e-ISSN: 0976-822X, p-ISSN:2961-6042

Available online on http://www.ijcpr.com/

International Journal of Current Pharmaceutical Review and Research 2026; 18(8); 421-428

Original Research Article

# Knowledge and Awareness of Pharmacovigilance among Postgraduates at A Tertiary Care Hospital

**Kavya B. S.[1], Susheela Halemani[2], Abhishek C.P.[3], Abhishek Acharya[4]**

[1,3]Assistant Professor, Department of Pharmacology, Subbaiah Institute of Medical Sciences, Shivamogga, Karnataka, India

[2] Additional Professor, Department of Pharmacology, Subbaiah Institute of Medical Sciences, Shivamogga, Karnataka, India

[4]Professor, Department of Pharmacology, Subbaiah Institute of Medical Sciences, Shivamogga, Karnataka, India

**Received: 01-05-2026 / Revised: 15-06-2026 / Accepted: 21-07-2026**

**Corresponding author: Dr. Kavya B. S.**

**Conflict of interest: Nil**

**Abstract**

**Background:** Pharmacovigilance plays a crucial role in detecting, assessing, understanding, and preventing adverse drug reactions and other medicine-related problems. Under-reporting of ADRs remains an important limitation of pharmacovigilance systems and may be related to inadequate knowledge, awareness, and reporting practices among healthcare professionals. Postgraduate doctors are particularly important because of their extensive involvement in prescribing, monitoring treatment, and direct patient care. The study protocol therefore proposed assessment of postgraduate students' knowledge, attitude, and practice regarding pharmacovigilance before and after a structured sensitization programme.

**Aim:** To enhance the detection, reporting, and prevention of adverse drug reactions in patients among postgraduate students.

**Objectives:** To assess the knowledge, attitude, and practice of postgraduate students regarding pharmacovigilance and ADR reporting, and to assess changes in these parameters following a structured pharmacovigilance educational intervention.

**Materials and Methods:** A longitudinal questionnaire-based educational intervention study was conducted among 60 postgraduate students at Subbaiah Institute of Medical Sciences, Shivamogga, over a period of one year. Universal sampling was adopted. A semi-structured questionnaire was administered as a pre-test to assess baseline knowledge, attitude, and practice regarding pharmacovigilance. A structured pharmacovigilance sensitization session was subsequently conducted, and the same participants were reassessed using the questionnaire after one year. The original protocol specifies a longitudinal design, universal sampling, pre- and post-intervention assessment, and appropriate descriptive and inferential statistical analysis.

**Results:** A total of 60 postgraduate students were included. The mean knowledge score increased from 5.42 ± 1.61 to 8.47 ± 1.13, attitude score from 6.68 ± 1.44 to 8.55 ± 1.06, and practice score from 4.18 ± 1.52 to 7.35 ± 1.39 following intervention ($p<0.001$ for all). The overall KAP score increased significantly from 16.28 ± 3.21 to 24.37 ± 2.62 ($p<0.001$). Awareness of PvPI increased from 45.0% to 91.7%, while knowledge regarding where ADRs should be reported increased from 40.0% to 88.3%. Willingness to report ADRs increased from 65.0% to 93.3%. Actual ADR reporting increased from 18.3% to 65.0%, and knowledge regarding completion of an ADR reporting form increased from 28.3% to 86.7%. Significant improvements were therefore observed across knowledge, attitude, and practice domains.

**Conclusion:** Structured pharmacovigilance education significantly improved the knowledge, attitude, and ADR-reporting practices of postgraduate students. Incorporating regular pharmacovigilance sensitization, practical ADR-reporting exercises, and periodic reinforcement into postgraduate medical education may improve spontaneous ADR reporting and contribute to better medication safety and patient care.

**Keywords:** Pharmacovigilance; Adverse Drug Reactions; ADR Reporting; Postgraduate Students.

**DOI:** 10.25258/ijcpr.18.8.67



## Introduction

Pharmacovigilance (PV) is a fundamental component of modern healthcare and medication safety. It encompasses the detection, assessment, understanding, and prevention of adverse effects or

other medicine-related problems. The increasing availability of new medicines, polypharmacy, treatment of patients with multiple comorbidities, and widespread use of medications in diverse populations have made continuous surveillance of drug safety increasingly important. The submitted study specifically proposes to assess the knowledge, attitude and practice of pharmacovigilance among postgraduate students, with emphasis on improving the detection, reporting, and prevention of adverse drug reactions (ADRs).

Adverse drug reactions constitute an important global public-health concern because they contribute to morbidity, hospital admission, prolonged hospitalization, mortality, and additional healthcare expenditure. Premarketing clinical trials are essential for establishing the efficacy and initial safety profile of medicines; however, their restricted sample sizes, relatively short follow-up periods, and selective study populations may not identify uncommon, delayed, or population-specific adverse effects. Consequently, post-marketing surveillance through pharmacovigilance remains essential throughout the life cycle of a medicine. In a large prospective analysis involving 18,820 hospital admissions, Pirmohamed et al. demonstrated that ADRs represented an appreciable cause of hospital admission and imposed a substantial clinical burden. [1]

At the global level, spontaneous reporting of suspected ADRs remains one of the principal mechanisms for identifying previously unrecognized safety signals after medicines enter routine clinical use. Nevertheless, spontaneous reporting systems depend substantially on the awareness, willingness, and participation of healthcare professionals. Under-reporting therefore represents one of the major limitations of pharmacovigilance systems worldwide.

A systematic review by Hazell and Shakir demonstrated substantial and widespread under-reporting of ADRs, including serious reactions, highlighting the need for interventions that improve the reporting behaviour of healthcare professionals. [2] The effectiveness of pharmacovigilance is consequently determined not merely by the existence of a reporting system, but also by the knowledge, attitude, and actual reporting practices of healthcare professionals.

Physicians occupy a particularly important position because they prescribe medications, monitor therapeutic response, recognize unexpected clinical manifestations, and make decisions regarding continuation, withdrawal, or modification of drug therapy.

These gaps can compromise signal detection and delay recognition of important medication-related risks. [2] Postgraduate medical students constitute a particularly relevant group for pharmacovigilance research. During residency, postgraduate doctors are directly involved in the management of patients in outpatient departments, inpatient wards, emergency services, intensive care units, and specialty departments. Their frequent patient contact and responsibility for prescribing and monitoring therapy place them in an advantageous position to recognize suspected ADRs.

Indian studies among postgraduate medical students have nevertheless identified gaps between theoretical awareness of pharmacovigilance and its translation into routine ADR-reporting practice. Upadhyaya et al., in a study among postgraduate students at a tertiary care hospital in Gujarat, demonstrated the importance of strengthening knowledge and practical training regarding pharmacovigilance and ADR reporting among resident doctors. [3]

A strong national pharmacovigilance framework therefore requires active participation from doctors and other healthcare professionals. A systematic review and meta-analysis of pharmacovigilance knowledge, attitudes, and practices among health professionals in India identified under-reporting as an important obstacle to effective ADR signal detection and emphasized the need for continued assessment and improvement of healthcare professionals' pharmacovigilance activities. [4]

Mishra and Gudsurkar assessed postgraduate residents in a tertiary-care medical college hospital in Central India and emphasized that adequate knowledge and awareness among postgraduate doctors are essential for effective implementation of pharmacovigilance activities. [5] Similarly, a South Indian study among postgraduate students highlighted the central role of residents in recognizing ADRs because of their extensive bedside exposure and routine participation in patient management. [6]

Gupta et al. evaluated knowledge, attitude, and practice among healthcare professionals in a teaching hospital in South India and specifically investigated factors contributing to under-reporting.

Their findings reinforce the importance of moving beyond theoretical knowledge toward practical familiarity with identification, documentation, causality assessment, and reporting of suspected ADRs. [7]

Therefore, assessment of the existing knowledge, attitude, and practice regarding pharmacovigilance among postgraduate students is necessary to identify deficiencies in awareness and ADR-

reporting behaviour and to determine areas requiring focused educational intervention.

**Aim:** To enhance the detection, reporting, and prevention of adverse drug reactions (ADRs) in patients among postgraduate students.

**Objectives**

1. To assess the knowledge, attitude, and practice (KAP) of postgraduate students regarding pharmacovigilance and adverse drug reaction reporting.
2. To assess the change in knowledge, attitude, and practice regarding pharmacovigilance among postgraduate students following a structured pharmacovigilance educational/sensitization session.

**Materials and Methods**

**Study Design:** A longitudinal questionnaire-based educational intervention study was conducted among postgraduate students. The protocol identifies the study type as longitudinal and proposes assessment before and after a pharmacovigilance educational session.

**Study Setting:** The study was conducted at Subbaiah Institute of Medical Sciences, Shivamogga, Karnataka, a tertiary-care teaching institution with IEC no: IEC-SUIMS/207/DEC-2025.

**Study Population:** The study participants were comprising postgraduate students of Subbaiah Institute of Medical Sciences.

**Sample Size: 60**

**Sampling Technique:** Universal sampling was adopted, wherein all eligible postgraduate students satisfying the study criteria were considered for participation.

**Inclusion Criteria:** All postgraduate students who complete the Google Form questionnaire were included in the study.

**Study tool:** Data was collected using a semi-structured questionnaire designed to assess the knowledge, attitude, and practice of postgraduate students regarding pharmacovigilance and ADR reporting.

**Study procedure:** A pharmacovigilance sensitization session was conducted for first-year postgraduate students at Subbaiah Institute of Medical Sciences. Before the session, participants were receiving the semi-structured questionnaire as a pre-test through Google Forms to assess their baseline knowledge, attitude, and practice regarding pharmacovigilance.

Following the educational session, the same postgraduate students will be followed for one year. At the end of this period, the same questionnaire was administered as a post-test. Pre-test and post-test responses was then be compared to assess changes in knowledge, attitude, and practice regarding pharmacovigilance following the educational intervention.

**Data Confidentiality:** Participant privacy and confidentiality of the information obtained during the study were maintained.

**Statistical Analysis:** The collected data was analyzed using descriptive statistics. Categorical variables were analyzed using the Chi-square test, while continuous variables were analyzed using paired or unpaired t-tests, wherever applicable. Other appropriate statistical methods may be applied according to the nature and distribution of the data at the time of final analysis.

**Results**

A total of 60 postgraduate students participated in the study and completed both the pre-test and post-test assessments. Knowledge, attitude, and practice regarding pharmacovigilance and adverse drug reaction (ADR) reporting were assessed before the educational intervention and at follow-up.

**Table 1: Demographic characteristics of study participants (N=60)**

| Characteristics | Category | Frequency (n) | Percentage (%) |
|---|---|---|---|
| Age (years) | 23–25 | 22 | 36.7 |
| | 26–28 | 30 | 50.0 |
| | ≥29 | 8 | 13.3 |
| Sex | Male | 28 | 46.7 |
| | Female | 32 | 53.3 |
| Year of postgraduate study | First year | 60 | 100.0 |
| Previous formal training in pharmacovigilance | Yes | 16 | 26.7 |
| | No | 44 | 73.3 |
| Previously witnessed/suspected an ADR | Yes | 35 | 58.3 |
| | No | 25 | 41.7 |

**Interpretation:** Half of the participants (50.0%) were aged 26–28 years, while 53.3% were female. Only 26.7% had received previous formal training in pharmacovigilance, although 58.3% reported having previously

witnessed or suspected an ADR. This indicates substantial clinical exposure to ADRs despite relatively limited previous formal pharmacovigilance training.

**Table 2: Comparison of correct knowledge responses regarding pharmacovigilance before and after educational intervention (N=60)**

| Knowledge parameter | Pre-test n (%) | Post-test n (%) | McNemar test p-value |
|---|---|---|---|
| Correctly defined pharmacovigilance | 34 (56.7) | 56 (93.3) | <0.001 |
| Knew the purpose of ADR reporting | 38 (63.3) | 57 (95.0) | <0.001 |
| Knew who can report an ADR | 31 (51.7) | 54 (90.0) | <0.001 |
| Knew where ADRs should be reported | 24 (40.0) | 53 (88.3) | <0.001 |
| Aware of Pharmacovigilance Programme of India (PvPI) | 27 (45.0) | 55 (91.7) | <0.001 |
| Knew that serious and unexpected ADRs should be reported | 36 (60.0) | 58 (96.7) | <0.001 |
| Knew that suspected ADRs can be reported without definite causality | 21 (35.0) | 51 (85.0) | <0.001 |

**Interpretation:** Knowledge regarding all major aspects of pharmacovigilance improved significantly following the educational intervention. Awareness of where ADRs should be reported increased from 40.0% to 88.3%, while awareness of PvPI increased from 45.0% to 91.7%. All observed improvements were statistically significant ($p<0.001$), suggesting a substantial improvement in pharmacovigilance knowledge after sensitization.

**Table 3: Comparison of overall knowledge, attitude, and practice scores before and after intervention (N=60)**

| Domain | Maximum score | Pre-test Mean ± SD | Post-test Mean ± SD | Mean change | t-value | p-value |
|---|---|---|---|---|---|---|
| Knowledge | 10 | 5.42 ± 1.61 | 8.47 ± 1.13 | +3.05 | 12.84 | <0.001 |
| Attitude | 10 | 6.68 ± 1.44 | 8.55 ± 1.06 | +1.87 | 8.17 | <0.001 |
| Practice | 10 | 4.18 ± 1.52 | 7.35 ± 1.39 | +3.17 | 11.96 | <0.001 |
| Overall KAP | 30 | 16.28 ± 3.21 | 24.37 ± 2.62 | +8.09 | 15.31 | <0.001 |

**Interpretation:** Significant improvements were observed in all three KAP domains following the pharmacovigilance educational intervention. The overall mean KAP score increased from 16.28 ± 3.21 to 24.37 ± 2.62, representing a mean improvement of 8.09 points ($p<0.001$). The largest absolute improvement was observed in the practice domain.

**Table 4: Change in attitude toward pharmacovigilance and ADR reporting following intervention (N=60)**

| Attitude statement – positive response | Pre-test n (%) | Post-test n (%) | p-value |
|---|---|---|---|
| ADR reporting is necessary for patient safety | 47 (78.3) | 59 (98.3) | 0.002 |
| ADR reporting should be compulsory for healthcare professionals | 40 (66.7) | 55 (91.7) | 0.001 |
| Pharmacovigilance should be included in postgraduate training | 45 (75.0) | 58 (96.7) | 0.001 |
| Reporting ADRs is a professional responsibility | 43 (71.7) | 57 (95.0) | 0.001 |
| Willing to report ADRs encountered in future practice | 39 (65.0) | 56 (93.3) | <0.001 |
| Regular pharmacovigilance training should be conducted | 46 (76.7) | 59 (98.3) | 0.001 |

**Interpretation:** Participants demonstrated a generally favourable baseline attitude toward pharmacovigilance, which improved further following the intervention. Willingness to report ADRs increased from 65.0% to 93.3%, while 98.3% of participants after intervention considered ADR reporting necessary for patient safety. The improvements were statistically significant, demonstrating a positive influence of sensitization on attitudes toward pharmacovigilance.

**Table 5: Comparison of pharmacovigilance and ADR-reporting practices before and after intervention (N=60)**

| Practice parameter | Pre-test n (%) | Post-test n (%) | p-value |
|---|---|---|---|
| Had identified/suspected an ADR during clinical practice | 35 (58.3) | 49 (81.7) | 0.006 |
| Had documented an ADR in patient records | 20 (33.3) | 44 (73.3) | <0.001 |
| Had reported an ADR to the concerned department/ADR monitoring centre | 11 (18.3) | 39 (65.0) | <0.001 |
| Knew how to complete an ADR reporting form | 17 (28.3) | 52 (86.7) | <0.001 |
| Had discussed suspected ADRs with seniors/colleagues | 29 (48.3) | 50 (83.3) | <0.001 |
| Routinely considered ADRs during patient monitoring | 26 (43.3) | 51 (85.0) | <0.001 |

**Interpretation:** A marked improvement was observed in the practical aspects of pharmacovigilance. Actual ADR reporting increased from 18.3% at baseline to 65.0% after intervention, while the proportion of participants who knew how to complete an ADR reporting form increased from 28.3% to 86.7%. Documentation and routine consideration of ADRs during patient monitoring also improved significantly ($p<0.001$ for most comparisons). These findings indicate that the educational intervention was associated not only with improved knowledge and attitude but also with better pharmacovigilance-related practices.

**Overall Result**

The findings demonstrate a statistically significant improvement in knowledge, attitude, and practice regarding pharmacovigilance among the 60 postgraduate students following the educational intervention. The overall KAP score increased from $16.28 \pm 3.21$ to $24.37 \pm 2.62$ ($p<0.001$). Particularly notable improvements were observed in awareness of PvPI, knowledge of ADR-reporting procedures, willingness to report ADRs, and actual ADR-reporting practices. These findings support the usefulness of structured pharmacovigilance sensitization among postgraduate medical students.

**Discussion**

The present longitudinal study among 60 postgraduate students demonstrated a significant improvement in knowledge, attitude, and practice regarding pharmacovigilance following the structured educational intervention. The overall KAP score increased from $16.28 \pm 3.21$ at pre-test to $24.37 \pm 2.62$ at post-test, with a mean improvement of 8.09 points ($p<0.001$), indicating that focused sensitization can substantially strengthen pharmacovigilance competency among postgraduate trainees. Similar knowledge–practice gaps have been documented by Desai et al., who studied 260 prescribers in an Indian tertiary-care hospital; although 97.3% considered ADR reporting important, only 15% had ever reported an ADR, while 70% did not know where and 68% did not know how to report it. [8]

In the present study, correct understanding of the definition of pharmacovigilance improved from 56.7% to 93.3%, while knowledge regarding the purpose of ADR reporting increased from 63.3% to 95.0% after the educational intervention. Knowledge regarding where ADRs should be reported showed an even greater increase, from 40.0% to 88.3%, and awareness of the Pharmacovigilance Programme of India increased from 45.0% to 91.7%. These findings are clinically important because inadequate knowledge regarding the actual reporting mechanism has consistently been identified as a major reason for under-reporting. Khan et al. also observed deficiencies in practical knowledge of ADR reporting among doctors in an Indian teaching hospital despite generally favourable attitudes toward pharmacovigilance, emphasizing the need for regular training and sensitization. [9]

The baseline findings of the present study are also comparable with those reported by Katekhaye et al. among medical professionals in a tertiary-care hospital in Mumbai, where gaps between awareness of pharmacovigilance and actual spontaneous reporting practices were demonstrated. [10] Their findings support the observation that merely knowing that ADRs should be reported does not necessarily ensure familiarity with the national reporting mechanism or translate into actual reporting behaviour. In the present study, the mean knowledge score increased markedly from $5.42 \pm 1.61$ to $8.47 \pm 1.13$ ($p<0.001$), suggesting that a structured educational programme can effectively address such deficiencies.

A particularly important finding was the improvement in attitude toward pharmacovigilance. At baseline, 78.3% of participants considered ADR reporting necessary for patient safety, which increased to 98.3% after intervention. Similarly, the proportion considering ADR reporting a professional responsibility increased from 71.7% to 95.0%, while willingness to report ADRs in future practice increased from 65.0% to 93.3%. This favourable attitudinal shift is important because positive attitude alone may be insufficient unless accompanied by adequate procedural knowledge and institutional support. Tandon et al. highlighted under-reporting as a persistent challenge in India and reported that, in their pharmacovigilance setting, spontaneous reporting contributed only 33.86% of ADR reports compared with 66.13% through active surveillance, demonstrating the continuing weakness of voluntary reporting systems. [11]

The effectiveness of educational intervention observed in the present study is strongly supported by international evidence. Figueiras et al., in a cluster-randomized controlled trial involving 6,451 physicians, demonstrated that an educational outreach intervention increased total ADR reporting from 7.6 to 100.2 reports per 1,000 physician-years in the intervention group, with an adjusted relative risk of 10.23 (95% CI 3.81–27.51). [12] The proportion of physicians submitting ADR reports also increased from 0.57% to 5.25%, and the effect remained significant for approximately one year. These results closely support the significant improvement observed in the present study after pharmacovigilance sensitization.

Similarly, Tabali et al. demonstrated a 148% initial increase in ADR reporting (p=0.001) following an educational intervention among physicians, together with improvement in completeness of ADR reports from 80.3% to 90.7%. [13] The effect persisted significantly through the first 16 months, although it subsequently diminished, suggesting that repeated reinforcement may be necessary to sustain reporting behaviour. This observation is particularly relevant to the present study because participants were reassessed after one year, indicating that periodic reinforcement sessions may be required even when substantial post-intervention improvements are achieved.

The present study also demonstrated a major improvement in actual pharmacovigilance practice. ADR documentation in patient records increased from 33.3% to 73.3%, actual reporting to the concerned department/ADR monitoring centre increased from 18.3% to 65.0%, and knowledge regarding completion of an ADR reporting form increased from 28.3% to 86.7%, all showing statistically significant improvement. These findings address the well-recognized problem described by Lopez-Gonzalez et al., whose systematic review identified lack of knowledge, uncertainty regarding causality, complacency, diffidence, insecurity, and practical reporting barriers as major determinants of ADR under-reporting. [14]

The improvement in practice observed in the current study is further supported by Gonzalez-Gonzalez et al., who systematically reviewed strategies for improving ADR reporting and concluded that educational and multifaceted interventions can improve spontaneous reporting by healthcare professionals. [15] Pagotto et al. similarly reviewed 16 eligible studies evaluating educational interventions and concluded that educational approaches have an important role in improving pharmacovigilance and spontaneous adverse-event reporting. [16] Collectively, these studies reinforce the finding that deficiencies in ADR reporting are modifiable and that structured educational programmes can influence both knowledge and actual reporting behaviour.

International data further demonstrate the persistence of a knowledge–practice discrepancy. Hussain et al., in a study of 346 healthcare professionals, reported good pharmacovigilance knowledge among many participants; pharmacists demonstrated 89.18% knowledge regarding ADRs, 81.08% regarding the pharmacovigilance system, and 72.97% regarding pharmacovigilance centres. Nevertheless, discrepancies in reporting practice remained evident, although 77.7% of physicians, 75.7% of pharmacists, and 68% of nurses considered ADR reporting a professional obligation. [17] These findings are comparable to the present study, in which favourable attitudes were already relatively common at baseline but practical reporting behaviour remained considerably lower.

More recent evidence also supports the usefulness of targeted pharmacovigilance education. Shinde et al. evaluated an educational intervention addressing knowledge, attitude, and practice of ADR reporting among pharmacy students and hospital pharmacists in a tertiary-care setting and reported significant improvement following structured training. [18] Thus, the substantial increase in the present study's practice score from 4.18 ± 1.52 to 7.35 ± 1.39 ($p<0.001$) is consistent with the broader evidence that focused instruction can bridge the gap between theoretical awareness and practical ADR reporting.

Overall, the findings indicate that postgraduate students possess reasonable baseline awareness and a favourable attitude toward pharmacovigilance, but significant deficiencies exist in knowledge of PvPI, reporting pathways, ADR documentation, and actual reporting practices. The statistically significant post-intervention improvements across all three KAP domains demonstrate the effectiveness of structured pharmacovigilance sensitization. Incorporating periodic pharmacovigilance workshops, practical demonstrations of ADR form completion, case-based discussions, regular reminders, and feedback from ADR Monitoring Centres into postgraduate training may help sustain these gains. Such interventions are likely to strengthen the culture of spontaneous ADR reporting and ultimately contribute to improved medication safety and patient care.

## Conclusion

The present longitudinal study among 60 postgraduate students demonstrated that a structured pharmacovigilance educational intervention was associated with a significant improvement in their knowledge, attitude, and practice regarding pharmacovigilance and adverse drug reaction (ADR) reporting. The overall KAP score increased significantly from 16.28 ± 3.21 at baseline to 24.37 ± 2.62 after intervention ($p<0.001$). Knowledge regarding the definition and purpose of pharmacovigilance, awareness of the Pharmacovigilance Programme of India (PvPI), identification of reportable ADRs, and understanding of ADR-reporting procedures showed substantial improvement.

The intervention also resulted in a more favourable attitude toward pharmacovigilance, with increased recognition of ADR reporting as a professional responsibility and greater willingness to report suspected ADRs. Importantly, improvement was not restricted to theoretical knowledge; practical

parameters such as ADR documentation, completion of ADR reporting forms, discussion of suspected reactions, and actual ADR reporting also improved significantly.

These findings emphasize the value of incorporating structured and periodic pharmacovigilance sensitization programmes into postgraduate medical training.

Regular training, practical demonstrations, reinforcement, and feedback may help bridge the gap between knowledge and actual ADR-reporting behaviour, thereby strengthening pharmacovigilance systems and promoting medication and patient safety.

**References**


1. Pirmohamed M, James S, Meakin S, Green C, Scott AK, Walley TJ, et al. Adverse drug reactions as cause of admission to hospital: prospective analysis of 18 820 patients. BMJ. 2004;329(7456):15-19. doi:10.1136/bmj.329.7456.15.
2. Hazell L, Shakir SAW. Under-reporting of adverse drug reactions: a systematic review. Drug Saf. 2006;29(5):385-396. doi:10.2165/00002018-200629050-00003.
3. Upadhyaya HB, Vora MB, Nagar JG, Patel PB. Knowledge, attitude and practices toward pharmacovigilance and adverse drug reactions in postgraduate students of tertiary care hospital in Gujarat. J Adv Pharm Technol Res. 2015;6(1):29-34. doi:10.4103/2231-4040.150369.
4. Bhagavathula AS, Elnour AA, Jamshed SQ, Shehab A. Health professionals' knowledge, attitudes and practices about pharmacovigilance in India: a systematic review and meta-analysis. PLoS One. 2016;11(3):e0152221. doi:10.1371/journal.pone.0152221.
5. Mishra PS, Gudsurkar G. Cross sectional study to assess the awareness of pharmacovigilance among post graduate residents of tertiary care medical college hospital of central India. Int J Basic Clin Pharmacol. 2018;7(3):386-390. doi:10.18203/2319-2003.ijbcp20180501.
6. Kumar CU, Rao GH, Vasavi G. A questionnaire based study on the knowledge, attitude and the practices of pharmacovigilance among the postgraduate students at a tertiary care hospital in South India. Int J Basic Clin Pharmacol. 2019;8(3):457-461. doi:10.18203/2319-2003.ijbcp20190568.
7. Gupta SK, Nayak RP, Shivaranjani R, Vidyarthi SK. A questionnaire study on the knowledge, attitude, and the practice of pharmacovigilance among the healthcare professionals in a teaching hospital in South India. Perspect Clin Res. 2015;6(1):45-52. doi:10.4103/2229-3485.148816.
8. Desai CK, Iyer G, Panchal J, Shah S, Dikshit RK. An evaluation of knowledge, attitude, and practice of adverse drug reaction reporting among prescribers at a tertiary care hospital. Perspect Clin Res. 2011;2(4):129-136. doi:10.4103/2229-3485.86883.
9. Khan SA, Goyal C, Chandel N, Rafi M. Knowledge, attitudes, and practice of doctors to adverse drug reaction reporting in a teaching hospital in India: an observational study. J Nat Sci Biol Med. 2013;4(1):191-196. doi:10.4103/0976-9668.107289.
10. Katekhaye VM, Kadhe NG, John J, Pawar SR. Knowledge, attitude and practice of pharmacovigilance among medical professionals at a tertiary care hospital in Mumbai, Maharashtra, India. Int J Res Med Sci. 2017;5(1):156-161. doi:10.18203/2320-6012.ijrms20164540.
11. Tandon VR, Mahajan V, Khajuria V, Gillani Z. Under-reporting of adverse drug reactions: a challenge for pharmacovigilance in India. Indian J Pharmacol. 2015;47(1):65-71. doi:10.4103/0253-7613.150344.
12. Figueiras A, Herdeiro MT, Polónia J, Gestal-Otero JJ. An educational intervention to improve physician reporting of adverse drug reactions: a cluster-randomized controlled trial. JAMA. 2006;296(9):1086-1093. doi:10.1001/jama.296.9.1086.
13. Tabali M, Jeschke E, Bockelbrink A, Witt CM, Willich SN, Ostermann T, et al. Educational intervention to improve physician reporting of adverse drug reactions (ADRs) in a primary care setting in complementary and alternative medicine. BMC Public Health. 2009;9:274. doi:10.1186/1471-2458-9-274.
14. Lopez-Gonzalez E, Herdeiro MT, Figueiras A. Determinants of under-reporting of adverse drug reactions: a systematic review. Drug Saf. 2009;32(1):19-31. doi:10.2165/00002018-200932010-00002.
15. Gonzalez-Gonzalez C, Lopez-Gonzalez E, Herdeiro MT, Figueiras A. Strategies to improve adverse drug reaction reporting: a critical and systematic review. Drug Saf. 2013;36(5):317-328. doi:10.1007/s40264-013-0058-2.
16. Pagotto C, Varallo F, Mastroianni PC. Impact of educational interventions on adverse drug events reporting. Int J Technol Assess Health Care. 2013;29(4):410-417. doi:10.1017/S0266462313000457.
17. Hussain R, Hassali MA, Hashmi F, Akram T. Exploring healthcare professionals' knowledge, attitude, and practices towards pharmacovigilance: a cross-sectional survey. J Pharm

Policy Pract. 2021;14:5. doi:10.1186/s 40545-020-00287-3.
18. Shinde A, Thorat V, Koli S, Salve P, Surale-Patil S. Impact of an educational intervention on knowledge, attitude, and practice of adverse drug reaction reporting: a comparative study among pharmacy students and hospital pharmacists in a tertiary care setting. Cureus. 2026;18(5):e109852. doi:10.7759/cureus.109852.