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ADVERSE DRUG EVENTS FOLLOWING VACCINATION REPORTED TO ADR MONITORING CENTRE IN KUMAON REGION

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ABSTRACT Vaccination is the process of making an individual's defence or immune system fortified against an immunogen. It is an essential and important part of public health programmes, making the medical intervention cost effective. However, like pharmaceutical products they are associated with some risk which can be mild or serious. It requires active surveillance to monitor and record such risk. This was a retrospective study conducted at the tertiary care centre at Dr.Sushila Tiwari Government Medical College Hospital, Haldwani and nearby hospitals from Feb 2018 to Oct 2018 with the purpose of analysing the adverse drug events related to vaccines. A total of 15 patients were recruited, out of which 60 % were males and 40 % were females. Most common adverse reaction was local swelling 52.6% whereas Pentavalent vaccine 68.4% was most commonly implicated in causing adverse reactions. WHO causality scale assessed 79 % of reactions as possible and 21 % as probable.

KEYWORDS : PvPI, AEFI, Immunization

Introduction:

Immunization constitutes very important and effective public health measure for preventing serious and life threatening diseases. Vaccines are administered to large population of healthy individuals, particularly millions of infants every year through national immunization programme. It has been estimated that under Universal Immunization Programme millions of children are eligible for receiving vaccines in our country.[1,2] Adults too are receiving many different type of vaccines. So vaccine safety is a major concern of modern world. Although, vaccines represent a good defence against some infectious diseases, their administration may also be related to the development of adverse vaccine events. Therefore, their use is continuously monitored to detect both expected and unexpected adverse effects.[3,4]

Pharmacovigilance of vaccines is crucial. Adverse event following immunization (AEFI) is a medical incident that takes place after an immunization, causes concern and believed to be caused by immunization.[5,6] The aim of AEFI reporting is to monitor vaccine and immunisation programme safety; and detect population specific, rare, late onset or unexpected adverse effects or events that may not have been detected in prelicensure vaccine.

Pharmacovigilance of vaccines in India is still at its nascent stage. There is need for large scale monitoring and reporting in India as only a few Indian studies on ADR related to immunization are available.

Material and Methods:

Study Area: This study was conducted at tertiary care centre at Dr Sushila Tiwari Government medical college hospital, Haldwani and nearby hospitals.

Study Period and Study Population: The Data was collected using suspected ADR reporting form during the period of nine months (Feb 2018 to October 2018) from various sources to the ADR monitoring centre attached to department of Pharmacology under the Pharmacovigilance Programme of India (PvPI).

Study Design: It was a retrospective study conducted using ADR reporting forms. The demographic details of patients were recorded. Details of medication along with chief complaints, drug history and other relevant history were also noted. Details about occurrence, nature and severity of AEFI were also recorded. Patients of both sexes and all ages, developing at least one adverse event during treatment were included in the study.

Study tool: Suspected ADR reporting form designed by National coordination centre, Indian Pharmacopoeia Commission was used to collect the relevant data. All reported events were assessed for causality using WHO causality scale[7] and for severity using Hartwig and Siegel scale.[8] The WHO causality assessment scale determines the causal relationship of a suspected drug to the ADR in question and categorize it into "Certain", "Probable", "Possible", "Unlikely", "Conditional/Unclassified" and "Unassessable/Unclassifiable". The Data collected was analyzed using Microsoft excel sheet; frequency and percentage were determined for each variable.

Result: Total of 15 patients were included in our study who experienced AEFI, of which 60% males and 40% females (Table 1). Most common age group experienced AEFI was 0-1 years (86.7%) (Table 1).

Table 1: Demographic Distribution

VARIABLES	NUMBER (n =15)	PERCENTAGE (%)
GENDER		
Male	9	60
Female	6	40
AGE IN YEARS		
0 -1	12	80
2-10	1	6.7
11-20	1	6.7
21-30	-	-
31-40	1	6.7

Most common AEFI was local swelling (52.6%) followed by injection site pain (15.7%) and abscess (10.5%) (Table 2). 79% of reactions fell under possible and 21 % under probable causality (Table 2, Figure 1).

Table 2: Pattern and Causality of AEFI

PATTERN OF AEFI	WHO CA USALITY SCALE			
	POSSIBLE	PROBABLE	CERTAIN	TOTAL n(%)
Rashes	-	2	-	2(10.5)
Local swelling	10	-	-	10(52.6)
Abscess	-	2	-	2(10.5)
Injection site pain	3	-	-	3(15.7)
Arm weakness	1	-	-	1(5.2)

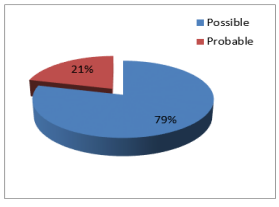
Localised lipodystrophy	1	-	-	1(5.2)
TOTAL (%)	15(79)	4(21)	-	19(100)

Most common vaccine causing adverse event was Pentavalent vaccine (46.5%) followed by MR (Measles-rubella) vaccine (10.5%) and DPT (Diptheria, Pertussis, Tetanus) vaccine (10.5%) (Table 3, Figure 2). Severity of all the cases was mild according to Modified Hartwig and Siegel severity assessment scale

Table 3: Commonly incriminated vaccine causing adverse drug reactions

Vaccine	AEFI (n=19)	No of Patients	%
Pentavalent (DPT+Hepatitis B + Hib)	Abscess	2	68.4
	Swelling	9	
	Pain	2	
MR (Measles-rubella)	Pain	1	10.5
	Arm weakness	1	
BCG (Bacille-Calmette Guerin Vaccine)	Rash	1	5.2
DPT (Diptheria+Pertussis+Tetanus)	Swelling	1	10.5
	Rash	1	
TT (Tetanus toxoid)	Localized lipodystrophy	1	5.2

WHO criteria indicated 10.5 % of reactions were serious, whereas 89.4 % were non- serious .



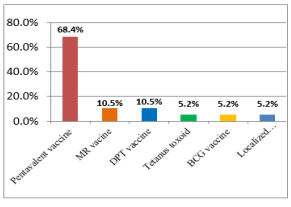


Figure 1: Causality assessment using WHO scale
Figure 2: Pattern of vaccines related adverse events

Discussion:

The present study evaluated the pattern of adverse events following vaccination, its causality and severity. Out of the 15 ADR forms evaluated, 60% were males and 40 % were females. This was similar to the studies done by Nisarg et al, Zhou et al and Carrasco-Garrido et al.[9,10,11] Majority of the patients were infants in the age group of 0-1 years, which was comparable to findings of Mahajan et al [12] but was contrary to the results of the study conducted in Denmark where it was 0 to 2 years.[3]

In our study, the most common adverse effects was local swelling (52.6%) followed by injection site pain (15.7%). This was also seen in study done by Nisarg et al[9] and Mansoor O et al[13] whereas in the study done by Zhou et al[10], it was 10.8 %. Arm weakness was seen in 5.2 % of patient and localized lipodystrophy was noted in 5.2% with tetanus toxoid which has not yet been reported by any study as per our literature search, however localized lipodystrophy was seen with DPT vaccine as reported by Sardana K et al.[14]

The most common vaccine responsible for causing adverse event was Pentavalent vaccine (DPT+ Hepatitis B +Hib) (68.4%). It caused swelling, pain and abscess at the injection site. DPT vaccine caused 10.5 % of the adverse events with swelling and rash as the common adverse event. Abscess was also seen in the study done by other researcher.[9,11] A study done in US reported higher concentration of endotoxin in whole cell DPT vaccines as compared to DTaP or DT vaccine. This high level of endotoxin may be responsible for higher incidence of adverse effects.[15] Tetanus toxoid showed localized lipodystrophy which has not been reported in any of the study so far, although DPT is known to cause this reaction.[14] MR vaccine caused 10.5 % of the adverse reactions with pain and arm weakness being seen in one of the patient. All of the reactions were mild to moderate in nature. A study by Aagaard et al in Denmark reported that one-third of adverse reactions were serious. It also reported two deaths (n=2600).[3] The causality of most of the reactions in our study was possible (79%) followed by probable (21%) as per WHO causality scale.

Limitations:

This study was done by the voluntary reporting of ADRs to vaccine in our centre. Active patient follow up was not done so there was a possible chance to miss common and non-serious adverse events. This was a small sized study so results cannot be generalized.

Conclusion:

Since vaccines are given to millions of people annually, therefore it becomes imperative that health authorities should have scientific data so that vaccines can be used safely. Their monitoring after marketing is the sole way to detect rare ADRs. This surveillance is made possible through extensive steps taken by government through national programmes i.e. Pharmacovigilance programme of India.

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