

## Clinical view on adverse drug reactions, pharmacovigilance in India and role of clinical pharmacist

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### Abstract

An Adverse Drug Reaction (ADRs) is still a challenge in modern healthcare, increasing complication of therapeutics, an elderly populace and increasing multimorbidity. Pharmacovigilance is the science and activities relating to the detection, assessment, understanding and prevention of adverse effects or any other medicine/vaccine related problem. This article is having objective of evaluating the pharmacist perception about Pharmacovigilance and ADRs monitoring through ample literature review. In India pharmacovigilance activity begins in 1986 with ADR monitoring system under supervision of drug controller general of India. The prescribed National Pharmacovigilance Program was commence in 2005; with unsuccessful attempt in 1998, and renamed as Pharmacovigilance Program of India (PvPI) in 2010. Adverse drug reactions monitoring has become an essential part to be executed together with other health-care services for a safe use of medicines. Pharmacist can play an important role in evaluation of ADRs. Pharmacist – drug expert- having abundant knowledge of pharmacological action, pharmaco-therapeutics, adverse reactions, and disease pathophysiology, can make the drug therapy safer.

**Keywords:** Adverse drug reaction; Pharmacovigilance; Clinical Pharmacist; India; Modern healthcare

### 1. Adverse Drug Reactions

It is a recognized truth that not a single drug is absolutely free from side effects. An adverse drug reaction (ADRs) is still a challenge in modern healthcare, increasing complication of therapeutics, an elderly populace and increasing multi morbidity [1, 2]. The term adverse drug reactions elucidate by WHO refer to any response to a drug which is noxious and unintended, and which occurs at doses used in man for diagnosis, prophylaxis and/or therapy [3-11]. ADRs causes mortality is on higher ranks, in breast cancer, in accidents; in acquired immune deficiency syndrome is also highest, major reason for hospital admissions [12]. It is a 4<sup>th</sup> – 6<sup>th</sup> leading cause of death; estimating 100000 deaths per year. ADRs are predictable and unpredictable types. In clinical practice, evaluation of adverse drug reactions is a bit arbitrary. It is difficult to find out all possible, predictable and unpredictable ADRs in clinical trial studies. It is because overall

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number of patients exposed to an investigational drug during clinical studies may not be sufficient to predict the infrequent side effects of agent or drugs [13-17]. Pharmacovigilance program is useful for the identification of uncommon ADRs, which are escaped during the animal studies and clinical trials of the drugs. That is why specific target oriented Pharmacovigilance studies must be carried out. The term of Pharmacovigilance is a wide-ranging concept. According to WHO Pharmacovigilance is the science and activities relating to the detection, assessment, understanding and prevention of adverse effects or any other medicine/vaccine related problem [18, 19]. After Thalidomide disaster which occurs in 1961 drew attention of world towards adverse drug reaction monitoring and following further resolutions takes place in 1966, 1967 and 1970[20].

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## 2. Pharmacovigilance in India

In India pharmacovigilance activity begins in 1986 with ADR monitoring system under supervision of drug controller general of India. The prescribed National Pharmacovigilance Programme was commence in 2005; with unsuccessful attempt in 1998, and renamed as Pharmacovigilance Program of India (PvPI) in 2010. There are more than 250 PvPI centers are established all over the country. In India adverse drug reaction reporting authority is Indian Pharmacopoeia Commission (IPC). National Pharmacovigilance Program of India (NPPI) is supervised by National Pharmacovigilance Advisory Committee (NPAC) from Central Drugs Standard Control Organization (CDSCO), New Delhi. There is system viz. - 02 zonal centers – South-West (SW) zone and North-East (NE) zone. These centers were responsible to collect information from pan India and process consequently. Under these zonal centers there were regional subsequently peripheral centers are established [21]. In India there are various studies focuses on this research viz. Ghosh S, Leelavathi DA, Padma GM (2006), Chhetri AK et.al. (2008), Padmaja U et.al. (2009), Poddar S. et.al. (2009), Gupta P. et.al. (2011), Kristina SG et.al. (2011), Rajesh R, Vidyasagar S, nandkumar K (2011), Shrivastav M. et.al. (2011), Divakar B et.al. (2012), John IJ et.al. (2012), Rishi RK et.al. (2012), Smyth RMD et.al. (2012), Joshi N et.al. (2013), Lihite et.al. (a) (2013), Lihite et.al. (b) (2013), Lobo et.al. (2013), Mishra S et.al. (2013), Pintail BS (2013), Shi QP et.al. (2013), Vijaykumar, Dhanaraju (2013), Alam K et.al. (2014), Bhuvana KB et.al. (2014), Nirojini PS et.al. (2014), Shamna M et.al. (2014), Tads' et.al. (2014), Roshani A et.al. (2015), Sharma A et.al. (2015) [15].

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## 3. Categorization of ADRs

### 3.1. Predictable ADRs

- Excessive Pharmacological effect – Ex. CNS depressants, cardio active, hypotensive and hypoglycemic agents
- Secondary Pharmacological Effects – Ex. OTC drugs or self-medication
- Rebound response on discontinuation – Ex. – Clonidine (rebound Hypertension)

### 3.2. Unpredictable ADRs

- Allergic drug reaction and Anaphylaxis– Ex. Anaphylaxis (Penicillin), Skin rashes (Sulphonamide)
- Genetically determined Toxicities– Ex. Glaucoma (Corticosteroids), Porphyria (Barbiturates)
- Idiosyncrasy, – Ex. Cancer of Uterus, breast Oestrogen (long term)
- Toxicity following drug withdrawal– Ex. narcotic analgesics, hypnotic

### 3.3. Origins of ADR

- Bio-availability deviation- Various brands-same drug
- Drug-drug and drug food interaction
- Drugs with less safety margin
- Inadequate monitoring of the patient - Cardio tonics, Diuretics
- Medication errors- Self-medication, Over prescribing of potent medicament
- New potent drugs: may cause hypersensitivity reactions.
- Patient factors - Age, Disease state, Genetic factors
- Patient incompliance- Causes - Medicine cost, Trust on Physician etc.
- Sudden withdrawal of drugs- Corticosteroids and hormones

### **3.4. Monitoring of ADRs [1, 20]**

- Information gathering from scientific resources.
- Compilation, organization and scrutinize of the information.
- Circulation of data, measures adopted in all related health divisions.

### **3.5. Recognizing ADRs [22, 23]**

- Through analyzing the case reports, laboratory data
- Through case record reviewing
- Through case-control are used.
- Through cohort study
- Through drug related data reviewing
- Through electronic/ computerized patients history
- Through making active presence in ward rounds
- Through patient interactions, screening patient records
- Through spontaneous report
- Through statistical analysis

### **3.6. Significance of monitoring the ADRs [1, 24-26]**

- Ready to use summarized and précised data about the quality and safety of drugs.
- Instigating administrative procedures, for on suspicious, speculative and hazardous drugs.
- Prevention can be done for predictable adverse events.
- Developing directives, responsiveness in the health care providers.

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## **4. Pharmacist's role in ADR monitoring**

The accomplishment of Pharmacovigilance is subject to active participation of all type of health care professionals; particularly pharmacist, countrywide to report ADRs and/or AEs. Pharmacist can play an important role in evaluation of ADRs. Pharmacist – drug expert- having abundant knowledge of pharmacological action, pharmaco-therapeutics, adverse reactions, and disease pathophysiology, can make the drug therapy safer. Clinical Pharmacist also involved in ward rounds so that can help in gathering proper data in respect to main components of ADR monitoring viz.- Demographic info of patient with medical and medication history, suspected drug, illustration of ADR, and correspondent informer. [2, 3, 5, 14, 20, and 27] Pharmacist should involve in following steps of identification and monitoring of ADR -

### **4.1. Literature review**

Through packages inserts relevant data on suspected adverse effect.

### **4.2. Patient history**

Checking of history of hypersensitivity, disorders, medication allergy to specific and/or related compounds, drug therapy duration etc.

### **4.3. Bioavailability and Bioequivalence studies**

Checking the drug level in biological fluids may helpful in understanding relation of adverse effects and dose.

### **4.4. Therapeutic decision making**

In view of reaction's intensity and seriousness, the pharmacists can advise if immediate discontinuation of therapy is required or to modified it. The risk- benefit ratio of drug should be checked regularly.

### **4.5. Pharmacy and Therapeutic Committee**

Approval for the ADRs evaluation, ADRs reporting, documentations,

#### 4.6. Policy making

Procedures for ADR-monitoring, reporting program, systems.

#### 4.7. Documentation of ADR

Maintenance, and evaluation of ADR records, reporting to appropriate authorities like Food and Drug Administration (FDA) with Suspected Adverse Drug Reaction Reporting Form and also manufacturer.

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### 5. Discussion

Research has extended incorrigible the extensive human and cost-effective costs of adverse drug reactions to prescribe drugs. One can say that the success of the Pharmacovigilance system is directly proportional to active involvement of clinical pharmacists in it. Also the by increasing Public awareness to report suspected ADRs, continuing training for health care workers, well designed and implemented policies by appropriate authorities[7-11]. In India before registration and marketing of any drug their safety and efficacy tastings are to be carried out. These trials are also helpful in detecting the possible, predictable and unpredictable adverse drug reactions or events. But some reactions like taking long time to develop, rarely occurring, and specific connection with individuals are cannot be detected in limited time framed trails or tastings. For this National Pharmacovigilance Advisory Committee (NPAC), Central Drug Standard Control Organization (CDSCO) monitors through centers divided into regionally and state wises [28]. Under the guidance of Ministry of Health & Family Welfare, Government of India, the Indian Pharmacopoeia Commission (IPC) is working from 2011 as National Coordination Centre (NCC) for Pharmacovigilance Programme of India (PvPI) also. The most important role of NCC is to collect, collate, analyze and scrutinize data gathered as Adverse Drug Reactions (ADRs) as suggestion to recommend regulatory interventions to Central Drugs Standard Control Organization (CDSCO), in addition to healthcare professionals and the public through authorized PvPI-Newsletters[29]. In the findings of comprehensive research in India by Pingilli SB, that doctors; serving for government, demonstrated superior understanding about ADRs and current ADR reporting systems well set up in the country, whereas private practitioners had an inadequate information of current systems !. On the other hand, all surveyed doctors having acquaintance of the guidelines and concerning to ADR reporting. Also had positive attitudes towards reporting ADRs, majority of them in favor of to making ADR reporting being made mandatory for doctors. While discussing on factors which affects on ADR reporting, unavailability of ADR reporting forms is a major issue. Others are bureaucratic type of system, fear of any legal liability, unaware about how to report? Etc. [6]. Taking into consideration all data gathered in this research article, all the authors put together some recommendations and suggestions. Following measures can be possible for success of pharmacovigilance program -

- Active involvement of healthcare providers.
- Awareness programs for community pharmacists.
- Each hospital connected with nearby Pharmacovigilance centers.
- Enrollment of pharmacy institutions in PvPI to increase ADRs reporting.
- Establishments more and convenient reporting centers.
- Feedback form inserts in medicine cartoons (Easy availability of forms).
- Only Pharmacy qualified person practice in pharmacy.
- Overview of pharmacovigilance should be incorporated in diploma curriculum.
- Periodic trainings for updating reporting knowledge.
- Pharmacovigilance related workshops, training programs.
- Suspected Adverse Drug Reaction Reporting Form at each pharmacy store
- Publications of various reported ADRs for healthcare providers and common public.
- Timely summit of healthcare providers, field experts.

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### 6. Conclusion

It is must to give an effective and up to date education and training to health professionals for improving the ADRs monitoring. Involvement of Pharmacovigilance in the pharmacy curriculum can also be beneficiary concept, because majority of pharmacist is having diploma pharmacy. Each and every pharmacy store should keep a copy of 'Suspected Adverse Drug Reaction Reporting Form' available online for easy availability to patients or their caretaker [30]. The pharmacovigilance must be widens to covers – herbals, traditional medicines, blood products, biologicals, medical devices, vaccines etc.

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## Compliance with ethical standards

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The authors declare no conflicts of interest.

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## References

- [1] Sahu RK, Yadav R, Prasad P, Roy A, Chandrakar S. Adverse drug reactions monitoring: prospects and impending challenges for pharmacovigilance. SpringerPlus. 2014; 3: 695.
- [2] Coleman JJ, Pontefract SK, Adverse drug reactions, Clinical Medicine. 2016; 16(5): 481–5.
- [3] Upasani MS, Upasani SV. Clinical, Community and Hospital Pharmacy- Summary of important topics of HCP (0816). 1<sup>st</sup> ed. Lambert Academic Publications, Germany, ISBN 978620248312; 2020.
- [4] Upasani MS, Upasani SV, FAQ for Clinical and Hospital Pharmacy (0816). Part 01-HP. 1<sup>st</sup> ed. Lambert Academic Publications, Germany, ISBN 9786200588241; 2019.
- [5] Upasani MS, Upasani SV, Haswani NG, FAQ for Clinical and Hospital Pharmacy (0816). Part 02- CP. 1<sup>st</sup> ed. Lambert Academic Publications, Germany, ISBN 9786200655875; 2020.
- [6] Pingili SB. Pharmacovigilance: A comparative study about the knowledge of adverse drug reaction (ADR) reporting that private practitioners and government doctors gained in a random locality in India (2013). Master's Theses and Doctoral Dissertations. 535.
- [7] Stephens M, Hospital Pharmacy, Pharmaceutical Press. 2011.
- [8] Paradkar AR, Chunawala SA. Textbook of Hospital & Clinical Pharmacy, Nirali prakashan; 2008.
- [9] Yadav AV, Yadav BV. Hospital & Clinical Pharmacy, Nirali prakashan; 2007.
- [10] Patil DJ. Textbook of Hospital & Clinical Pharmacy, Nirali prakashan; 2008.
- [11] Dahiya RS, Luthra D. Hospital & Clinical Pharmacy, Nirali prakashan; 2015.
- [12] Alqurbi MMA, et al. The role of clinical pharmacists in reducing adverse drug reactions, IJMDC. 2020; 4(1):236–239.
- [13] Ajayi FO, Sun H, Perry J. Adverse Drug Reactions: A Review of Relevant Factors, Journal of Clinical Pharmacology. 2000; 40:1093-1101.
- [14] Karch FE, Lasagna L. Towards the operational identification of adverse drug reactions, Clin. Pharmacol. Ther. 1977; 21: 247–54.
- [15] Bansod KA, Bashir MS, Ingle SS. Adverse drug reaction profile in Amravati region of India: A pharmacovigilance study. J Pharm Bioall Sci. 2020;12:155-62.
- [16] Blenkinsopp A, Wilkie P, Wang MPA. Routledge Patient reporting of suspected adverse drug reactions: a review of published literature and international experience, Br J Clin Pharmacol. 2006; 63(2): 148–156.
- [17] Becquemont L. Pharmacogenomics of adverse drug reactions: practical applications and perspectives, Pharmacogenomics. 2009; 10(6): 961-969.
- [18] WHO -World Health Organization. The importance of pharmacovigilance. Geneva: World Health Organization, 2002.
- [19] World Health Organization, Safety of medicine: A guide to detecting and reporting adverse drug reaction, Department of Essential Drugs and Medicines Policy, WHO, Geneva. 2002.

- [20] Prakasam A, Nidamanuri A, Kumar S. Knowledge, perception and practice of pharmacovigilance among community pharmacists in South India. *Pharmacy Practice (Internet)*. 2012 Oct-Dec; 10(4):222-226.
- [21] Dutta A, Banerjee A, Basu S, Chaudhry S. Analysis of under-reporting of Adverse Drug Reaction: Scenario in India and neighbouring countries. *IP Int J Compr Adv Pharmacol*. 2020; 5(3):118-124.
- [22] Sachdev Yadav. Status of adverse drug reaction monitoring and Pharmacovigilance in selected countries, *Indian Journal of pharmacology*. 2008; 40(1): S4-S9.
- [23] Phillips KA, Veenstra DL, Oren E, Lee JK, Sadee W. Potential Role of Pharmacogenomics in Reducing Adverse Drug Reactions: A Systematic Review , *JAMA*. 2001; 286(18): 2270-79.
- [24] Kumar S Badruddeen, Singh SP. Pharmacovigilance: an inevitable path towards drug safety in India, *IRJP*. 2016; 7(10):1-7.
- [25] Moore N. The role of the clinical pharmacologist in the management of ADRs. *Drug Saf*. 2001; 24(1):1–7.
- [26] Murphy BM, Frigo LC. Development implementation and results of a successful multidisciplinary adverse drug reaction reporting Program in a University Teaching Hospital. *Hospital Pharm*. 1993; 28:1199–1240.
- [27] Najafi S. Importance of Pharmacovigilance and the Role of Healthcare Professionals. *J Pharmacovigil*. 2018; 6: 252.
- [28] Indian Pharmacopoeia Commission, guidance document for spontaneous adverse drug reaction reporting, Ministry of Health & Family Welfare, Government of India. 2014; (1).
- [29] Kalaiselvan V, Thota P, Singh A. Current Status of Adverse Drug Reactions Monitoring Centres under Pharmacovigilance Programme of India, *Indian Journal of Pharmacy Practice*. 2014; 7(3): Jul–Sep 19-22.
- [30] ADR reporting form in India [Internet]. CDSCO © 2021 [cited 2021 Apr 09]. Available from <https://cdsco.gov.in/>