

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INTRODUCTION

Advent of vaccines is one of the most significant contributions of the medical fraternity to mankind. Vaccines are the most powerful, safe and cost-effective measures for prevention/control of a number of diseases especially in under five children.[1] The purpose of the immunization program is to achieve high vaccination rates and to control vaccine-preventable-diseases (VPDs) among groups who are susceptible to the diseases and reduce morbidity and mortality among them. Evidence says that health service providers are the key determinants to promote vaccination coverage among children.[2] Immunization has been a major contributor in the decline of under-five mortality rates in last five decades in India.[3] However, still VPDs are prevalent and responsible for over five lakhs deaths in India. Globally, VPDs are responsible for nearly 20% of the 8.8 million deaths among under-five children.[4] Immunization can avert about 3 million deaths annually and has the potential, if coverage improves, of saving the lives of an additional 1.5 million children annually.[4,5] In India, though the coverage levels of immunization are in increasing in trends, but lot of deficiencies still remain. According to the recent estimates of National Family Health Survey (NFHS 4) 2015-16 report, percentage of children aged 12-23 months fully immunized was 62%.[6] Many newer vaccines have been added recently in the national immunization schedule some of which are being implemented in a phased manner throughout India such as Pentavalent vaccine (DPT+Hep B+Hib), Inactivated polio vaccine (IPV), Rota virus vaccine, rubella vaccine as MR vaccine and few others.[7] It is extreme important that the caretakers especially the mothers should be educated regarding these new vaccines and changes in the immunization schedule so that their children are immunized completely appropriate to the age as Knowledge regarding immunization is a key factor for immunization coverage. Districts also need to upgrade the knowledge and skills of the health

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workers and build community awareness for the better introduction and acceptability of vaccine.[8] As a result, following study was conducted with aim and objective to assess the knowledge of health care workers and mothers/caregivers regarding pentavalent vaccine and the possible adverse effects.

SUBJECTS AND METHODS

This cross-sectional study was conducted in Raipur Rani Block, district Panchkula, Haryana. Study was carried out for a period of 3 months from May – July 2014. Study participants were the mothers/caregivers of children aged 12-23 months who visited immunization sessions during study period All 10 health workers' available in the primary health centers were selected and enrolled in the study. Out of these 8 were ANMs and 2 are LHVs. A total of 9 immunization sessions were observed, out of these 7 sessions were conducted at Anganwadi and 2 at sub-center. On each visit, 10-12 mothers/caretakers were interviewed in each immunization session. Eighty persons were interviewed in these sessions that included 70 mothers, 5 fathers and 5 grandmothers. Both entry and exit interviews were done.

Inclusion criteria

- All mothers/caregivers of children aged 12-23 months who attended immunization session.
- Health workers working at PHC.
- All those children whose parents/guardians gave consent to participate in study.
- All those who were present at the time of study.

Exclusion criteria

- All those who did not give consent to participate in study or showed hostile behaviour.
- All those who were not present at the time of study.

Sampling Technique

The block was selected as per convenience sampling. All four PHCs of the block were selected and one SC from each PHC was selected randomly.

Study method

A predesigned, pretested, semi structured questionnaire was used to collect data from mothers/caregivers of children and health workers.

Study tool

The interview tool for mothers/ caregivers consisted of questions on sociodemographic characteristics of the child and mothers (occupation, education, source of immunization information). Questions were asked to assess their knowledge about the vaccines that will be given to their children during immunization (entry interview) and what children actually received (exit interview), diseases prevented by these vaccines and the possible side effects.

Interview tool for the health workers included questions on diseases prevented by vaccination, AEFI, its control measures, training status of health workers especially for pentavalent vaccine administration, working experience with the health system, knowledge of VVM and multi dose open vial policy.

Observation checklist was used to assess the immunization practices of the health workers. Two check lists were used: a) to observe the overall management of the immunization session and b) to observe the administration of the vaccine to the individual child. First checklist had questions regarding immunization register (patients name, address), maintenance of vaccine stock, availability of anaphylaxis kit, status of open vials and its records and whether ANM washes hands before the immunization session. Second checklist had questions about vaccines (dose, route, site), position of child during vaccination, length and gauge of needle and disposal of immunization waste.

Functioning of cold chain system such as temperature of ice lined refrigerator (ILR) and maintenance of records was also assessed.

Data Analysis

Data was entered into excel sheet and analysed using SPSS version 23. For continuous variable mean and SD was calculated and *t* test was applied to compare mean and chi square test was applied to test proportions. *P* value <0.05 was considered significant.

Ethical clearance

The ethical approval for conducting this study was obtained from the institutional (PGIMER Chandigarh) ethical clearance committee.

RESULTS

Interview of Mothers/ Caretakers

Most of the respondents (77.5%) had secondary or higher education, 19% had primary education, while 3.7% were illiterate. Most of the mothers were housewives (85.4%) and fathers were daily wagers. The average monthly income of the respondents was Rs 4331/-. As shown in Table 1 on exit interview, caretakers were assessed for their knowledge regarding vaccine given to their child, nearly two-fifth of the respondents (38.7%) gave correct response. Majority of them had correct knowledge regarding measles vaccine and Vitamin A administration. A total of 12.5% had wrong knowledge. Those respondents with higher education had 100% correct knowledge regarding vaccine administered. ASHA workers were the main source of information regarding the immunization session, activities and vaccine preventable diseases followed by electronic media like television and radio. Knowledge of caregivers regarding pentavalent vaccine was very low, only 20.8% responded correctly. 70% respondents were aware regarding the side effects of the vaccines. (8% knew fever as the major side effect also had knowledge regarding swelling and pain at injection site. None of them were aware about the serious adverse effects of the vaccination like convulsions and fits. All of the respondents were satisfied with the treatment and vaccination provided to their children by Government as there was no out of pocket expenditure.

Interview of Health Workers

60% of health workers had secondary education, 40% higher secondary education. 60% of them had working experience less than 20 years. 83.3 % of health workers with more than 20 years of experience and 25% of health workers with less than 20 years of experience knew about diseases prevented by pentavalent vaccine. Supervisors (LHVs) had more knowledge (75%) regarding diseases prevented by pentavalent vaccine as compared to ANMs. All Health workers had good knowledge regarding open vial policy andVVM. They all knew that measles vaccine needs to be discarded after 4 hr of reconstitution and pentavalent vaccine can be used for 4 weeks after opening when stored properly. 60% of Health workers received the training for pentavalent vaccine.

Immunization Session Observations

As shown in Table 2 in all the nine immunization sessions immunization register was 100% completed (patient's name, address, name of vaccine administered and next date of vaccine). All vaccines had proper labeling, with mentioning of expiry date. VVM was present on all vaccines, anaphylaxis kit was present in seven immunization sessions except in two. Immunization practice was poor among ANM's, they did not wash their hands before immunization, did not clean injection site of child

and did not follow aseptic techniques, did not shake the vaccine before administration and did not administer vaccine at correct angle. Hub cutter was used for the disposal of sharp waste. Regarding adverse events after immunization 82% of caretakers were told about fever, 70% about swelling and 14% about pain and redness at the site of injection by health workers. They informed all the caretakers regarding the name of the next vaccine, date of administration and disease prevented by it. But they had poor knowledge regarding diseases prevented by pentavalent vaccine.

Health Centre Record review and Observations of Cold Chain Equipment

As Table 3 all four selected PHCs were observed for maintenance of record and cold chain equipment. The health workers recorded the temperature of the ILR twice a day and noted down in the register, the vaccines were arranged in the proper order. In all PHCs, power plugs were working and LHV recorded the power cuts daily in register and the staff nurse recorded on holidays. Only in one PHC generator was available for the maintenance of power cuts.

Table 1: Respondents knowledge regarding what vaccine was delivered to their baby on the day of observation. (N=80).

Name of Vaccine	Number who received vaccine	Correctnessof response	Correct response of respondents	Percentage
BCG	1	Correct answer	1	100
Measles and vitamin A	21	Correct answer	18	85.7
		Partially correct answer	2	9.5
		Wrong answer	1	4.7
Measles2 and DPT booster	19	Correct answer	4	21.6
		Partially correct answer	14	73.6
		Wrong answer	1	5.2
Pentavalent and OPV	39	Correct answer	8	20.5
		Partially correct answer	23	58.9
		Wrong answer	8	2.5

Table 2: Knowledge of health workers regarding the multi dose open vial policy. (*N*=10).

Condition of multi dose open vial policy	Correct knowledge (N)	Percentage (%)
Expiry date has not been passed	10	100
VVM has not reached the discard point (colour change)	10	100
Aseptic technique has been used to withdraw all doses	2	20
Vaccine vial septum has not been submerged in water	2	20

Table 3: Different techniques of vaccines administration followed during immunization session. (N=80).

Techniques of vaccine administration	Correctly administered (N)	Percentage (%)
Route and site of the injection	80	100
Length and gauge of the needle	80	100
Angle of the needle	75	93.8
Shake vial before withdrawing the vaccine dose	33	41.2

DISCUSSION

The success of immunization does not only depend only upon vaccine efficacy but also on the vaccine coverage with quality. Training and knowledge of health workers and public is important for the success of the intervention.

It was observed in the present study that there were many strengths in implementation of overall immunization program in terms of inventory, cold chain, waste management, conduct of immunization sessions, record keeping and client-provider interaction.

However, there are some serious gaps that need to be bridged. Firstly, Health staff is not fully aware about the diseases prevented by Pentavalent vaccine and possible serious AEFI associated with it. As a result, there is lack of knowledge in mothers/caretakers. Majority of the respondents had correct knowledge regarding administration of Measles and Vitamin A. While study conducted in Mangalore showed that 57.8% of mothers were aware about all four mandatory vaccinations for infants (poliomyelitis, tetanus, diphtheria, hepatitis B).[9]A good number of the participants in this study had also heard about common adverse events following immunization. Mostly all the respondents knew about the fever, swelling, pain and redness at the site of injection as side effects of current vaccination. Similar finding was observed during the immunization session, that after injecting the vaccine to the children, health workers only told about the minor side effects of the vaccination but none of them mentioned about the serious side effects like convulsions or fits. It is encouraging to note that most mothers believed that immunization should continue despite the occurrence of minor adverse events and that suffering from the minor adverse reactions were better than suffering from the diseases. The results showed that the knowledge regarding immunization was significantly greater among the respondents with higher education level. Mangalore study also showed that knowledge was significantly greater among educated mother and among those who were older at the time of the child's birth.[9]In our study, the main source of information regarding the immunization session, activities and vaccine preventable diseases was only ASHA, while study conducted in Ahmedabad[10] and source of knowledge about Vaccine Preventable Diseases was Anganwadi Workers(47 %), T.V(35 %) and health professionals (33.3%) and T.V respectively. The study conducted by D. Adeyinka *et al*.[11] 65.7 % of the respondents got information about Vaccine Preventable Diseases from Antenatal clinics and role of media was only 4.8%.

Inability of the health workers to focus on this pentavalent vaccine can also be attributed to their training on pentavalent vaccine. Not all the workers were found to be trained. Supervisors who were trained had better knowledge than ANMs who were not trained. Similar finding was showed in a study conducted in Thailand that trained healthcare workers had better knowledge than untrained health care workers.[12] Although cold chain maintenance in all health centers was satisfactory but some gaps was observed like only one primary health center had backup generator system at the time of power failure while study conducted by Samant Y *et al*. showed that backup generator services was only available in 20% of the centers.[13] In actual practices gaps in the overall health system are likely to be much more. Thus, further studies should be undertaken in all the districts periodically to monitor the practices and act appropriately. Not much data is available in this area so this study was planned.

Conclusion and Recommendations

Present study showed that knowledge of mothers/ caregivers was inadequate regarding the vaccines administered during immunization session whereas knowledge of health workers was quite satisfactory. But practices of health workers during immunization sessions were not found to be adequate. Health care workers at the grass root level must be trained and through them the importance of childhood vaccination to be disseminated in the community. Since the mothers are the primary care givers, they need to be educated about the newer vaccines and the changes made in immunization schedule by the health workers.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

ABBREVIATIONS

PHC: Primary Health Centre; **SC:** Sub center; **ANM:** Auxiliary Nurse Midwife; **LHV:** Lady Health Visitor; **VVM:** Vaccine Vial Monitor; **AEFI:** Adverse Events Following Immunization; **UIP:** Universal Immunization Program; **VPD:** Vaccine Preventable Disease; **IPV:** Inactivated Polio Vaccine; **ILR:** Ice Lined Refrigerator.

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