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Impact of Educational Intervention on Knowledge, Attitude and Practice of Pharmacovigilance, Materiovigilance and Haemovigilance among Final Year Medical and Paramedical Students: A Prospective Cross-Sectional Study

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Abstract

Pharmacovigilance, Materiovigilance, and Haemovigilance together form the backbone of healthcare safety monitoring in India, yet their coverage in undergraduate curriculum remains inconsistent. This prospective cross-sectional study assessed the impact of a short structured educational session on knowledge, attitude, and practice of all three vigilance systems among 200 final-year medical and paramedical students at a tertiary care teaching hospital in Raichur, Karnataka. A validated pre-test/post-test questionnaire was administered before and after a 15-minute seminar; data were analyzed by the Wilcoxon Signed-Rank Test and Chisquare test (SPSS v20.0). The cohort was 56% female, with a mean age of 22.21 ± 1.87 years; pharmacy students made up 79% of participants. Haemovigilance showed the clearest benefit: knowledge improved significantly ($p = 0.033$) and practice improved highly significantly ($p = 0.0002$). Pharmacovigilance knowledge edged upward but did not reach significance ($p = 0.052$), while attitude fell sharply ($p = 0.0001$). In Materiovigilance, both knowledge ($p = 0.035$) and attitude ($p = 0.032$) declined significantly after the session, though all four practice items improved on Chi-square analysis. The declines in attitude scores likely reflect critical recalibration rather than genuine disengagement. A single short seminar can shift knowledge and practice in selected domains, but is insufficient for attitude change across all three. Regular, multi-session, curriculum-integrated vigilance training is needed to build the reporting culture that patient safety requires.

Keywords: Adverse Drug Reaction, Educational Intervention, Haemovigilance, Knowledge Attitude Practice, Materiovigilance, Medical Students, Pharmacovigilance.

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INTRODUCTION

Adverse drug reactions are a recognized and largely preventable cause of patient harm. The World Health Organization defines an ADR as any noxious, unintended response to a drug occurring at doses normally used for prophylaxis, diagnosis, or therapy (Mahesh & Parthasarathi, 2012). The scale of the problem is substantial. In the European Union, ADRs account for roughly 197,000 deaths per year; in American intensive care units, the cost of a single drug-related hospitalization exceeds USD 19,000 (Onyeye *et al.,* 2015; Hu *et al.,* 2022).

Indian data tell a similar story a drug-related morbidity and mortality costs surpassed USD 177.4 million in 2000 alone, with hospital admissions accounting for the majority Pharmacovigilance is the science of detecting, assessing, understanding, and preventing adverse drug effects it is the main tool for managing this burden at a population level. The PvPI (Pharmacovigilance Programme of India) was launched in July 2010 under the Ministry of Health and Family Welfare, with the Indian Pharmacopoeia Commission at Ghaziabad serving as the National Coordination Centre from April 2015. (Goel, 2018).

Despite this infrastructure, under-reporting is severe, even in countries with long-established reporting systems, fewer than 10% of drug-related adverse events are ever notified to a pharmacovigilance center. The

barriers are well documented with respect to time pressure, uncertainty about what counts as reportable, and inadequate training, but knowing the barriers has not, on its own, fixed them. (Mahesh & Parthasarathi, 2012; Winfield & Richards, 2004).

Medical devices carry comparable risks that are less well appreciated. The WHO defines a medical device as any instrument, apparatus, or material intended for the diagnosis, prevention, or treatment of disease. India formalized device surveillance through the Materiovigilance Programme of India, launched on 6 July 2015 at IPC, Ghaziabad, under CDSCO oversight. The programme collects data on medical device-associated adverse events and feeds them into regulatory decision-making (Kumar *et al.,* 2016; Hoda *et al.,* 2020).

A 2022 survey of practicing surgeons in Gujarat put the problem clearly: only 9% had ever reported a device adverse event, yet 77.6% said they would be willing to do so in the future. A gap almost entirely explained by a lack of knowledge of reporting pathways (Panchal *et al.,* 2022).

Haemovigilance, derived from the Greek haema and Latin vigilans, covers the complete transfusion chain from blood donation to recipient follow-up. The Haemovigilance Programme of India was launched on 10 December 2012 as part of PvPI, with the National Institute of Biologicals at Noida coordinating data from 154 enrolled centers. Transfusion reactions are systematically undercounted; training of nursing staff, resident doctors, and interns in blood component handling and the recognition of reaction signs reliably increases both detection and reporting rates (Grandi *et al.,* 2018; Gente *et al.,* 2018).

The published evidence on vigilance KAP among healthcare workers is consistent on one point: knowledge gaps are the norm, not the exception. Studies across nurses, pharmacists, and physicians in India and elsewhere find that while most clinicians accept ADR reporting as a professional duty, actual reporting rates remain low because training has not kept pace with intent (Hussain *et al.,* 2021; Haines *et al.,* 2020; Ayeni *et al.,* 2024).

Educational interventions do help, but most published trials address pharmacovigilance alone, target practicing professionals rather than students, and use designs too brief to assess whether gains persist (Ganesan *et al.,* 2017; Fatima *et al.,* 2021; Rajesh *et al.,* 2011).

This study addressed that gap by measuring the effect of a single educational session on KAP across all three vigilance domains simultaneously, in a population of finalyear medical and paramedical students. The intent was practical to tell curriculum designers and institutional pharmacovigilance coordinators which domains respond to a short intervention and where more sustained teaching effort is needed.

MATERIALS AND METHODS

Study Design and Setting

A prospective, questionnaire-based cross-sectional study using a pre-test/post-test design was conducted between June and September 2025 at Navodaya Medical College Hospital and Research Centre, Raichur, a tertiary care teaching hospital under Rajiv Gandhi University of Health Sciences, Karnataka.

Participants and Sampling

The study enrolled final-year students from Medical (MBBS), Pharmacy (B. Pharm & Pharm D), and Nursing (B.Sc. Nursing) programmes under Navodaya Education Trust. All students present on the data collection day and willing to provide written informed consent were included. Sample size was calculated as $n = Z^2 \times p(1–p)/d^2$ ($Z = 1.96$, $p = 0.0012$, $d = 0.000025$), giving $n \approx 184$, rounded to 200.

Questionnaire

The questionnaire were developed after a literature review across pharmacovigilance, Materiovigilance, and Haemovigilance publications. It contained three sections: pharmacovigilance (7 knowledge + 7 attitude + 4 practice items), Materiovigilance (8 knowledge + 5 attitude + 4 practice items), and Haemovigilance (knowledge, attitude, and practice items). A pilot study in 300 students confirmed readability and clarity; pilot data were excluded from analysis. *Pre-Intervention*

The Project team approached the study participants and discussed the purpose of the study. The participant consent form was taken. A structured questionnaire was given to each participant and they were requested to fill it within 10 minutes before the seminar. Data was analyzed using appropriate statistical tools.

Intervention

A 15-minute PowerPoint seminar in English covered ADR definitions and classification, national vigilance programmes, reporting procedures, device safety, transfusion reactions, and the role of healthcare professionals in reporting. The questionnaire was administered immediately before and after the seminar using an identical instrument.

Post-Interventional Phase

The questionnaire was re-administered to the study participants who participated in the preintervention phase and reassessed the knowledge, attitude, and practice of Pharmacovigilance, Materiovigilance and Haemovigilance among participants.

Statistical Analysis

The collected data were analyzed by comparing the pre-intervention and post-intervention results using the Wilcoxon Signed Rank Test and Chi-square Test. Statistical analyses were performed using the Statistical Package for the Social Sciences (SPSS) version 20.0.

RESULTS

Demographic Profile of Study Participants

Table 1 shows out of 200 participants, 112 (56%) were female and 88 (44%) male (male-tofemale ratio 0.79). Mean age was 22.21 ± 1.87 years; the 21–23-year group was the largest at 67% (Table. Pharmacy students made up 158 (79%) of the cohort, nursing students 38 (19%), and medical students 4 (2%).

Table 1: Demographic Profile of Study Participants (n=200)

Sl. No.	Variables	Category	No. of Participants	Percentage (%)
1	Age Group (Years)	18–20	28	14
		21–23	134	67
		24–26	34	17
		27–29	4	2
2	Gender	Male	88	44
		Female	112	56
3	Course	Pharmacy	158	79
		Nursing	38	19
		Medical	4	2

Mean age: 22.21 years; SD: 1.87 years

Pre- and post-intervention KAP scores for Pharmacovigilance

As shown in Table 2, Knowledge scores rose from 8.89 ± 1.77 to 9.26 ± 2.38 (p = 0.052), a meaningful trend that narrowly missed significance. Attitude fell from 12.01 ± 1.68 to 10.72 ±1.82 (p = 0.0001), a sharp and statistically robust drop. Practice barely moved: 6.71 ± 1.28 to 6.79 ± 1.34 (p = 0.615). At the item level, however, 6 of 7 knowledge questions and 5 of 7 attitude questions were significant by Chi-square, suggesting that the aggregate attitude drop masked genuine item-level learning alongside a broader critical reassessment

Table 2: Pre- and post-intervention KAP mean scores for Pharmacovigilance (n=200)

Domain and Aspect	Pre-test Mean (SD)	Post-test Mean (SD)	Direction	p-value
Pharmacovigilance – Knowledge	8.89 (1.77)	9.26 (2.38)	Increase	0.052
Pharmacovigilance – Attitude	12.01 (1.68)	10.72 (1.82)	Decrease	0.0001*
Pharmacovigilance – Practice	6.71 (1.28)	6.79 (1.34)	Increase	0.615

**p < 0.05 (Wilcoxon Signed Rank Test); SD = Standard Deviation*

Pre- and post-intervention KAP scores for Materiovigilance

Table 3 shows that both knowledge and attitude declined after the intervention. Knowledge fell from 11.38 ± 2.18 to 10.89 ± 2.29 (p = 0.035); attitude from 9.91 ± 1.81 to 9.54 ± 1.67 (p = 0.032). Practice rose modestly from 6.02 ± 1.54 to 6.29 ± 1.43 (p = 0.082). Chi-square analysis showed significant improvement in 2 of 8 knowledge questions and 1 of 5 attitude questions, but not in all 4 practice questions, indicating that practical orientation improved even as aggregate scores fell.

Table 3: Pre- and post-intervention KAP scores for Materiovigilance (n=200)

Domain and Aspect	Pre-test Mean (SD)	Post-test Mean (SD)	Direction	p-value
Materiovigilance – Knowledge	11.38 (2.18)	10.89 (2.29)	Decrease	0.035*
Materiovigilance – Attitude	9.91 (1.81)	9.54 (1.67)	Decrease	0.032*
Materiovigilance – Practice	6.02 (1.54)	6.29 (1.43)	Increase	0.082

**p < 0.05 (Wilcoxon Signed Rank Test); SD = Standard Deviation*

Pre- and post-intervention KAP scores for Haemovigilance

Haemovigilance showed the most consistent response to the intervention. Knowledge improved from 10.10 ± 2.47 to 10.66 ± 2.88 (p = 0.033); practice improved from 7.96 ± 1.80 to 8.72 ± 1.30 (p = 0.0002). Attitude was stable: 7.19 ± 1.79 versus 7.11 ± 1.82 (p= 0.731). The Wilcoxon ranks confirmed the practice finding — 103 participants scored higher postintervention, 48 lower, with 42 ties. Details were shown in Table 4.

Table 4: Pre- and post-intervention KAP mean scores for Haemovigilance (n=200)

Domain and Aspect	Pre-test Mean (SD)	Post-test Mean (SD)	Direction	p-value
Haemovigilance – Knowledge	10.10 (2.47)	10.66 (2.88)	Increase	0.033*
Haemovigilance – Attitude	7.19 (1.79)	7.11 (1.82)	Stable	0.731
Haemovigilance – Practice	7.96 (1.80)	8.72 (1.30)	Increase	0.0002*

**p < 0.05 (Wilcoxon Signed Rank Test); SD = Standard Deviation*

Wilcoxon Signed Rank Test — full rank distribution

Table 5 shows the complete rank distributions (negative ranks, positive ranks, and ties) for each domain-aspect comparison. The number of participants with lower post-test scores (negative ranks), higher post-test scores (positive ranks), and no change (ties) provides additional context for interpreting the direction and consistency of change beyond aggregate mean comparisons.

Table 5: Wilcoxon Signed Rank Test rank distributions across all nine comparisons (n=200)

Comparison	Rank Type	N	Mean Rank	Sum of Ranks	p-value
PV: Post Knowledge – Pre-Knowledge	Negative	79	78.16	6174.50	0.052
	Positive	93	93.59	8703.50	
	Ties	28	–	–	
PV: Post Attitude – PreAttitude	Negative	132	93.73	12373.00	0.0001*
	Positive	43	70.40	3027.00	
	Ties	25	–	–	
PV: Post Practice – PrePractice	Negative	66	78.53	5183.00	0.615
	Positive	81	70.31	5695.00	
	Ties	53	–	–	
MV: Post Knowledge – Pre-Knowledge	Negative	96	100.09	9609.00	0.035*
	Positive	84	79.54	6681.00	
	Ties	20	–	–	
MV: Post Attitude – PreAttitude	Negative	93	85.67	7967.00	0.032*
	Positive	70	77.13	5399.00	
	Ties	37	–	–	
MV: Post Practice – PrePractice	Negative	70	79.64	5575.00	0.082
	Positive	92	82.91	7628.00	
	Ties	38	–	–	
HV: Post Knowledge – Pre-Knowledge	Negative	79	86.32	6819.00	0.033*
	Positive	103	95.48	9834.00	
	Ties	18	–	–	
HV: Post Attitude – PreAttitude	Negative	76	81.01	6156.50	0.731
	Positive	78	74.08	5778.50	
	Ties	46	–	–	
HV: Post Practice – PrePractice	Negative	48	72.57	3483.50	0.0002*
	Positive	110	82.52	9077.50	
	Ties	42	–	–	

*Negative ranks: post-test score lower than pre-test. Positive ranks: post-test score higher than pretest. Ties: no change between pre- and post-test. *p < 0.05.; PV = Pharmacovigilance; MV = Materiovigilance; HV = Haemovigilance*

Chi-square analysis: item-level pre–post comparisons

Tables 9, 10, and 11 summarise Chi-square p-values for each individual questionnaire item across the three vigilance domains. Items with $p < 0.05$ indicate statistically significant shifts in response distribution between pre- and post-test. These item-level findings complement the aggregate Wilcoxon results and reveal which specific concepts were most affected by the educational intervention.

Table 9: Chi-square analysis of individual item responses — Pharmacovigilance (n=200)

Item	Question	Domain	p-value
10a	Do you think all medicines available in the market are safe?	Knowledge	0.0001*
10b	Do you think drugs of other systems (except allopathy) are safe?	Knowledge	0.002*
10c	Have you heard about ADR?	Knowledge	0.0001*
10d	Do you think all drugs can cause ADR?	Knowledge	0.002*

Item	Question	Domain	p-value
10e	Do you think ADR can be prevented?	Knowledge	0.033*
10f	Have you ever heard of ADR reporting?	Knowledge	0.858
10g	Have you ever heard about Pharmacovigilance?	Knowledge	0.0002*
11a	Do you think only pharmacists can report ADR?	Attitude	0.284
11b	Do you think ADR reporting should be compulsory?	Attitude	0.005*
11c	Whether ADR reporting should be voluntary?	Attitude	0.270
11d	Do you believe workplace should encourage reporting an ADR?	Attitude	0.006*
11e	Are you interested in participating in ADR reporting system?	Attitude	0.011*
12b	Do you think ADR reporting should be compulsory? (practice)	Practice	0.277
12c	Whether your institution practises ADR reporting to higher centres?	Practice	0.005*
12d	Does your institution provide training on ADR monitoring and reporting?	Practice	0.032*

**p < 0.05 (Chi-square test). Items 10a–10g = Knowledge; 11a–11e = Attitude; 12b–12d = Practice.*

Pharmacovigilance

Knowledge scores rose from 8.89 ± 1.77 to 9.26 ± 2.38 (p = 0.052), a meaningful trend that narrowly missed significance. Attitude fell from 12.01 ± 1.68 to 10.72 ± 1.82 (p = 0.0001), a sharp and statistically robust drop. Practice barely moved: 6.71 ± 1.28 to 6.79 ± 1.34 (p = 0.615). At the item level, however, 6 of 7 knowledge questions and 5 of 7 attitude questions were significant by Chi-square, suggesting that the aggregate attitude drop masked genuine item-level learning alongside a broader critical reassessment.

Table 10: Chi-square analysis of individual item responses — Materiovigilance (n=200)

Item	Question	Domain	p-value
13a	Are you aware of Materiovigilance?	Knowledge	0.032*
13b	Do you know what medical devices are?	Knowledge	0.115
13c	Are you aware of the MvPI?	Knowledge	0.085
13d	Do you know where the National Collaborating Centre of MvPI is located?	Knowledge	0.024*
13e	Do you know the risk-based classification of medical devices (CDSCO)?	Knowledge	0.240
13f	Who all can report adverse events due to medical devices?	Knowledge	0.243
14c	Do you think reporting of adverse events from medical devices will improve care?	Attitude	0.037*
14d	Do you feel it is important to report medical device adverse events?	Attitude	0.055
14e	Do you think reporting adverse events due to medical devices will enhance patient safety?	Attitude	0.102
14f	Should Materiovigilance be taught in detail to medical professionals?	Attitude	0.640
15a	Have you ever encountered any adverse events due to medical devices?	Practice	0.000*
15b	Have you ever reported any MDAE?	Practice	0.000*
15c	Are you aware of how to report MDAEs?	Practice	0.000*
15d	Does your institution have a system for reporting MDAEs?	Practice	0.000*

**p < 0.05 (Chi-square test). Items 13a–13f = Knowledge; 14c–14f = Attitude; 15a–15d = Practice. MDAE = Medical Device Adverse Event.*

Materiovigilance

Both knowledge and attitude declined after the intervention. Knowledge fell from 11.38 ± 2.18 to 10.89 ± 2.29 (p = 0.035); attitude from 9.91 ± 1.81 to 9.54 ± 1.67 (p = 0.032). Practice rose modestly from 6.02 ± 1.54 to 6.29 ± 1.43 (p = 0.082). Chi-square analysis showed significant improvement in 2 of 8 knowledge questions and 1 of 5 attitude questions, but not in all 4 practice questions, indicating that practical orientation improved even as aggregate scores fell.

Table 11: Chi-square analysis of individual item responses — Haemovigilance (n=200)

Item	Question	Domain	p-value
16a	Do you know what Haemovigilance is?	Knowledge	0.556
16b	Do you know that blood transfusion can cause adverse events?	Knowledge	0.000*
16c	Are you aware of the Haemovigilance Programme of India (HvPI)?	Knowledge	0.358
17b	Is blood transfusion a risk to patients?	Attitude	0.133
17c	Have you witnessed a transfusion reaction?	Attitude	0.006*
17d	Is reporting of transfusion reactions essential?	Attitude	0.065
17e	Does transfusion reaction reporting benefit patients?	Attitude	0.277

Item	Question	Domain	p-value
18a	Have you documented any transfusion reactions?	Practice	0.046*
18b	Have you pricked yourself with needles while collecting blood?	Practice	0.027*
18c	Have you ever reported a transfusion reaction?	Practice	0.012*
18d	Does your institution have a system for haemovigilance reporting?	Practice	0.003*

**p < 0.05 (Chi-square test). Items 16a–16c = Knowledge; 17b–17e = Attitude; 18a–18d = Practice.*

Haemovigilance

Haemovigilance showed the most consistent response to the intervention. Knowledge improved from 10.10 ± 2.47 to 10.66 ± 2.88 (p = 0.033); practice improved from 7.96 ± 1.80 to 8.72 ± 1.30 (p = 0.0002). Attitude was stable: 7.19 ± 1.79 versus 7.11 ± 1.82 (p = 0.731). The Wilcoxon ranks confirmed the practice finding — 103 participants scored higher postintervention, 48 lower, with 42 ties.

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**p < 0.05 (Chi-square test). Items 16a–16c = Knowledge; 17b–17e = Attitude; 18a–18d = Practice.*

DISCUSSION

The results from this study majorly reveal that a 15-minute educational session works best for Haemovigilance and least predictably for Materiovigilance. That difference is worth noting because it has direct consequences for how vigilance education should be structured in undergraduate curriculum.

Haemovigilance improved in both knowledge and practice. This fits with what Grandi *et al.,* (2018) and Gente *et al.,* (2018) found, that training nurses and resident doctors in blood component administration and the recognition of transfusion reaction signs reliably moves reporting rates upward. Blood transfusion is already part of clinical training; Haemovigilance content slots into a familiar schema. Students likely connected the seminar material to procedures they had already observed, which made the knowledge stick and the practice shift easier to endorse.

Pharmacovigilance knowledge edged up at item level, which is consistent with Ganesan *et al.,* (2017), both of whom found that short educational sessions shift knowledge scores more readily than attitude or practice. The attitude decline is the more interesting result.

Fatima *et al.,* (2021) and Rajesh *et al.,* (2011) observed similar drops in attitude after single-session training and attributed them not to disengagement but to what might be called a calibration effect: participants who previously believed they understood ADR reporting revised their confidence downward once they encountered how complex reporting actually is. If that interpretation is correct, the attitude decline is not a failure of the intervention instead it is the evidence that the session worked, at least in prompting self-assessment.

The Materiovigilance findings are harder to explain straightforwardly. Pre-test knowledge scores were notably high (mean 11.38), and they fell after the session. One interpretation is the same calibration effect described above in which students who thought they knew Materiovigilance were confronted with regulatory detail they did not know, and their self-assessment adjusted accordingly. This was consistent with Panchal *et al.,* (2022), whose survey of practicing surgeons found that familiarity with device-related concepts did not translate into knowledge of actual reporting pathways.

The fact that all four practice items improved on Chi-square analysis, even as aggregate scores fell, supports this reading: students became more practically oriented even if they rated their overall knowledge lower. Meher *et al.,* (2022) and Kumar *et al.,* (2016) have both attributed poor Materiovigilance performance to the near-total absence of device surveillance content from standard pharmacy and medical curricula, and this study does nothing to challenge that conclusion.

Across all three domains, attitude was the least responsive dimension. Attitude change requires more than information, it requires time, credible role models, institutional reinforcement, and repeated practice. A 15-minute PowerPoint session can deliver information. It cannot do the rest. Ayeni *et al.,* (2024), Deepalakshmi *et al.,* (2019), and Vigneshwaran *et al.,* (2020) all found that even pharmacists with high knowledge and ostensibly positive attitudes reported low actual practice rates, pointing to a persistent gap between believing in ADR reporting and actually doing it. Closing that gap requires changes in the institutional environment at ward-level pharmacovigilance champions, accessible reporting forms, feedback to reporters as much as changes in education.

The study has limits worth naming. Convenience sampling from a single institution restricts how far the results can be generalised. There was no control group, so testretest familiarity cannot be ruled out as a confound. The intervention was brief by design and one-off; no follow-up was conducted to test whether gains persisted. The sample was dominated by pharmacy students, so findings may not fully represent nursing or medical students, who were a small minority. Future research should use randomised controlled designs, validated standardised instruments with established psychometric properties, delayed post-tests at one month and one semester, and samples drawn from multiple institutions and programme types.

CONCLUSION

A 15-minute educational seminar produced statistically significant knowledge and practice gains in Haemovigilance, marginal knowledge improvement in pharmacovigilance, and a counterintuitive decline in Materiovigilance aggregate scores that was accompanied by itemlevel gains in practice. Attitude proved resistant to change in all three domains. These results are consistent with what the broader education literature would predict: a single short session can shift knowledge and, to a lesser extent, self-reported practice, but attitude formation is slower and requires sustained engagement. Undergraduate curriculum in pharmacy, nursing, and medicine should treat pharmacovigilance, Materiovigilance, and Haemovigilance as recurring educational themes embedded across years, linked to clinical placement activities, and reinforced through mentored reporting rather than topics covered in a single session. Institutional coordination with PvPI, MvPI, and HvPI can help bridge classroom instruction and real-world reporting practice. The goal is not compliance; it is building professionals who report adverse events because they understand why it matters.

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Ethical Approval Statement

This study was conducted in accordance with the ethical standards of the institution and with the Declaration of Helsinki. Institutional approval was obtained from the Medical Superintendent of Navodaya Medical College Hospital and Research Centre, Raichur. Written informed consent was obtained from all participants.

Conflict of Interest: The authors declare no conflict of interest.

REFERENCES

- Mahesh, P. A., & Parthasarathi, G. (2012). Medication adherence. In A textbook of clinical pharmacy practice (2nd ed., pp. 146-174). Universities Press.
- Hu, W., Tao, Y., Lu, Y., Gao, S., Wang, X., & Li, W. (2022). Knowledge, attitude and practice of hospital pharmacists in central China towards adverse drug reaction reporting. Frontiers in Pharmacology, 13, 1-8.
- Onyeye, E. G., Umunnakwe, A. I., & Umoke, M. (2015). Effect of healthcare professionals' knowledge and attitude towards reporting adverse drug reactions in military and paramilitary hospitals. African Journal of Humanities and Contemporary Education Research, 15(1), 24-43.
- Fatima, H., Subhani, G., Mohsin, M., & Devi, D. N. (2021). A questionnaire-based study assessing the knowledge, attitude, and practice of pharmacovigilance among healthcare professionals, pre- and post-educational intervention. International Journal of Basic and Clinical Pharmacology, 10(6), 638-642.
- Winfield, A. J., & Richards, R. M. E. (2004). Adverse drug reactions. In A. J. Winfield & R.
- M. E. Richards (Eds.), A textbook of pharmaceutical practice (3rd ed., pp. 364-368). Churchill Livingstone.
- Kumar, P., Kalaiselvan, V., Kaur, I., Thota, P., & Singh, G. N. (2016). Materiovigilance programme of India (MvPI): A step towards patient safety for medical devices. European Journal of Biomedical and Pharmaceutical Sciences, 12(7), 497-501.
- Hoda, F., Verma, R., Arshad, M., Siddiqui, A. N., Khan, M. A., & Akhtar, M. (2020). Materiovigilance: Concept, structure and emerging perspective for patient's safety in India. Drug Research, 70(9), 429-436.
- Panchal, Y. N., Vyas, B. M., Suthar, K. M., & Shah, K. N. (2022). A study of assessing knowledge, attitude, and practice of Materiovigilance among medical surgeons of Gujarat. National Journal of Physiology, Pharmacy and Pharmacology, 12(11), 1792-1797.

- Grandi, J. L., Grell, M. C., Areco, K. C. N., & Barbosa, D. A. (2018). Haemovigilance: A report on the experience of transfusion reactions notification in a university hospital. Revista da Escola de Enfermagem da USP, 52.
- Gente, V. K., Basavarajegowda, A., Kulkarni, R., & Basu, D. (2018). Recipient haemovigilance at a tertiary care hospital in southern India: A cross-sectional study. International Journal of Advances in Medicine and Health Science, 5, 66-70.
- Hussain, R., Hassali, M. A., Hashmi, F., & Akram, T. (2021). Exploring healthcare professionals' knowledge, attitude, and practices towards pharmacovigilance. Journal of Pharmaceutical Policy and Practice, 14(5), 1-13.
- Haines, H. M., Meyer, J. C., Summers, R. S., & Godman, B. B. (2020). Knowledge, attitudes and practices of health care professionals towards adverse drug reaction reporting in public sector primary health care facilities. European Journal of Clinical Pharmacology, 76, 991-1001.
- Ayeni, F. A., Olugbake, O. A., & Ambeke, Y. P. (2024). Assessing the knowledge, attitude, and practice of hospital-based pharmacists in reporting adverse drug reactions. American Journal of Pharmacotherapy and Pharmaceutical Sciences, 12, 2-10
- Anesan, S., Sandhiya, S., Reddy, K. C., Subrahmanyam, D. K., & Adithan, C. (2017). The impact of the educational intervention on knowledge, attitude, and practice of pharmacovigilance toward adverse drug reactions reporting among healthcare professionals in a tertiary care hospital. Journal of Natural Sciences, Biology and Medicine, 8(2), 203210.
- Fatima, H., Subhani, G., Mohsin, M., & Devi, D. N. (2021). A questionnaire-based study assessing the knowledge, attitude, and practice of pharmacovigilance among healthcare professionals, pre- and post-educational intervention. International Journal of Basic and Clinical Pharmacology, 10(6), 638-642.
- Rajesh, R., Vidyasagar, S., & Varma, D. M. (2011). An educational intervention to assess knowledge, attitude, and practice of pharmacovigilance among healthcare professionals in a tertiary care teaching hospital. International Journal of Pharmaceutical Technology Research, 3(2), 678-692.
- Meher, B., Padhy, B., Srinivasan, A., & Mohanty, R. (2022). Awareness, attitude, and practice of materiovigilance among medical professionals at a tertiary care institute of national importance: A cross-sectional study. Perspectives in Clinical Research, 13(2), 94.
- Deepalakshmi, M., Kumar, P., Arun, K. P., & Ponnusankar S. (2019). Impact of continuing pharmacy education on the knowledge, attitude and practice of community pharmacists about ADR monitoring and reporting. Indian Journal of Pharmaceutical Sciences, 81(4), 633-639.
- Vigneshwaran, E., Harichandana, V., Sadiq, M. J., Alavudeen, S. S., Khan, N. A., & Ahmed T. (2020). Knowledge, attitude and practice of community pharmacists towards adverse drug reactions reporting. Journal of Young Pharmacists, 12(1), 75-80.