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Knowledge, Attitudes and Practices of Nurses Regarding Hypervigilance Medications; Across-Sectional Study in a Public Sector Tertiary Care Hospital Swat

Ihsanur Rahman[1*], Hazrat Bilal[2], Kashif Ahmad[2], Mansoor Khan[2], Faisal Hayat[2], Asad Khan[2], Sajad Ali[2], Hasnain Khan[2], Robina[2] and Muhammad Anees[2]

[1]Khyber Medical University, Institute of Health Sciences, Islamabad, Pakistan
[2]Royal College of Nursing, Swat, Pakistan

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***Corresponding Author:**
Ihsanur Rahman
Khyber Medical University, Institute of Health Sciences, Islamabad, Pakistan
ihsan2321@gmail.com

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ABSTRACT

The usage of hypervigilance medications presents a considerable risk regarding patient safety and is fraught with medication blunders that is a problem around the world. In regard to preventing errors, nurses' knowledge, attitude, and practice regarding hyper vigilance drugs need to be precise. They also have significant responsibility in the dispensing of the prescriptions. **Objective:** To assess nurses' practices, attitudes, and knowledge of hyper vigilance drugs in Swat, Khyber Pakhtunkhwa, Pakistan. **Methods:** This was a cross- sectional quantitative study. We employed a practical sampling method and selected a total of 158 nurses and data was collected using self-modified questionnaires. Nurses' knowledge, attitudes and practices were analyzed by descriptive statistics. **Results:** With regard to hypervigilant drugs, 43.7 percent of respondents held positive views towards them. While the majority, 56.3 percent, held negative views which indicates general anxiety towards their use. **Conclusions:** The study highlighted the need for system level approach and targeted educational interventions to address the safety gap and to improve the overall attitude. The study recommended enforcing compulsory training programs, improving communication policies, and fostering the safety culture to ensure proper management of hypervigilant drugs and minimize errors.

INTRODUCTION

Medication Administration Errors (MAEs) especially with Hypervigilance Medications (HMs), which contain a greater risk for patient harm or death if administered incorrectly, stand as a significant global health issue [1, 2]. Some examples of HMs include anticoagulants, chemotherapeutic agents, opioids, and any form of neuromuscular blocking drugs that must be treated with caution due to their narrow therapeutic range and increased possibility of adverse effects [3]. These drug errors can cause morbidity, prolongation of hospitalization, economic loss, and even death [3]. According to the World Health Organization (WHO), medication errors account for one of the top ten causes of death and disability across the globe, with nearly 50 percent deemed avoidable and five percent resulting in deaths [2]. As a consequence of these errors, health systems incur an annual loss of over 42 billion dollars [4]. In the health system, where HMs are frequently used in intensive care units (ICUs) and emergency departments, the intricacy of drug administration increases [4]. Administering the wrong amount; administering the wrong route; identifying the patient incorrectly; and others. Lack

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of understanding among the heath care workers along with system related causes, poor communication, and heavy workloads are the most cited explanations for these [4]. Detailed measures are often overlooked in the integration of human machines in the field of medicine, especially in medicine administration in healthcare facilities such as Intensive Care Units (ICUs) and Emergency Departments (ER) [4]. Incorrect dosages, inaccurate administration techniques, or wrong patient matching are all too common. Such errors are often attributed to systems problem, poor coordination, excessive workload, and lack of knowledge among health workers [4]. Because their work is very complex and involves both motor and mental components, nurses, who directly give out medications, are particularly at risk to these challenges [5]. Drug errors are often attributed to insufficient training, inadequate feedback mechanisms, and absent or unsatisfactory benchmarks in many countries. For instance, time pressure, miscalculations, and the ignorance of the drug's properties qualify as the reasons for the errors during drunk-driving execution of the highly active agent (HAM) [6]. Even with the advancement of education and technology, barriers such as extreme workloads and fear of disciplinary actions tend to prevail [7]. This makes attempts to identify the underlying reasons and effective applicable interventions impossible. To this situation the programa applied and suggested by WHO and other international healthcare bodies offer was the need to focus on assuring the safety of the medicine [8]. To mitigate mistakes and their negative impact, this project advocates for strengthening professional education, creating a safety culture, and enhancing institutional planning. It is particularly concerning the amount of published literature regarding nurses' knowledge, attitude, and practices of health management (HMs) in Pakistan. The absence of automated reporting systems and lack of training programs increases the chance of error and further endangers patient safety. The unfortunate event where a baby died at a private hospital because of a mistakenly administered dose of potassium chloride is one of the many examples that call for hasty evidence-based solutions. This research sought to assess nurses' understanding of HMs in a tertiary care hospital with the goal of addressing this gap. It seeks to identify the root causes and potential remedies with the appropriate safety margins, the relative magnitude of the problems, and the nature of the problems. To facilitate the development of targeted educational and policy recommendations, attitudes and knowledge of nurses are assessed. The outcomes will aid Pakistan and other resource limited settings by improving nursing services, reducing medication errors, and increasing safety of patients.

The study's findings ultimately highlighted the need of giving nurses the skills and resources they need to safely administer HMs, encouraging a safety culture, and giving priority to measures that reduce medication-related harm.

METHODS

This study employed a quantitative descriptive cross-sectional design to assess nurses' Knowledge, Attitudes, and Practices (KAP) regarding Hypervigilance Medications (HMs). Data collection was conducted across various wards, including medical, surgical, ICU, emergency, cardiology, pediatrics, and gynecology. The Ethical Review Board with Ref No. 135/RCNS/2024 approved this study, ensuring compliance with ethical guidelines and patient confidentiality. Over four months (July 10 to November 10, 2024), a sample of 158 Registered Nurses (RNs) was selected using a convenient non-probability sampling method. Inclusion criteria comprised RNs aged 25 and above, holding valid Pakistan Nursing council licenses, and with at least one year of clinical experience, while those on leave, in administrative roles, or with mental health concerns were excluded. The inclusion criteria encompassed all nurses working the morning and evening shift. Nurses who refused to participate, were absent during data collection, or submitted incomplete forms were excluded. A structured questionnaire was used to evaluate KAP [9]. The study questionnaire consisted of four sections: demographic information, knowledge, practices and attitude. The first section included six questions about demographic information. The second section assessed nurses' knowledge of Hypervigilance medications through 10 questions, each with three response options: "True," "False," and "I don't know." The inclusion of the third option aimed to minimize guessing and reduce unanswered questions. Each correct response was awarded one point, while incorrect or "I don't know" answers received zero. Scores ranged from 0 to 10, with percentages computed based on total scores. Knowledge levels were categorized as poor (<50%), moderate (50–75%), and high (>75%). The third section include the practices about high alert medication, collected the responses on the basis of Likert scale from strongly disagree, disagree, neutral, agree and strongly agree. The four section evaluated nurses' attitudes toward Hypervigilance medications through five questions, also offering the options "True," "False," and "I don't know." Scoring followed the same method, with a maximum score of 5 and a minimum of 0. Attitudes were classified as positive (scores >50%) or negative (scores ≤50%) based on the percentage. Data entry and analysis were performed using the Statistical Package for Social Sciences (SPSS), version 27. Frequency and percentage calculations were used to evaluate nurses' knowledge and attitudes toward Hypervigilance medications.

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RESULTS

A total of 158 registered nurse were participated in the study. The demographic profile reveals that the majority of participants were aged 31–40 years (53.2%), with smaller proportions under 30 years (36.1%), 41–50 years (8.9%), and over 51 years (1.9%). Gender distribution was nearly balanced, with 53.8% female and 46.2% male participants. Regarding qualifications, most held either a BSN (34.2%) or a Diploma in Nursing (29.7%), Post RN (29.7%) and fewer having MSN (6.3%) degrees. Marital status showed a majority were married (75.3%), while 23.4% were single, and only 1.3% were divorced. In terms of work experience, most participants had less than 10 years of experience (54.4%), followed by 11–20 years (38.6%) and 21–30 years (7%)(Table 1).

Table 1: Socio Demographic Variables

Variables	Category	Frequency (%)
Age	<30 Years	57 (36.1%)
	31-40 Years	84 (53.2%)
	41-50 Years	14 (8.9%)
	>51 Years	3 (1.9%)
Gender	Male	73 (46.2%)
	Female	85 (53.8%)
Qualification	Diploma Nursing	47 (29.7%)
	BSN	54 (34.2%)
	Post RN	47 (29.7%)
	MSN	10 (6.3%)
Marital Status	Single	37 (23.4%)
	Married	119 (75.3%)
	Divorced	2 (1.3%)
Working Experience	<10 Years	86 (54.4%)
	11-20 Years	61 (38.6%)
	21-30 Years	11 (7%)
Special Training	BLS	13 (8.2%)
	ACLS	4 (2.5%)
	No Training	121 (76.6%)
	Both BLS and ACLS	20 (12.7%)

The participants' knowledge of Hypervigilance medication practices reveals varying levels of awareness and misconceptions. For several critical safety questions, a significant proportion provided incorrect or uncertain responses. 68.4% incorrectly believed that 10% calcium gluconate and 10% calcium chloride are interchangeable, and 80.4% correctly recognized that pushing 15% potassium chloride (KCl) rapidly into an IV during emergencies is unsafe. However, only 44.9% correctly identified the inappropriate fast IV push of 10% calcium chloride in 1–2 minutes, with 38.6% incorrectly agreeing. Similarly, there was uncertainty regarding the fast infusion of 3% sodium chloride, with 44.9% correctly rejecting it and 44.3% believing it was appropriate (Table 2).

Table 2: Responses in Knowledge and Attitude

Q. No.	Question	Category	Correct Option (T/F)	True Frequency (%)	False Frequency (%)	Don't Know Frequency (%)
1	10% Ca gluconate and 10% CaCl2 are the same drug and "can be used interchangeably."	Knowledge	F	16 (10.1%)	108 (68.4%)	34 (21.5%)
2	When an emergency such as ventricular fibrillation happens, push fast 15% KCl 10 mL into IV.	Knowledge	F	8 (5.1%)	127 (80.4%)	23 (14.6%)
3	When an emergency happens, fast IV push 10% CaCl2 10 mL in 1-2 minutes.	Attitude	F	61 (38.6%)	71 (44.9%)	26 (16.5%)
4	Fast IV infusion of 3% NaCl 500 mL for a patient who has low sodium level.	Attitude	F	70 (44.3%)	71 (44.9%)	17 (10.8%)
5	15% KCl better added to Ringer's solution for rapid infusion.	Knowledge	F	43 (27.2%)	90 (57%)	25 (15.8%)
6	Use "Amp" or "Vial" for dose expression instead of "mg" or "gm".	Knowledge	F	44 (27.8%)	96 (60.8%)	18 (11.4%)
7	If patient can tolerate, potassium can be administered orally instead of IV route.	Attitude	T	77 (48.7%)	55 (34.8%)	26 (16.5%)
8	For convenience, heparin and insulin should be stored together in the refrigerator.	Knowledge	F	81 (51.3%)	59 (37.3%)	18 (11.4%)
9	15% KCl is frequently used, so it should be stored without special precautions.	Knowledge	F	53 (33.5%)	81 (51.3%)	24 (15.2%)
10	Use distinctive labeling on look-alike drugs.	Attitude	T	79 (50%)	53 (33.5%)	26 (16.5%)

The results of the practice of Hypervigilance medications reveal that participants largely support implementing safety protocols. Establishing standard operating procedures for Hypervigilance medications received agreement or strong agreement from 75.9% of participants. Similarly, verifying written orders only, with no verbal orders, was supported by 78.5%. The highest level of adherence was observed for storing Hypervigilance medications separately, with 84.1% of participants agreeing or strongly agreeing. Furthermore, 79.1% of respondents agreed or strongly agreed that strict rules and control should be put in place for these drugs. 82.2% of interviewees favored limiting authorized personnel's access to

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hypervigilance drugs. These results show that participants had a proactive and positive approach to managing hypervigilance drugs, with a strong emphasis on safety measures and little disagreement or neutrality.

Table 3: Perceptions of High Alert Drugs

Q. No.	Question	Strongly Disagree Frequency (%)	Disagree Frequency (%)	Neutral Frequency (%)	Agree Frequency (%)	Strongly Agree Frequency (%)
1	Establishing standard operatingprocedures for high alert medications.	9 (5.7%)	17 (10.8%)	12 (7.6%)	46 (29.1%)	74 (46.8%)
2	Verifying written orders for high alert medications (no verbal orders).	9 (5.7%)	9 (5.7%)	16 (10.1%)	49 (31%)	75 (47.5%)
3	Storing high alert medications separately from other medications.	4 (2.5%)	11 (7%)	10 (6.3%)	53 (33.5%)	80 (50.6%)
4	Implementing rigorous regulations and oversight fo r high alert medications.	3 (1.9%)	11 (7%)	19 (12%)	51 (32.3%)	74 (46.8%)
5	Restricting access to high alert medications to authorized personnel only.	7 (4.4%)	10 (6.3%)	11 (7%)	50 (31.6%)	80 (50.6%)

Table 4 categorized the knowledge and attitude scores of the 158 study participants into different levels, such as poor, moderate, and good.

Table 4: Category of Knowledge and Attitude Scores (n= 158)

Attitude of High Alert Medication	
Total Score After Median	**Frequency (%)**
Negative Attitude	89 (56.3%)
Positive Attitude	69 (43.7%)

DISCUSSION

The results of this study provide important information on the profiles, behaviors, and perceptions of Registered Nurses (RNs) with respect to Hypervigilance medicines. The age group of 31-40 dominantly represented clinical nurses-the findings are in agreement with other work indicating that this age group is significant representation in healthcare occupations [10]. With respect to sex in the nursing field, the study had a male-to-female ratio of 46.2% and 53.8%, respectively. However, the troubling aspect is that only 6.3% of the nurses had a Master of Science in Nursing (MSN); other studies have indicated that higher education levels result in better knowledge and practice in medication safety [1]. Also, notably high is the fact that 54.4% of participants had less than 10 years of experience. While this gives insights that are refreshing, it may also imply a gap in knowledge on hypervigilant medication management. The study revealed significant knowledge gaps in Hypervigilance medications. It was found that 68.4% of nurses wrongly believe that 10% calcium gluconate is equivalent to 10% calcium chloride. This confusion is quite worrisome since drug errors of this nature can lead to damages in real-life practice. Another study had already revealed that confusion exists about Hypervigilance medications among healthcare professionals, thus emphasizing the need for more extensive and continuous education on these agents [11]. However, it is certainly a positive sign that 80.4% of participants correctly recognized the threats of rapid administration of 15% potassium chloride, consistent with the recommendations of best practices regarding drug administration by the Institute for Safe Drug Practices [12]. When it comes to practice-based safety measures, 75.9% of survey respondents agree that SOPs should be there, and they advocate safety standards for Hypervigilance drugs due to the findings. This finding is consistent with [13], who observed that nursing staff often advocate for structured policies as a means of reducing medication errors. The strong support for policies such as the need to verify written orders solely (78.5%) and limit access to Hypervigilance medications to authorized personnel (82.2%) demonstrates the participants' commitment to safety and best practices. The developing awareness among the responders to this study of the importance of regulatory oversight in medications is indeed a strong step in the right direction toward minimizing errors that might harm patient safety [11]. In addition, it is interesting that 84.1% of the respondents agreed that Hypervigilance drugs ought to be kept isolated. There is evidence that physically separating Hypervigilance drugs significantly reduces the risk of inadvertent administration errors [1]. Though their understanding of hypervigilance drugs could still be improved, these findings show that nurses are highly motivated to follow safety protocols in order to promote patient well-being. To summarize, despite the great enthusiasm shown by participants in the investigation for the safe administration of Hypervigilance drugs, several aspects still drew questions. With these findings, education and training programs follow, so that it ameliorates the gaps and improves clinical practice. Further exploration into how focused educational interventions change nurses' knowledge and use of hypervigilance drugs is proposed. Da Cunha *et al.*, in 2023 provided a global perspective on the burden of lip, oral, and pharyngeal cancer, which may have implications for patients undergoing bariatric surgery [14]. Akkayaoğlu and Celik in 2020 examined the impact of bariatric surgery on eating attitudes, body image, and quality of life,

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highlighting the psychological adjustments patients experience [15]. Similarly, Teng M *et al.*, in 2022 investigated the relationship between patient satisfaction and perspectives on artificial intelligence [16]. El-Attar and El-Emary in 2022 evaluated a nursing intervention program's effectiveness in improving body image, marital satisfaction, and quality of life among post-bariatric surgery patients [17]. Rochin in 2012 discussed healthcare reform's role in bariatric nursing, comparing patient experiences between bariatric and non-bariatric individuals [18]. Additionally, Derenzo *et al.*, in 2023 conducted an integrative review on nursing care for bariatric patients, emphasizing best practices in postoperative management [19]. Finally, Camden in 2006 provided a foundational overview of bariatric patient care, addressing the unique challenges faced by nurses in this specialty [20]. These studies collectively underscore the importance of nursing interventions, patient satisfaction, and comprehensive care in improving bariatric surgery outcomes.

CONCLUSIONS

This study underscored the critical role of nurses in ensuring the safe administration of hypervigilance drugs and highlights the prevalent concerns regarding their use. The findings reveal a significant gap in knowledge, attitudes, and practices, with over half of the respondents expressing apprehension towards these medications. Addressing these concerns requires a system-level approach, including mandatory training programs, enhanced communication policies, and a stronger safety culture. Implementing these measures can improve nurses' confidence, minimize medication errors, and ultimately enhance patient safety.

Authors Contribution

Conceptualization: IR, HB, KA, MK, FH, AK, SA, HK, R, MA
Methodology: HB, KA, MK, FH, AK, SA, HK, R, MA
Formal analysis: IR, SU
Writing, review and editing: IR, HB, KA, SU

All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

All the authors declare no conflict of interest.

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