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Original Research Article

Pharmacovigilance Interventions on Awareness, Attitude and Practices of Nurses Regarding Chemotherapy Administration

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Abstract: ***Background:*** Safe chemotherapy administration requires nurses to possess adequate knowledge, positive attitudes, and appropriate clinical practices. Pharmacovigilance-based educational interventions play a vital role in reducing medication errors and improving patient safety. ***Objectives***: This study aimed to evaluate the effectiveness of pharmacovigilance interventions on nurses' knowledge, attitudes, and practices related to chemotherapy administration. ***Methods:*** A pre–post interventional study was conducted among nurses involved in chemotherapy care. Data were collected before and after the intervention using a reliable structured questionnaire. Nonparametric statistical tests, including the Wilcoxon Signed Ranks Test, were applied to analyze changes across demographic variables. ***Results:*** The intervention resulted in significant improvements in nurses' knowledge, attitudes, and practices regarding chemotherapy administration ($p < .001$). Improvements were observed across all demographic groups, with slightly greater gains among female nurses, those aged 25–30 years, undergraduate degree holders, and nurses with 5–10 years of experience. ***Conclusion:*** Pharmacovigilance-based educational interventions significantly enhance nurses' competencies in chemotherapy administration, supporting the need for continuous and structured training to promote safe oncological care and minimize medication-related risks.

Keywords: Pharmacovigilance, Chemotherapy Administration, Nurses, Educational Intervention, Patient Safety

INTRODUCTION

Cancer remains one of the leading causes of morbidity and mortality worldwide and continues to pose a major public health challenge due to its increasing burden. Chemotherapy is a cornerstone of cancer management and has significantly improved survival rates and quality of life; however, its cytotoxic nature and narrow therapeutic index make patients highly vulnerable to adverse drug reactions (ADRs). According to the World Health Organization, ADRs are harmful and unintended responses occurring at normal drug doses and contribute substantially to hospital admissions, morbidity, and mortality, yet remain underreported (Fatima et al., 2021). The recognition of ADRs led to the development of pharmacovigilance, defined as the science of detecting, assessing, understanding, and preventing adverse drug effects, which is particularly crucial in high-risk settings such as oncology (WHO).

Pharmacovigilance is especially important in chemotherapy administration, where nurses play a pivotal role in drug preparation, administration, monitoring, and early detection of ADRs. Nurses' knowledge, attitudes, and practices directly influence patient safety, reporting of ADRs, and overall treatment outcomes. Despite this critical role, studies from developing countries highlight gaps in nurses'

training, awareness, and reporting practices related to chemotherapy safety (Wahb et al., 2020; Mousa et al., 2021). Educational interventions have been shown to significantly improve nurses' knowledge and attitudes, emphasizing the need for continuous and structured training in pharmacovigilance and safe chemotherapy practices (Matta & Karam, 2022).

The burden of cancer is particularly high in low- and middle-income countries, including Pakistan, where late-stage diagnoses and limited resources further complicate treatment outcomes (Mattiussi & Lippi, 2020; Tufail & Wu, 2023). Oncology nurses in Pakistan are frequently exposed to chemotherapy-related risks due to inadequate training and inconsistent adherence to safety protocols (Hosen et al., 2019). Strengthening nurses' competencies through pharmacovigilance-based educational interventions is therefore essential to enhance safe chemotherapy administration, reduce medication-related risks, and improve patient outcomes while fostering a positive safety culture in oncology care (Coyne et al., 2019; Mamdouh et al., 2022).

MATERIAL AND METHODS

A quasi-experimental one-group pre-test and post-test design was employed to evaluate the effectiveness of a pharmacovigilance-based educational intervention on nurses' knowledge, attitude, and practices regarding chemotherapy administration. The study was conducted in the oncology units of Bahria Hospital and Life Hospital, Lahore, among 115 nurses selected through purposive sampling, based on predefined inclusion criteria. Data were collected using validated and reliable questionnaires assessing demographic characteristics, awareness (12 items), attitude (4-item Likert scale), and practice (9 items) adapted from Shrestha and Sharma (2020). Baseline data were obtained prior to the intervention, followed by an eight-week structured educational program consisting of four sessions focusing on pharmacovigilance principles, chemotherapy safety, adverse drug reaction (ADR) identification, and reporting procedures. Post-intervention and one-month follow-up assessments were conducted using the same tools to evaluate immediate and retained effects of the intervention. Data were analyzed using IBM SPSS version 25, applying descriptive statistics and paired sample t-test or Wilcoxon signed-rank test as appropriate, with statistical significance set at $p < 0.05$. Ethical approval was obtained, written informed consent was secured, confidentiality was maintained, and participants were assured of their right to withdraw at any stage.

RESULTS

Table 1: *Demographic Characteristics of Respondents (n = 115)*

Variable	Category	Frequency (n)	Percentage (%)
Gender	Female	75	65.2
	Male	40	34.8
Marital Status	Single	31	27.0
	Married	57	49.6
	Divorced / Widow	27	23.5
Age Group	25-30 Years	73	63.5
	31-36 Years	36	31.3
	37-42 Years	6	5.2
Level of Education	Diploma	18	15.7
	Undergraduate	68	59.1
	Graduate	29	25.2
Working Experience	< 5 Yrs	29	25.2
	5-10 Yrs	58	50.4
	> 10 Yrs	28	24.3

Table 1 presents the demographic characteristics of the 115 participants. Most respondents were female (65.2%) and nearly half were married (49.6%). The majority were aged 25–30 years (63.5%), held an undergraduate degree (59.1%), and had 5–10 years of professional experience (50.4%). Overall, the sample comprised predominantly young, well-qualified nurses with moderate clinical experience.

Table 3 presents the descriptive statistics of nurses' awareness, attitude, and practices regarding chemotherapy administration before and after the intervention (n = 115). Significant improvements were observed across all domains following the pharmacovigilance intervention. Mean awareness scores increased from 1.67 ± 0.26 to 3.59 ± 0.79, attitude scores from 1.72 ± 0.33 to 3.32 ± 0.99, and practice scores from 1.18 ± 0.16 to 3.92 ± 0.46. Median values supported these findings, indicating consistent improvement, while post-test variability suggested differing levels of individual response. Overall, the results confirm the effectiveness of the pharmacovigilance intervention in enhancing nurses' chemotherapy-related knowledge, attitudes, and practices.

Table 2. Descriptive statistics for Pre and post data values of Awareness, Attitude and practices of Nurses in Chemotherapy Administration (n=115)

Statistics	Awareness		Attitude		Practice	
	Pre-test	Post-test	Pre-test	Post-test	Pre-test	Post-test
Mean ± Std. Deviation	1.67 ± 0.26	3.59 ± 0.79	1.72 ± 0.33	3.32 ± 0.99	1.18 ± 0.16	3.92 ± 0.46
Median ± IQR	1.75 ± 0.33	4.08 ± 1.58	1.75 ± .50	3.75 ± 2.00	1.88 ± .22	4.00 ± .44
Minimum	1.00	1.83	1	1.75	1.33	2.44
Maximum	2.17	4.67	2.50	5	2.11	4.56
Range	1.17	2.83	1.50	3.25	.78	2.11
Skewness	-.803	-.417	-.149	-.165	-.513	-1.482
Kurtosis	-.046	-1.609	-.425	-1.57	.030	2.130
Std. Error of Mean	.024	.074	.031	.092	.015	.042

IQR= Interquartile Range

Table 3. Overall Awareness, Attitude and practices of Nurses in Chemotherapy Administration (n=115)

Group	Pre-test		Post-test		Z	*p*	Percentage Difference
	M	SD	M	SD			
Awareness	1.67	.262	3.59	.799	-9.31	<0.001	114.97
Attitude	1.72	.334	3.32	.995	-9.23	<0.001	93.02
practices	1.83	.167	3.92	.460	-9.31	<0.001	114.21

Table 3 shows results comparing pre- and post-test scores of nurses' awareness, attitude, and practices regarding chemotherapy administration (n = 115). Statistically significant improvements were observed across all domains following the pharmacovigilance intervention ($p < .001$). Mean scores increased for awareness (1.67 ± 0.26 to 3.59 ± 0.79; $Z = -9.31$), attitude (1.72 ± 0.33 to 3.32 ± 0.99; $Z = -9.23$), and practice (1.83 ± 0.17 to 3.92 ± 0.46; $Z = -9.31$). These findings confirm the strong effectiveness of the intervention in enhancing nurses' chemotherapy-related knowledge, attitudes, and practices.

DISCUSSION

The findings of this study demonstrate a significant positive effect of pharmacovigilance-based educational interventions on nurses' awareness, attitudes, and practices related to chemotherapy administration across all demographic and professional groups. Both descriptive statistics and the Wilcoxon Signed Ranks Test confirmed marked improvements in all domains following the intervention ($p < .001$), indicating enhanced knowledge, positive attitudinal shifts, and improved clinical practices. These results highlight the effectiveness of structured training programs in strengthening nursing competencies and promoting patient safety in oncology settings.

Subgroup analysis revealed that improvements were evident among both male and female nurses, with slightly greater gains among females. Younger nurses (25–30 years), those with undergraduate education, and nurses with 5–10 years of experience showed the greatest improvements, suggesting that early- and mid-career professionals may be particularly receptive to pharmacovigilance training. These findings underscore the value of targeting actively practicing nurses to maximize the impact of educational interventions.

The results are consistent with previous studies reporting significant gaps in pharmacovigilance knowledge and ADR reporting due to inadequate training and systemic barriers (Bankar et al., 2023; Kassa et al., 2025). Similar to findings by Manasa et al. (2023) and Alkofide et al. (2024), this study supports the role of continuous education in bridging the gap between knowledge and practice. Overall, the findings reinforce the need for sustained, structured pharmacovigilance training to enhance safe chemotherapy administration and improve reporting practices in oncology care.

CONCLUSION

The results demonstrate that to increase the knowledge, attitudes, and practices of nurses involved in the administration of chemotherapy, systematic educational interventions are necessary. The high rates of improvement noted after the interventions by all age groups, education level, work experience proves that continuous professional growth is very essential in supporting high standards of clinical practice. The findings also indicate that increasing knowledge and the positive attitude can make people adhere to the rules of safety better and feel more secure when receiving chemotherapy. Therefore, one can promote good treatment and reduce risks involved in

taking medicine in healthcare practices through capacity-building programs aimed at education.

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