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# Assessment of Knowledge, Attitude and Practice of Pharmacovigilance among Healthcare Professionals: A Cross-sectional Study at a Tertiary Hospital in Eastern Nepal

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## ABSTRACT

**Introduction:** Adverse drug reactions (ADRs) pose a major concern worldwide causing substantial morbidity and mortality. Healthcare professionals involved in identification, documentation and reporting of ADRs are the pillars of a pharmacovigilance program. Lack of knowledge influence the ADR reporting by healthcare professionals.

**Objective:** To assess knowledge, attitude and practice of pharmacovigilance among healthcare professionals working at Koshi Hospital, Biratnagar, Nepal.

**Methodology:** A descriptive cross-sectional study was conducted among healthcare professionals working at Koshi Hospital, Biratnagar, Nepal from August-December 2021 using a semi-structured proforma. Ethical clearance was obtained from Nepal Health Research Council, Kathmandu (396/2021P). The data were entered into Microsoft Excel 2010 and the descriptive statistics like mean, standard deviation, frequency and percentage were calculated. Statistical Package for the Social Sciences (version 11.5) was used for all statistical analysis. The findings were presented as tables and graphs.

**Results:** Out of 88 healthcare professionals, 57 (64.77%) were females and 35 (39.77%) were staff nurse. Fifty-six (63.64%) participants knew that Department of Drug Administration is the authorized National center for pharmacovigilance program in Nepal. Thirty-six (40.91%) participants had good knowledge and 52 (59.09%) had poor knowledge of pharmacovigilance. Seventy-nine (89.77%) participants had positive attitude and 41 (46.59%) participants had poor practice. Seventy (79.55%) participants had not seen ADR reporting form.

**Conclusion:** The healthcare professionals had insufficient knowledge, positive attitude and poor practice of pharmacovigilance. Efforts are required to enhance knowledge and good practice among healthcare professionals toward pharmacovigilance and ADR reporting which would ultimately strengthen the pharmacovigilance program.

## INTRODUCTION

Adverse drug reaction (ADR) is defined as a noxious and unintended response which occurs at doses normally used in humans for the prophylaxis, diagnosis, or therapy of disease, or for the modification of physiological function.<sup>1</sup> ADRs pose a major concern worldwide causing substantial morbidity and mortality.<sup>2</sup> Pharmacovigilance is the activities involved in the detection, assessment, understanding, and prevention of ADRs or any other drug related problems.<sup>3</sup> Good pharmacovigilance program allows for the intelligent, evidence-based use of medicines and has the potential for preventing many ADRs.<sup>3</sup> There are currently more than 171 members of the World Health Organization (WHO) Programme for International Drug Monitoring. Uppsala Monitoring Centre (UMC) situated in Sweden is the WHO Collaborating Center for International Drug Monitoring that operates the technical and scientific aspects of pharmacovigilance program globally.<sup>4</sup> Though Nepal became full member of the WHO Programme for International Drug Monitoring in 2006, the pharmacovigilance system is still in the

developmental stage.<sup>5</sup> There are 14 regional pharmacovigilance centers in Nepal and Department of Drug Administration is the National Pharmacovigilance Center.

Healthcare professionals (HCPs) including doctors, dental surgeons and nurses are the pillars of a pharmacovigilance program who are involved in identification, documentation and reporting of ADRs.<sup>6,7</sup> However, underreporting of ADRs is common in Nepal.<sup>8-10</sup> Lack of knowledge, carelessness, ambiguity about ADRs and its reporting system are some of the important factors that influence the reporting of an ADR by a HCPs.<sup>11</sup> Thus, to improve the ADR reporting, it is very important to understand the knowledge, attitude and practices (KAP) of pharmacovigilance. Most of the studies done in Nepal regarding pharmacovigilance are conducted in patients, general public and students.<sup>12-14</sup> Very few studies have been conducted in HCPs to assess KAP of pharmacovigilance.<sup>15,16</sup> The objective of this study was thus to assess KAP of pharmacovigilance among HCPs working at Koshi Hospital, Biratnagar, Nepal.

## METHODOLOGY

A descriptive cross-sectional study was conducted among HCPs working at Koshi Hospital, Biratnagar, Nepal from August-December 2021. Medical doctors, dental surgeons, nurses, health assistants, assistant health workers and pharmacists working at the hospital were enrolled. The HCPs who did not give consent to participate were excluded. The study considered 95% confidence interval (CI) and 80% power to estimate the sample size. Considering a study conducted in Pakistan where 70.53% physicians responded with the right answer that pharmacovigilance ensures the safety of drugs, the sample size was calculated.<sup>14</sup>

Therefore, Prevalence (p)=70.53,

Compliment of p (Q)=100-p=29.47

Z=1.96 at 95% CI;

Permissible error (L)= 10% of p at 80% power=7.053

$n = z^2 * p * q / L^2 \rightarrow 154$

However, there were around 100 healthcare professionals working at the time of data collection in Koshi Hospital, Biratnagar. Therefore, using the finite population sample size formula, the sample size became 61. Adding 10% in calculated sample size to reduce various bias, the final sample size was 68. Convenience sampling method was used.

A semi-structured proforma was prepared based on the primary and secondary objectives of our study and in accordance with the relevant literatures.<sup>14-18</sup> It consisted of four parts: (A) sociodemographic data, (B) knowledge (10 items), (C) attitude (10 items) and (D) practice (10 items). The attitudes domain had 10 items having a 3-point Likert scale (1='disagree', 2='neutral', and 3='agree'). The practice domain had ten items having options 'yes' and 'no'. Total knowledge score was 16. The questionnaire were reviewed by the research team and the subject experts (three pharmacists, two staff nurses, one physician) for confirming its relevance, simplicity and internal

consistency as a part of the validation. It was also pretested in 10% of the study population and by consulting with the subject experts to establish validity and reliability. The sample used for pilot testing was not used for the final data analysis.

Ethical clearance was obtained from Nepal Health Research Council, Kathmandu (396/2021P). The purpose of the study was explained to the participants and then written informed consent was obtained. The questionnaire were distributed to the participants during office hour. The filled questionnaires were collected on next day. The personal data (name, phone number) were not collected to maintain the confidentiality.

The data were entered into Microsoft Excel 2010 and the descriptive statistics like frequency and percentage were calculated. The responses like disagree and neutral were given a zero score and score 1 was given to 'agree'. For the practice, the response 'No' was given zero score and the response 'Yes' was given score 1. The knowledge was categorized as 'Good' (score above or equal to 8), and 'Poor' (score below 8). Attitude was categorized as positive (score 5 or more) and negative (score below 5). Practice was categorized as good (score 5 or more) and poor (score below 5).<sup>19,20</sup> Statistical Package for the Social Sciences (version 11.5) was used for all statistical analysis. The findings were presented as tables and graphs.

## RESULTS

Of the 100 questionnaires distributed, 88 HCPs responded resulting in a response rate of 88%. Out of 88 HCPs, 57 (64.77%) were females, 67 (76.14%) were aged 21-30 years and 35 (39.77%) were staff nurse. Seventy-three (82.95%) participants had professional experience of 1-5 years (Table 1).

**Table 1: Sociodemographic characteristics of the participants (n=88)**

	Variables	n	%
Gender	Male	31	35.23
	Female	57	64.77
Age groups (years)	21 – 30	67	76.14
	31 – 40	19	21.59
	> 40	2	2.27
Educational level	Certificate level	50	56.82
	Bachelor degree	29	32.95
	Master degree	9	10.23
Educational qualification	BSc Nursing	10	11.36
	Community Medicine Assistant	4	4.55
	Diploma in Pharmacy	10	11.36
	MBBS	15	17.05
	MD/MS	7	7.95
	Staff nurse	35	39.77
	Others	7	7.95
Professional experience (years)	1 to 5	73	82.95
	6 to 10	9	10.23
	>10	6	6.82

Knowledge of pharmacovigilance among the participants is shown in table 2. Seventy-two (81.82%) participants responded that the specific aim of pharmacovigilance is to improve patient safety. Fifty-six (63.64%) participants knew that

Department of Drug Administration is the authorized National Center for Pharmacovigilance Program in Nepal. Fifty-six (63.64%) participants did not know that reporting of ADR to a pharmacovigilance center in Nepal is voluntary (Table 2).

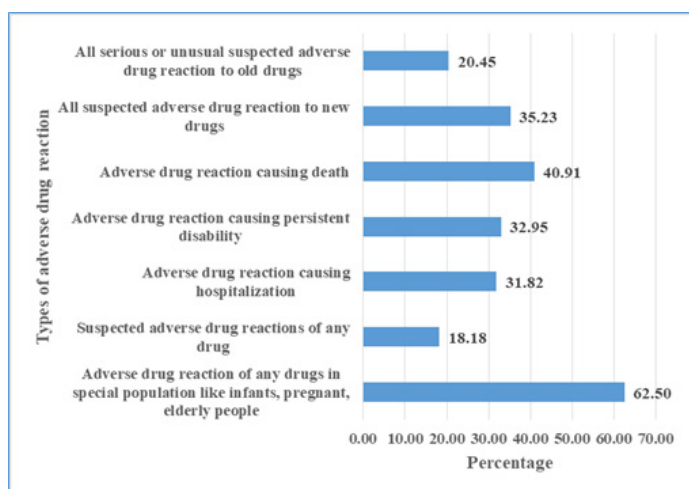
**Table 2: Knowledge of pharmacovigilance among the participants (n=88)**

S.N.	Questions	Correct response*	Incorrect response*	I do not know.*
1.	Pharmacovigilance is the science that relates to the detection, assessment, understanding and prevention of ADRs.	60 (68.18)	11 (12.5)	17 (19.32)
2.	The specific aim of pharmacovigilance is to improve patient safety.	72 (81.82)	6 (6.82)	10 (11.36)
3.	The serious and rare ADRs are known before the marketing of a new drug.	55 (62.50)	21 (2.86)	12 (13.64)
4.	Department of Drug Administration is the authorized national Xcenter for pharmacovigilance program in Nepal.	56 (63.64)	25 (28.41)	7 (7.95)
5.	There are 14 regional pharmacovigilance centers are in Nepal at present.	19 (21.59)	38 (43.18)	31 (35.23)
6.	Medical doctors, dental surgeon, nurses, and pharmacists including any HCP can report ADR to a pharmacovigilance center in Nepal.	63 (71.59)	22 (25.00)	3 (3.41)
7.	Reporting of ADRs to a pharmacovigilance center in Nepal is voluntary.	25 (28.41)	56 (63.64)	7 (7.95)
8.	ADR reporting form is used to report adverse drug reaction in Nepal.	37 (42.05)	34 (38.64)	17 (19.32)
9.	The regional pharmacovigilance center in Eastern Nepal is located in B. P. Koirala Institute of Health Sciences.	49 (55.68)	18 (20.45)	21 (23.86)

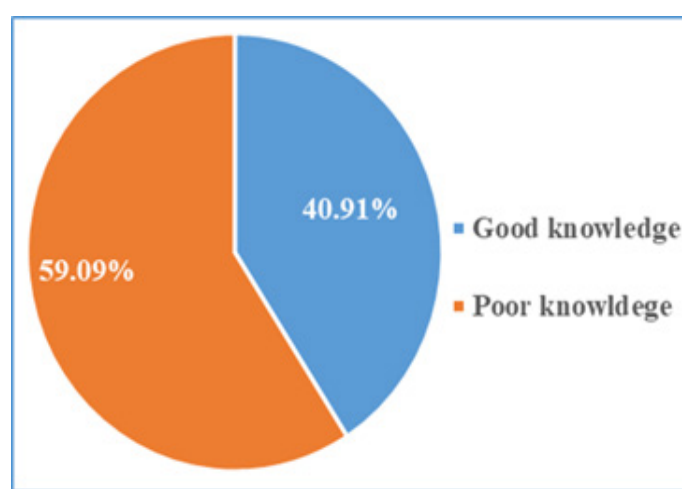
\*Data are presented as frequency (percentage).

Fifty-five (62.5%) participants responded that ADR of any drugs in special population like infants, pregnant, elderly people should be reported to the pharmacovigilance center (Figure 1).

Mean knowledge score was 7.20±2.64. About 36 (40.91%) participants had good knowledge and 52 (59.09%) had poor knowledge of pharmacovigilance (Figure 2).



**Fig 1:** Types of adverse drug reaction reported to the pharmacovigilance center



**Fig 2:** Knowledge of pharmacovigilance among the participants (n=88)

Attitude of pharmacovigilance among the participants is shown in Table 3. Seventy-nine (89.77%) of participants had positive attitude and only nine (10.23%) had negative attitude. Out of 88, 83 (94.32%) participants responded that ADR reporting is

a way to improve the safety of medicines. Fifty-seven (64.77%) participants believed that ADR reporting is a professional obligation. Fifty-two (59.09%) participants agreed that reporting of ADR can be detrimental to one’s professional career (Table 3).

**Table 3: Attitude of pharmacovigilance among the participants (n=88)**

S.N.	Questions	Agree*	Neutral*	Disagree*
1.	I believe that ADR reporting is a way to improve the safety of medicines.	83 (94.32)	3 (3.41)	2 (2.27)
2.	I believe that my educational background has provided enough information about ADR reporting and pharmacovigilance.	53 (60.23)	21 (23.86)	14 (15.91)
3.	I believe that I am the most important healthcare professional to report ADR to pharmacovigilance center.	67 (76.14)	13 (14.77)	8 (9.09)
4.	I believe that consulting other colleagues is important before reporting ADR	67 (76.14)	19 (21.59)	2 (2.27)
5.	I believe that ADR reporting is a professional obligation.	57 (64.77)	21 (23.86)	10 (11.36)
6.	I believe that reporting of ADR should be mandatory for all healthcare professionals.	65 (73.86)	17 (19.32)	6 (6.82)
7.	I believe that financial incentives should be provided to the healthcare professionals for reporting ADR.	60 (68.18)	18 (20.45)	10 (11.36)
8.	I believe that ADR should be confirmed before reporting to the regional pharmacovigilance center.	72 (81.82)	9 (10.23)	7 (7.95)
9.	I believe that workplace environment should encourage reporting ADR.	76 (86.36)	8 (9.09)	4 (4.55)
10.	I believe that reporting of ADR can be detrimental to one's professional career.	52 (59.09)	18 (20.45)	18 (20.45)

\*Data are presented as frequency (percentage).

Practice of pharmacovigilance among the participants is shown in Table 4. Forty-one (46.59%) participants had poor practice and 47 (53.41%) had good practice of ADR reporting. Fifty-two (59.09%) participants had observed or seen ADR in patients

during their professional practice; however, only 15 (17.5%) of them reported ADR to the pharmacovigilance center. Seventy (79.55%) participants had not seen ADR reporting form yet (Table 4).

**Table 4: Practice of pharmacovigilance among the participants (n=88)**

S.N.	Questions	Yes*	No*
1.	Do you explain about possible ADR of medications to the patients?	47 (53.41)	41 (46.59)
2.	Do you ask leading questions to the patients to find out any ADR during follow up visits?	56 (63.64)	32 (36.36)
3.	Have you ever observed or seen ADR in patients during your professional practice?	52 (59.09)	36 (40.91)
4.	Have you ever reported an ADR to the pharamacovigilance center?	15 (17.05)	73 (82.95)
5.	Have you ever seen ADR reporting form?	18 (20.45)	70 (79.55)
6.	Do you keep records of ADR?	40 (45.45)	48 (54.55)
7.	Are you willing to report ADR to regional pharmacovigilance center?	60 (68.18)	28 (31.82)
8.	Have you visited any websites related to pharmacovigilance to update yourself?	22 (25.00)	66 (75.00)
9.	Have you attended training or workshop or seminar on pharmacovigilance and ADR reporting?	20 (22.73)	68 (77.27)
10.	Do you want to attend training or workshop or seminar on pharmacovigilance and ADR reporting?	66 (75.00)	22 (25.00)

\*Data are presented as frequency (percentage).

## DISCUSSION

In the present study, more than two-thirds of the patients (68.18%) knew the definition of pharmacovigilance and this finding was consistent to the report of Shanableh et al (93.3%).<sup>21</sup> More than half of the participants (63.64%) did not know that reporting of ADR to a pharmacovigilance center in Nepal is voluntary. Reporting of suspected ADRs is currently voluntary for everyone except pharmaceutical manufacturers and distributors in most of the countries.<sup>22,23</sup> One-fourth of the participants did not know that medical doctors, dental surgeon, nurses and pharmacists including any HCPs can report ADR to a pharmacovigilance center in Nepal. All HCPs including clinicians, dentists, pharmacists, nurses and even patient and consumers can report ADRs to the pharamcovigilance centers. The pharmaceutical companies can also send individual case

safety reports for their product to National Pharamcovigilance Center.<sup>24</sup> There is no provision for consumers to report ADRs in the existing pharmacovigilance system of Nepal.<sup>25</sup> There is unmet need of continued medical education, seminars or workshops to educate the HCPs about the volunteering reporting of ADRs to the regional pharmacovigilance center; they also need sensitization at frequent period of 3-5 years to make it a regular habit for ADR reporting.

Majority of the participants (62.5%) knew that ADR of any drugs in special population like infant, pregnant and elderly people should be reported to the pharmacovigilance center. HCPs should be encouraged to report all types of suspected ADRs whether they are known, unknown, serious, or non-serious, frequent, or rare regardless of an established causal relationship between a drug and the reaction. ADRs related with the use of

allopathic medicines, vaccines, traditional medicines, medical devices, contrast media, etc., can also be reported to the pharmacovigilance center.<sup>26</sup>

Majority of the participants (59.09%) had poor knowledge of pharmacovigilance. This was in line with another study in which majority participants had low knowledge about pharmacovigilance and ADR reporting.<sup>9</sup> In another study by Shakya-Gurung et al, similar finding was also reported.<sup>20</sup> In a study by Hussain et al, most of the participants had good knowledge about ADR reporting.<sup>17</sup> The differences in knowledge of pharmacovigilance and ADR reporting might be due to the difference in national policy, exposure and motivation. More than half of the participants (55.68%) were aware of the regional pharmacovigilance center; in contrast to this less than one-third (30%) participants were aware of the regional pharmacovigilance center in another study by Ahmad et al.<sup>27</sup> Only 38% of respondents knew about the existence of regional pharmacovigilance Centre in another study.<sup>28</sup> Unawareness of the regional pharmacovigilance center might act as a discouraging factor for ADR reporting among the HCPs.<sup>26</sup> The HCPs need to be sensitized about the occurrence of regional pharmacovigilance center through continued medical education, seminar, workshops, pamphlets or medical bulletin. Majority of the HCPs responded that suspected ADRs, reaction causing hospitalization, persistent disability or death should be reported. Similar results could be found in a study conducted by Hussain et al.<sup>17</sup>

Most of the HCPs exhibited positive attitude regarding pharmacovigilance and ADR reporting and similar finding was also obtained from other study.<sup>17</sup> A positive attitude may encourage the prompt reporting of an ADR. Majority of the participants (94.32%) believed that ADR reporting is a way to improve the safety of medicines. Hence, it is very important to encourage HCPs to report any definite or suspected ADR. Proper training and education on pharmacovigilance system and ADR reporting should be conducted regularly to sensitize HCPs. More than half of the participants (64.77%) believed that ADR reporting is a professional obligation. HCPs should consider ADR reporting as their professional obligation because the effective system of pharmacovigilance program and ADR reporting is important to improve patient safety. More than half of the participants (59.09%) believed that reporting of ADR can be detrimental to one's professional career that might be an important obstacle to the National Pharmacovigilance Program. This kind of attitude toward ADR reporting reflects a complex interplay of individual concerns, organizational factors and broader systemic issues within the healthcare sector. Addressing these concerns requires continuous and consistent efforts to foster a culture of safety, provide adequate support and resources for ADR reporting, and mitigate the perceived risks associated with ADR reporting for HCPs. Awareness programs on pharmacovigilance program would help to remove misconceptions and modify the attitudes of HCPs.

ADR reporting should be a continuous process for proper functioning of a pharmacovigilance program in any country. However, low ADR reporting is one of the biggest problem in

many low and middle-income countries.<sup>29</sup> Our study findings also supports this. Although majority of HCPs had observed or seen ADR in patients during their professional practice, less than one-fifth of them (17.5%) reported it to the pharmacovigilance center and hence majority of the HCPs had poor practice of ADR reporting. Similar finding was also reported by KC et al in which only 20.1% had reported ADRs.<sup>10</sup> The participants in a study by Hussain et al also had similar practice of ADR reporting.<sup>17</sup> The main reason for underreporting is limited pharmacovigilance literacy of the HCPs.<sup>30</sup> One-fifth (20.45%) participants had seen ADR reporting form and similar finding was also reported by Thilini et al (35.3%).<sup>31</sup> It might be another factor that had led to poor ADR reporting. The ADR reporting form should be made freely available in each clinical department of any hospital and all HCPs must have easy access to that. Three-fourths of the participants had never visited any websites related to pharmacovigilance to update themselves. The HCPs should update themselves by regularly visiting the website of Department of Drug Administration, Nepal; it contains important information and other resources regarding pharmacovigilance and ADR reporting.<sup>5</sup> More than three-fourths (77.27%) of the participants had not attended training or workshop or seminar on pharmacovigilance and ADR reporting. This was in accordance with the study by Danekhu et al in which most participants have never attended any pharmacovigilance course.<sup>9</sup> Educational interventions, workshops, seminar, symposium and other activities on pharmacovigilance should be conducted to promote ADR reporting and to increase awareness to ADRs. Inclusion of pharmacovigilance and ADR reporting trainings in undergraduate education curricula is highly needed to inculcate the habit at very beginning of the professional career. The sample size of our study was small and it was a single center study. However, the participation of HCPs from diverse group was the strength of the study. The findings could not be compared between various HCPs. The study findings might be used by the stakeholders and policymakers to formulate appropriate educational intervention to promote pharmacovigilance program.

## CONCLUSION

The HCPs had poor knowledge, positive attitude and poor practice of pharmacovigilance. Efforts are required to enhance knowledge and good practice of HCPs toward pharmacovigilance and ADR reporting which would ultimately strengthen the pharmacovigilance program. Educational interventional study can be planned to know whether the improvement in attitude and practice on ADR reporting changed the behavior in real practice. There is need of inclusion of module on pharmacovigilance training in undergraduate and graduate medical, dental, nursing and pharmacy education programs that helps to promote reporting of ADRs. Further multicenter studies with different settings and HCPs are needed to improve awareness about pharmacovigilance and ADR reporting.

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**CONFLICT OF INTEREST** None

**FINANCIAL DISCLOSURE** None

## REFERENCES

- Edwards RE, Aronson JK. Adverse drug reactions: definitions, diagnosis, and management. *Lancet*. 2000;356(9237):1255-59. DOI: [10.1016/S0140-6736\(00\)02799-9](https://doi.org/10.1016/S0140-6736(00)02799-9) PMID: 11072960
- Bouvy JC, De Bruin ML, Koopmanschap MA. Epidemiology of adverse drug reactions in Europe: a review of recent observational studies. *Drug Saf*. 2015;38(5):437-53. DOI: [10.1007/s40264-015-0281-0](https://doi.org/10.1007/s40264-015-0281-0) PMID: 25822400 PMCID: PMC4412588
- The safety of medicines in public health programmes: pharmacovigilance an essential tool. WHO, Geneva, 2006.
- Global pharmacovigilance. WHO, Geneva, 2021. Available at <https://www.who-umc.org/global-pharmacovigilance/who-programme-for-international-drug-monitoring/> (Accessed on December 5, 2021)
- Public information: Pharmacovigilance. Department of Drug Administration, Ministry of Health and Population, Government of Nepal, 2021 Available at <https://www.dda.gov.np/content/pharmacovigilance>. (Accessed on December 5, 2021)
- Global pharmacovigilance: Easing the burden of data management. WHO, Geneva, 2021. Available at <https://www.who-umc.org/global-pharmacovigilance/vigiflow/> (Accessed on December 5, 2021)
- Zolezzi M, Parsotam N. Adverse drug reaction reporting in New Zealand: implications for pharmacists. *Ther Clin Risk Manag*. 2005;1(3):181. PMCID: PMC1661625.
- Jha N, Rathore DS, Shankar PR, Bhandary S, Pandit RB, Gyawali S, Alshakka M. Effect of an educational intervention on knowledge and attitude regarding pharmacovigilance and consumer pharmacovigilance among community pharmacists in Lalitpur district, Nepal. *BMC Res Notes*. 2017;10(1):4. DOI: [10.1186/s13104-016-2343-5](https://doi.org/10.1186/s13104-016-2343-5) PMID: 28057047 PMCID: PMC5217211
- Danekhu K, Shrestha S, Aryal S, Shankar PR. Health-care Professionals' Knowledge and Perception of Adverse Drug Reaction Reporting and Pharmacovigilance in a Tertiary Care Teaching Hospital of Nepal. *Hospital Pharmacy*. 2021;56(3):178-186. DOI: [10.1177/0018578719883796](https://doi.org/10.1177/0018578719883796) PMID: 34024926 PMCID: PMC8114297
- Santosh KC, Tragulpiankit P, Gorsanan S, Edwards IR. Attitudes among healthcare professionals to the reporting of adverse drug reactions in Nepal. *BMC Pharmacol Toxicol*. 2013;14:16. DOI: [10.1186/2050-6511-14-16](https://doi.org/10.1186/2050-6511-14-16) PMID: 23497690 PMCID: PMC3599543
- Al Dweik R, Stacey D, Kohen D, Yaya S. Factors affecting patient reporting of adverse drug reactions: a systematic review. *Br J Clin Pharmacol*. 2017;83(4):875-83. DOI: [10.1111/bcp.13159](https://doi.org/10.1111/bcp.13159) PMID: 27868226 PMCID: PMC5346870
- Jha N, Rathore D, Shankar P, Bhandary S, Alshakka M, Gyawali S. Knowledge, attitude and practice regarding pharmacovigilance and consumer pharmacovigilance among consumers at Lalitpur District, Nepal. *Journal of Nepal Health Research Council*. 2017;15(1):31-37. DOI: [10.3126/jnhrc.v15i1.18011](https://doi.org/10.3126/jnhrc.v15i1.18011) PMID:28714489
- Jha N, Rathore DS, Shankar PR, Gyawali S. Pharmacovigilance knowledge among patients at a teaching hospital in Lalitpur district, Nepal. *J Clin Diagn Res*. 2014;8(3):32-34. DOI: [10.7860/JCDR/2014/7378.4097](https://doi.org/10.7860/JCDR/2014/7378.4097) PMID: 24783073 PMCID: PMC4003677
- Deo SK, Dahal A, Gautam N, Yadav S, Gupta S. Assessment of knowledge, attitude, and practice of pharmacovigilance in a medical college of Nepal. *Med. Res. Chronicles*. 2020; 7(3):119-125. DOI: DOI No. 10.26838/MEDRECH.2020.7.3.603.
- Palaian S, Ibrahim MI, Mishra P. Health professionals' knowledge, attitude and practices towards pharmacovigilance in Nepal. *Pharm Pract (Granada)*. 2011;9(4):228-235. DOI: [10.4321/S1886-36552011000400008](https://doi.org/10.4321/S1886-36552011000400008) PMID: 24198861 PMCID: PMC3818739
- Shrestha S, Sharma S, Bhasima R, Kunwor P, Adhikari B, Sapkota B. Impact of an educational intervention on pharmacovigilance knowledge and attitudes among health professionals in a Nepal cancer hospital. *BMC Med Educ*. 2020;20(1):179. DOI: [10.1186/s12909-020-02084-7](https://doi.org/10.1186/s12909-020-02084-7) PMID: 32493307 PMCID: PMC7268292
- 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(1):5. DOI: [10.1186/s40545-020-00287-3](https://doi.org/10.1186/s40545-020-00287-3) PMID: 33397478 PMCID: PMC7784002
- 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;5:156-61. DOI: [10.18203/2320-6012.ijrms20164540](https://doi.org/10.18203/2320-6012.ijrms20164540)
- Prakasam A, Nidamanuri A, Kumar S. Knowledge, perception and practice of pharmacovigilance among community pharmacists in South India. *Pharm Pract (Granada)*. 2012;10(4):222-226. DOI: [10.4321/S1886-36552012000400006](https://doi.org/10.4321/S1886-36552012000400006) PMID: 24155840 PMCID: PMC3780499

20. Shakya-Gurung R, Shrestha D, Thapa R. Assessment on knowledge, attitude and practice of pharmacovigilance among the healthcare professionals in a tertiary hospital of Kathmandu. *Nepal Medical College Journal*. 2019;21(1):53-59.  
DOI: [10.3126/nmcj.v21i1.24854](https://doi.org/10.3126/nmcj.v21i1.24854)
21. Shanableh S, Zainal H, Alomar M, Palaian S. A national survey of knowledge, attitude, practice, and barriers towards pharmacovigilance and adverse drug reaction reporting among hospital pharmacy practitioners in the United Arab Emirates. *J Pharm Policy Pract*. 2023;16(1):92.  
DOI: [10.1186/s40545-023-00593-6](https://doi.org/10.1186/s40545-023-00593-6)  
PMID: 37464445 PMCID: PMC10355021
22. Cross C. Drug reporting may be mandatory for doctors. *CMAJ*. 2013;185(10):866.  
DOI: [10.1503/cmaj.109-4487](https://doi.org/10.1503/cmaj.109-4487)  
PMID: 23695608 PMCID: PMC3707989
23. Datta S, Sengupta S. An evaluation of knowledge, attitude, and practice of adverse drug reaction reporting in a tertiary care teaching hospital of Sikkim. *Perspect Clin Res*. 2015;6(4):200-206.  
DOI: [10.4103/2229-3485.167096](https://doi.org/10.4103/2229-3485.167096)  
PMID: 26623391 PMCID: PMC4640013
24. Kalaiselvan V, Kumar P, Mishra P, Singh GN. System of adverse drug reactions reporting: What, where, how, and whom to report? *Indian J Crit Care Med*. 2015;19(9):564-6.  
DOI: [10.4103/0972-5229.164819](https://doi.org/10.4103/0972-5229.164819)  
PMID: 26430348 PMCID: PMC4578206
25. Jha N, Rathore DS, Shankar PR, Thapa BB, Bhujra G, Alshakka M. Need for involving consumers in Nepal's pharmacovigilance system. *Australas Med J*. 2014;7(4):191-5.  
DOI: [10.4066/AMJ.2014.2011](https://doi.org/10.4066/AMJ.2014.2011)  
PMID: 24817914 PMCID: PMC4009881
26. Ergün Y, Ergün TB, Toker E, Ünal E, Akben M. Knowledge attitude and practice of Turkish health professionals towards pharmacovigilance in a university hospital. *Int Health*. 2019;11(3):177-184.  
DOI: [10.1093/inthealth/ihy073](https://doi.org/10.1093/inthealth/ihy073)  
PMID:30265317
27. Ahmad A, Patel I, Balkrishnan R, Mohanta GP, Manna PK. An evaluation of knowledge, attitude and practice of Indian pharmacists towards adverse drug reaction reporting: A pilot study. *Perspect Clin Res*. 2013;4(4):204-10.  
DOI: [10.4103/2229-3485.120168](https://doi.org/10.4103/2229-3485.120168)  
PMID: 24312887 PMCID: PMC3835963
28. Santosh KC, Tragulpiankit P, Edwards IR, Gorsanan S. Knowledge about adverse drug reactions reporting among healthcare professionals in Nepal. *Int J Risk Saf Med*. 2013;25(1):1-16.  
DOI: [10.3233/JRS-120578](https://doi.org/10.3233/JRS-120578)  
PMID: 23442293
29. Dorji C, Tragulpiankit P, Riewpaiboon A, Tobgay T. Knowledge of adverse drug reaction reporting among healthcare professionals in Bhutan: a cross-sectional survey. *Drug Saf*. 2016;39(12):1239-50.  
DOI: [10.1007/s40264-016-0465-2](https://doi.org/10.1007/s40264-016-0465-2)  
PMID: 27743333
30. Güner MD, Ekmekci PE. Healthcare professionals' pharmacovigilance knowledge and adverse drug reaction reporting behavior and factors determining the reporting rates. *J Drug Assess*. 2019;8(1):13-20.  
DOI: [10.1080/21556660.2019.1566137](https://doi.org/10.1080/21556660.2019.1566137)  
PMID: 30729064 PMCID: PMC6352929
31. Thilini Madhushika M, Jayasinghe SS, Liyanage PGC, Dilan Malinda WA, Abeykoon P. Knowledge, Attitudes, and Practices of Adverse Drug Reaction Reporting Among Healthcare Professionals in Sri Lanka- A Cross Sectional Study. *Hosp Pharm*. 2024;59(1):102-109.  
DOI: [10.1177/00185787231194988](https://doi.org/10.1177/00185787231194988)  
PMID:38223853