



A STUDY OF KNOWLEDGE, ATTITUDE AND PRACTICE OF REPORTING OF ADVERSE DRUG REACTIONS AMONG MEDICAL PRACTITIONERS AT A TERTIARY CARE HOSPITAL

Medical Science

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ABSTRACT

Background: All Medications have side effects and/or adverse effects in addition to therapeutic effects. Pharmacovigilance is necessary to deal with Adverse Drug Reactions (ADRs). **Objective:** To evaluate the knowledge, attitude and practice of reporting of adverse drug reactions among medical practitioners at Sree Gokulam Medical College & Research Foundation. **Method:** The assessment was done with the help of a questionnaire which contained 8 questions on basic knowledge and information about pharmacovigilance, 9 questions on attitude and 7 questions on practice of ADR reporting. Data was entered into MS Excel spreadsheet and analysed using SPSS Version 27. Qualitative variables were expressed in frequency and percentage. Fischer's exact test was done to find out the association between qualitative variables. **Results:** Majority of the Doctors had average knowledge (55.2%) and all had a very good attitude regarding ADR reporting. However, in the practice of ADR reporting, majority (52.4%) had poor practice followed by average practice (45.7%). **Conclusion:** In spite of a very good attitude towards reporting of ADRs, the actual practice of reporting is low. This can be attributed to low level of knowledge regarding ADR reporting. Periodical training sessions on Pharmacovigilance to update the knowledge and awareness can ultimately improve the ADR reporting and patient care.

KEYWORDS

Pharmacovigilance, Adverse Drug reactions, Side effects, Patient care, Drug safety.

INTRODUCTION

All medications have therapeutic effects, but none are completely free from adverse drug reactions. Pharmacovigilance plays a key part in the sensible use of medications by giving information regarding adverse drug reaction (ADRs) (Gaude & Sa, 2018). The World Health Organization (WHO) has defined pharmacovigilance as "the science and activities relating to the detection, assessment, understanding and prevention of adverse effects or any other possible drug-related problems" (Pharmacovigilance, n.d.). The use of medications effectively for the treatment and prevention of ADRs is ensured by pharmacovigilance and is a component of patient care and safety.

When a medicine leaves the clinical trial setting and reach the pharmacy, a larger population is exposed to the drug (Katekhaye et al., 2017). Then some uncommon adverse effects can appear (Incidence of 1:100,000), only a competent pharmacovigilance can reveal such uncommon drug related adverse effects (Marko, 2019).

The Pharmacovigilance Programme of India (PvPI) was established in 2010, with a comprehensive focus on patient safety for more than one billion people of India. Since April 2011, the headquarters of PvPI is at National Coordinating Centre (NCC) of Indian Pharmacopoeia Commission is at Ghaziabad, (Uttar Pradesh) under the supervision of the Uppsala Monitoring Centre (World Health Organization's Collaborating Centre for International Drug Monitoring) (Upadhyaya et al., 2015).

A spontaneous reporting system is one of the essential components of Pharmacovigilance. There is a lack of knowledge and practice of ADR reporting by the doctors (Gaude & Sa, 2018). Underreporting is one of the biggest issues that pharmacovigilance programmes encounter globally (Alwhaibi et al., 2020).

For Healthcare facilities to enhance their treatments and pharmaceutical conditions, proper functioning of the reporting procedures related to ADRs is very essential (Haritha et al., 2022). Adverse drug reaction (ADR) reporting is one of the professional

responsibilities of health care professionals. They should be aware and must be familiar with the pharmacovigilance systems in their countries (Hindoliya & Chitapure, 2019). The effectiveness of ADR reporting and Pharmacovigilance is dependent upon the knowledge, attitude and practice of doctors (Deo et al., 2020).

An assessment of Knowledge, Attitude, and Practices (KAP) of ADR reporting with predefined questions written in standardised questionnaires, is a method that helps us to overcome the obstacles to ADR reporting (Acharya et al., 2022). The duties of Medical practitioners also includes identification and management of Adverse drug reactions.

Even in western nations, only 6–10% of ADRs are being reported (Sharma & Kellarai, 2014). The overall general practice of reporting of adverse reactions is low and minimal in India. ADR reporting in India is less than 1% compared to incidents of ADRs, whereas worldwide, it is 5% (Shukla et al., 2023).

An active pharmacovigilance is essential for the detection and evaluation of safety signals, which is crucial for ensuring the up-to-date knowledge on the advantages and hazards of a given medication (EMA, 2018).

At present, there are short comings in reporting of ADRs, the reasons of which are not known. So, a study of knowledge, attitude and practice of adverse drug reactions reporting in medical practitioners in a tertiary care hospital is desirable. The findings can be used to get an insight of current knowledge, attitude and practice towards reporting of adverse drug reactions among medical practitioners, and to find out possible methods for betterment of reporting of the adverse drug reactions, so that the patient care can be improved.

METHODOLOGY

This was a cross-sectional, observational, questionnaire-based study, conducted at SGMCRF, Venjaramoodu. For this, a pre-validated and standardised questionnaire was used. The protocol was approved by

the Institutional Research Cell and the Institutional Ethics Committee. A written informed consent was taken from the survey participants. This study used a questionnaire to assess the knowledge, attitude and practice of clinicians working in the teaching hospital with regard to ADR monitoring and Pharmacovigilance.

After receiving informed consent, prescribers (Faculty and/or Consultants, Senior residents, Postgraduate students, Junior residents (Non-Academic) and House surgeons) from various disciplines in the hospital were enrolled in the study. Doctors who refused to participate or who didn't send the questionnaire back by the stipulated time were not included. There were 23 questions - with 8 questions relating to the basic knowledge and information about pharmacovigilance, 9 questions relating to attitude and 7 practice of ADR reporting. Data was entered into MS Excel spreadsheet and analysed using SPSS Version 27. Qualitative variables were expressed in frequency and percentage. Fischer's exact test was done to find out the association between qualitative variables. P-value less than 0.05 was considered to be statistically significant.

RESULTS

The study was conducted among 105 doctors in a tertiary care centre in Thiruvananthapuram district.

Distribution of Doctors based on Knowledge, attitude and practice of ADR reporting

Table No.1: Distribution of Doctors based on Knowledge of reporting ADRs (n=105)

	Knowledge	
	Correct n (%)	Incorrect n (%)
The detection, assessment, & prevention of ADRs is pharmacovigilance	85 (81.0)	20 (19.0)
Entity entrusted to monitoring of ADRs in India is Indian Pharmacopoeia Commission (IPC)	27 (25.7)	78 (74.3)
Headquarters of pharmacovigilance programme of India is National Coordination Centre (NCC) of Indian Pharmacopoeia Commission (IPC), Ghaziabad	45 (42.9)	60 (57.1)
International Pharmacovigilance centre is at Uppsala, Sweden	28 (26.7)	77 (73.3)
Toll-free number for reporting ADRs is 1800-180-3024	26 (24.8)	79 (75.2)
There is a particular format for reporting ADR	92 (87.6)	13 (12.4)
Most commonly used scale to establish the causality of an ADR is WHO-UMC scale / Naranjo scale	16 (15.2)	89 (84.8)

Majority of doctors (81%) were knowledgeable about proper definition pharmacovigilance according to World Health Organization. 87.6% of the doctors knew about the existence of a particular format for reporting ADR. Near to half (42.9%) of the Clinicians knew the Headquarters of Pharmacovigilance Programme of India. Almost quarter of the Doctors (25.7%) were aware about the entity entrusted to monitoring of ADRs in India and 26.7% of the Doctors knew the place where International Collaborating Centre for Drug Monitoring is located. [Table No:1]

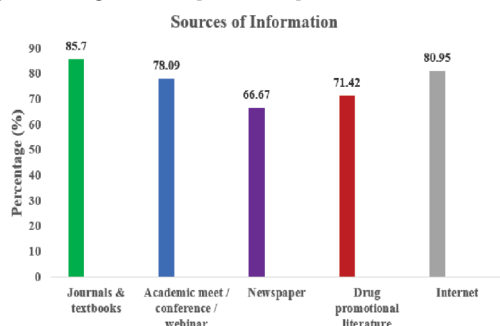


Fig No.1: Distribution of Doctors based on sources of information for obtaining ADRs of new drugs (n=105)

The most preferred source (85.7%) of knowing the Adverse Drug Reactions (ADRs) of the new drugs was Journals and Textbooks followed by browsing Internet (80.95%). Almost a similar percentage of Doctors (78.9 %) got the information about ADRs of new drugs form Academic meet / Conference / Webinar.

Table No.2: Distribution of Doctors based on Attitude of reporting ADRs (n=105)

	Attitude	
	Correct n (%)	Incorrect n (%)
Pharmacovigilance programme should be included in under graduate and post graduate curriculum	104 (99.0)	1 (1.0)
There is a need for healthcare professionals to attend awareness programmes on pharmacovigilance regularly	100 (95.2)	5 (4.8)
ADR reporting should be a professional obligation	94 (89.5)	11 (10.5)
ADR monitoring centre should be there in every tertiary care hospital	94 (89.5)	11 (10.5)
Awareness ADR monitoring centre in the hospital	69 (65.7)	36 (34.3)
Doctors, pharmacists, pharmacologists, nurses, health workers and patients are responsible for reporting ADRs	82 (78.1)	23 (21.9)
Serious ADRs, ADRs to new drugs, newly detected ADRs of old drugs, vaccine related adverse effects and ADRs to traditional & herbal medicines to be reported	104 (99.0)	1 (1.0)

Majority of Medical practitioners had positive attitude towards ADR reporting. 99 % of the doctors agreed that pharmacovigilance programme should be included in Medical under graduate and post graduate curriculum. Around 99 % of the Medical practitioners are of the opinion that serious ADRs, ADRs to new drugs, newly detected ADRs of old drugs, vaccine related adverse effects and ADRs to traditional & herbal medicines are to be reported. A large group (95.2%) of the doctors acknowledged the need for healthcare professionals to attend awareness programmes on pharmacovigilance regularly. Near to 90% of the Doctors opted that the ADR reporting should be a professional obligation (89.5%) and 89.5% of the Medical graduates admit that ADR monitoring centre should be there in every tertiary care hospital. Some Medical practitioners (65.7%) were aware of the ADR Monitoring Centre (AMC) in their hospital and 78.1% of clinicians were aware the about the individuals who can report the ADRs.

The commonest factor which discourages the Medical graduates from reporting an ADR was the difficulty to ascertain whether an ADR has occurred or not (42.85%) followed by lack of time (18.09%).

Table No.3: Distribution of Doctors based on Practice of reporting ADRs (n=105)

	Practice	
	Yes n (%)	No n (%)
Reported any ADR to Pharmacovigilance centre of their hospital	19 (18.1)	86 (81.9)
Ever filled an ADR form	15 (14.3)	90 (85.7)
Received any training on ADR reporting	12 (11.4)	93 (88.6)
Practice of giving ADR information of a prescribed drug to patients	75 (71.4)	30 (28.6)
Maintaining medical record of ADR that has occurred in patients	56 (53.3)	49 (46.7)
Practice of follow up of a patient affected by an ADR after being transferred to another department	71 (67.6)	34 (32.4)

More than half of the Doctors (71.4%) (Table 3) informed their patients regarding the adverse effects of the drugs prescribed. 67.6% of the doctors do follow up the patients affected by an ADR after being transferred to another department. Medical records of the encountered

ADRs were maintained by 53.3% of practitioners. Less than quarter of the medical practitioners have reported ADR to pharmacovigilance centre of their hospital (18.1%) and 14.3% of the Medical graduates have ever filled an ADR form during their practice. Only a negligible percentage (11.4%) of the doctors have received some training on ADR reporting.

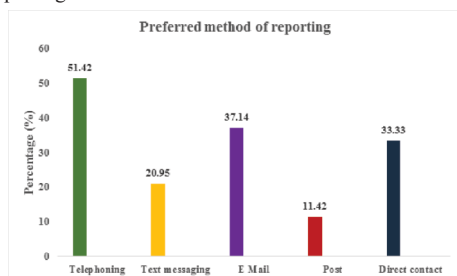


Fig No.2: Distribution of Doctors based on preferred method of reporting (n=105)

About 51.4% of the medical practitioners preferred telephoning as the method of reporting ADR information to the ADR centre followed by E-mail (35.2%). [Table No:2]

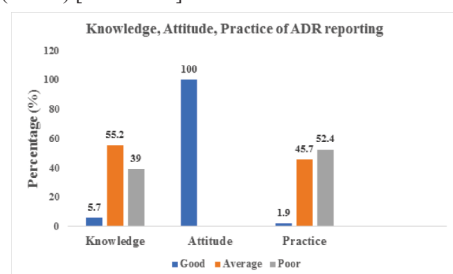


Fig No.3: Distribution of Doctors based on Knowledge, Attitude and Practice of reporting ADRs (n=105)

More than half of the Doctors had average knowledge (55.2%) [Fig 3] and all had a very good attitude regarding ADR reporting. However, with regards to practice of ADR reporting, majority (52.4%) had poor practice followed by average practice (45.7%) [Fig 3].

Association between designation of doctors with knowledge and practice of ADR reporting

Table No.4: Association between designation of doctors with knowledge, and practice of ADR reporting among the doctors (n=105)

Designation	Knowledge			χ^2	p value
	Good (n=6) n (%)	Average (n=58) n (%)	Poor (n=41) n (%)		
Faculty	1 (16.7)	26 (44.8)	16 (39.0)	9.23	0.32
Senior Resident	1 (16.7)	6 (10.3)	5 (12.2)		
Post graduate student	4 (66.7)	22 (37.9)	11 (26.8)		
Junior resident	0 (0.0)	1 (1.7)	3 (7.3)		
House surgeon	0 (0.0)	3 (5.2)	6 (14.6)		
Practice					
	Good (n=2) n (%)	Average (n=48) n (%)	Poor (n=55) n (%)		
Faculty	1 (50.0)	25 (52.1)	17 (30.9)	10.44	0.22
Senior Resident	1 (50.0)	6 (12.5)	5 (9.1)		
Post graduate student	0 (0.0)	12 (25.0)	25 (45.5)		
Junior resident	0 (0.0)	2 (4.2)	2 (3.6)		
House surgeon	0 (0.0)	3 (6.3)	6 (10.9)		

Majority (66.7%) [Table 4] of the Doctors who had good knowledge regarding ADR reporting were postgraduate students. However, there is no statistically significant association was found between designation of doctors and knowledge regarding reporting of ADR among them (p value > 0.05) [Table 4]. Half of the Medical practitioners who had good practice of ADR reporting were senior residents and this difference observed was not found to be statistically significant (p value > 0.05) [Table 4].

DISCUSSION

In the study done by Danekhu et al., the correct response on the definition pharmacovigilance was given by 68 % of Medical doctors (Danekhu et al., 2021). In our study, a high percentage of doctors (81%) were acquainted about the World Health Organization's definition of pharmacovigilance. In another study done by Nisa et al., 23.7% of people recognized the location of International Collaboration Centre for Adverse Drug Reaction Monitoring (Nisa et al., 2018). Similarly in our study also, 26.7% of Medical practitioners were familiar with the location of the International Collaborating Centre for Drug Monitoring. Training programmes can be conducted to rectify inadequate awareness of Pharmacovigilance programmes.

Due to the presence of active ADR monitoring centre in this hospital majority of the doctors were aware of the reporting forms and hence 87.6% of the doctors were aware of the particular format for reporting however Fadare et al reported that only 35.9% of the participating healthcare professionals were familiar with the standard reporting form for adverse drug reactions (Fadare et al., 2011). In our study, the percentage of doctors knowing the national Toll-Free number for reporting ADRs was 26 %. This means that the training in ADR reporting and Pharmacovigilance needs further strengthening

In the study done in Bangladesh, 77.14 % of the healthcare professionals mentioned the necessity for regular workshops and continuing medical education (N & S, 2022). In our study 95.2 % of doctors expressed their willingness to attend awareness programmes on pharmacovigilance regularly. This shows the positive attitude and willingness of the doctors to attend training programmes on Pharmacovigilance. In the study done by Kumar et al., awareness about nearby ADR monitoring centre was 48% (Kumar et al., 2020). In our study 65.7% of the Medical practitioners were aware of the ADR Monitoring Centre (AMC) in their hospital. In the study by Vijay M. Katekhaye et.al, 36.7% felt that a separate team should be posted for ADR reporting (Katekhaye et al., 2017). In our study, 78.1 % of the participants agrees that Doctors, pharmacists, pharmacologists, nurses, health workers and patients can report ADRs. So, awareness classes should actually include a wider audience in addition to doctors. In a study done Madhya Pradesh, various reasons for under-reporting of adverse drug reactions by doctors can be lack of time, feeling that a single case report may not be significant, concern that reporting will generate extra work and fear of legal implications (Marko, 2019). In the study done by Deepti Chopra et.al, the primary causes of shortcomings in ADR reporting was inadequate knowledge of what and where to report and lack of time .etc (Chopra et al., 2011). In the study done by Yashmay Gordhon et.al., lack of knowledge and time were the discouraging factors (Gordhon & Padayachee, 2020). In the study done by Supratim Datta et.al., 35% of the respondents had the issue of difficulty in deciding the causality of an ADR which prevented them from reporting (Datta & Sengupta, 2015). In our study, the problem faced by the Medical graduates from reporting an ADR was the difficulty to ascertain whether an ADR has occurred or not followed by the lack of time. This can be rectified by having frequent academic sessions on ADR monitoring during the house surgery training and reinforcing ADR reporting in undergraduate and post graduate curriculum.

Studies by Asha P. Dass et.al there was a significant difference between individuals who had practised pharmacovigilance (50%) and those who had good attitudes about it (>70%) (Dass et al., 2017). This was in concurrence with our study showing a significant difference between the level of attitude (100 %) and the practice of ADR reporting (52.4 %). This shows that though the clinicians have a positive attitude towards reporting, the lack of knowledge and time can hinder the quality of ADR reporting.

In the study done by Zahir Khan et.al, in spite of low ADR reporting, Health care providers (HCPs) maintained a positive outlook on Pharmacovigilance and ADR reporting. HCPs were found to having

inadequate training that lead to underreporting of ADRs(Khan et al., 2023). In our study, there is poor practice of ADR reporting despite good attitude, which could be due to poor knowledge (39 %) followed by average knowledge (55.2 %).

In the study done by Het B. Upadhyaya et.al, despite their excellent intentions, doctors lacked ADR reporting expertise and practise. ADR monitoring and reporting was opined to be crucial by majority of the clinicians, but only a few had actually done so (Upadhyaya et al., 2015a). In our study, in spite of good attitude, the practice of good ADR reporting is poor (1.9 %) followed by average level of practice (45.7 %).

CONCLUSION

From the study, it can be concluded that even though there is a good attitude towards reporting of Adverse Drug Reactions (100 %), the actual practice of reporting ADRs is low. We can also see that the level of knowledge regarding ADR reporting is poor (39 %). So, the low level of ADR reporting could be due to lack of Knowledge on Pharmacovigilance and reporting of ADRs. This warrants educational interventions like training programs, periodic awareness classes, workshops on ADR reporting, inclusion of Pharmacovigilance in the orientation programme of House surgeons and annual observation of Pharmacovigilance week which will ultimately improve the reporting of ADR, thereby Drug safety and patient care.

REFERENCES

- Alwhaibi, M., Alhindi, G., Alshamrani, M., Essa, M. B., A. AlAlool, N., & Alhawass, T. M. (2020). Pharmacovigilance in healthcare education: Students' knowledge, attitude and perception: a cross-sectional study in Saudi Arabia. *BMC Medical Education*, 20(1), 210. <https://doi.org/10.1186/s12909-020-02116-2>
- Chopra, D., Wardhan, N., & Rehan, H. S. (2011). Knowledge, attitude and practices associated with adverse drug reaction reporting amongst doctors in a teaching hospital. *The International Journal of Risk & Safety in Medicine*, 23(4), 227–232. <https://doi.org/10.3233/JRS-2011-0543>
- Danekhu, K., Shrestha, S., Aryal, S., & Shankar, P. R. (2021). Health-care Professionals' Knowledge and Perception of Adverse Drug Reaction Reporting and Pharmacovigilance in a Tertiary Care Teaching Hospital of Nepal. *Hospital Pharmacy*, 56(3), 178–186. <https://doi.org/10.1177/0018578719883796>
- Datta, S., & Sengupta, S. (2015). An evaluation of knowledge, attitude, and practice of adverse drug reaction reporting in a tertiary care teaching hospital of Sikkim. *Perspectives in Clinical Research*, 6(4), 200–206. <https://doi.org/10.4103/2229-3485.167096>
- Deo, D. S. K., Dahal, A., Gautam, N., Yadav, D. S., & Gupta, D. S. (2020). Assessment of knowledge, attitude, and practice of pharmacovigilance in a medical college of Nepal. *Medico Research Chronicles*, 7(3), Article 3.
- EMA. (2018, September 17). *Signal management* [Text]. European Medicines Agency. <https://www.ema.europa.eu/en/human-regulatory/post-authorisation/pharmacovigilance/signal-management>
- Fadare, J. O., Enwere, O. O., Afolabi, A. O., Chedi, B. a. Z., & Musa, A. (2011). Knowledge, Attitude and Practice of Adverse Drug Reaction Reporting among Healthcare Workers in a Tertiary Centre in Northern Nigeria. *Tropical Journal of Pharmaceutical Research*, 10(3), Article 3. <https://doi.org/10.4314/tjpr.v10i3.4>
- Gaude, O., & Sa, S. (2018). Assessment of knowledge, attitude, and practices of pharmacovigilance and adverse drug reaction reporting among final year medical students—A questionnaire-based study in a tertiary care hospital in Goa. *National Journal of Physiology, Pharmacy and Pharmacology*, 8(9), 1. <https://doi.org/10.5455/njppp.2018.8.0930506102018>
- Gordhon, Y., & Padayachee, N. (2020). Evaluating the knowledge, attitudes and practices of healthcare workers towards adverse drug reaction reporting at a public tertiary hospital in Johannesburg. *International Journal of Africa Nursing Sciences*, 12, 100191. <https://doi.org/10.1016/j.ijans.2020.100191>
- Haritha, G. N., Naha, A., Rani, U., & Rama, A. (2022). Evaluation of knowledge, attitude, and practice of medical and dental postgraduates toward reporting of adverse drug reactions in a teaching hospital, South India. *Journal of Applied Pharmaceutical Science*. <https://doi.org/10.7324/JAPS.2022.120904>
- Hindoliya, M., & Chitpure, F. (2019). A study on the knowledge, attitude and practice on adverse drug reactions and pharmacovigilance among post graduate residents in Gandhi Medical College, Bhopal. *International Journal of Basic & Clinical Pharmacology*, 8(9), Article 9. <https://doi.org/10.18203/2319-2003.ijbcp20194123>
- Katekhaye, V. M., Kadhe, N. G., John, J., & Pawar, S. R. (2017). Knowledge, attitude and practice of pharmacovigilance among medical professionals at a tertiary care hospital in Mumbai, Maharashtra, India. *International Journal of Research in Medical Sciences*, 5(1), Article 1. <https://doi.org/10.18203/2320-6012.ijrms20164540>
- Kumar, S., Babu, S. J. S., & Wilson, A. (2020). Assessment of Knowledge, Attitude, and Practice of Health-Care Professionals in Adverse Drug Reaction Reporting in a Tertiary Care Hospital. *Medical Journal of Dr. D.Y. Patil University*, 13(4), 356. https://doi.org/10.4103/mjdrdypu.mjdrdypu_75_19
- Marko, S. (2019). A study of knowledge, attitude, and practice of pharmacovigilance among medical students at a tertiary care teaching hospital in Madhya Pradesh, India. *National Journal of Physiology, Pharmacy and Pharmacology*, 0, 1. <https://doi.org/10.5455/njppp.2019.0620408062019>
- N, N., & S, R. (2022). A Study on Knowledge, Attitude and Practices among Healthcare Professionals Regarding the Adverse Drug Reaction Monitoring and Reporting at a Tertiary Care Teaching Hospital. *Bangladesh Journal of Medical Science*, 21(3), Article 3. <https://doi.org/10.3329/bjms.v21i3.59581>
- Nisa, Z. U., Zafar, A., & Sher, F. (2018). Assessment of knowledge, attitude and practice of adverse drug reaction reporting among healthcare professionals in secondary and tertiary hospitals in the capital of Pakistan. *Saudi Pharmaceutical Journal*, 26(4), 453–461. <https://doi.org/10.1016/j.jsps.2018.02.014>
- Pharmacovigilance. (n.d.). Retrieved April 14, 2023, from <https://www.who.int/teams/regulation-prequalification/regulation-and-safety/pharmacovigilance>
- Sharma, R., & Kellarai, A. (2014). Pharmacovigilance and adverse drug reaction reporting perspectives among interns and postgraduates of a teaching hospital. *Journal of Pharmacology & Pharmacotherapeutics*, 5(4), 248–250. <https://doi.org/10.4103/0976-500X.142436>
- Shukla, S., Sharma, P., Gupta, P., Pandey, S., Agrawal, R., Rathour, D., Kumar Kewat, D., Singh, R., Kumar Thakur, S., Paliwal, R., & Sulakhya, K. (2023). Current Scenario and Future Prospects of Adverse Drug Reactions (ADRs) Monitoring and Reporting Mechanisms in the Rural Areas of India. *Current Drug Safety*. <https://doi.org/10.2174/1574886318666230428144120>
- Upadhyaya, H. B., Vora, M. B., Nagar, J. G., & Patel, P. B. (2015). Knowledge, attitude and practices toward pharmacovigilance and adverse drug reactions in postgraduate students of Tertiary Care Hospital in Gujarat. *Journal of Advanced Pharmaceutical Technology & Research*, 6(1), 29–34. <https://doi.org/10.4103/2231-4040.150369>