Effect of a Risk for Bleeding Training program on Nursing Performance

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Abstract

Background: Nurses play an integral role in caring for patients with bleeding disorders, assist in developing a comprehensive nursing care plan and implementing appropriate interventions for patients at risk for bleeding by considering their unique needs and promoting their overall well-being, nursing can provide optimal care. **Aim:** this study aimed to assess the effect of using Risk for Bleeding Nursing Training Program on nursing performance. **Design** a quasi-experimental design was used to conduct this study. **Setting: This study was** conducted at King Saud Medical City (KSMC), Riyadh, Saudi Arabia. Which is considered as one of the largest in Ministry of Health (MOH) with an occupancy. **Sampling:** A convenience sample consisted of 77 staff nurses working in Pediatric and Adult Hematology Department. **Tools of data collection** consisted of three parts Demographic characteristics of nurses, Nurses knowledge about how to assess patient risk for bleeding and Nurses' practices toward patient risk for bleeding. **Results:** a marked improvement in practices of studied nurses toward patients risk of bleeding with a highly statistical significant difference ($p<0.001$) between pre and post-intervention phases. **Conclusion:** the current study concluded that the structured training program significantly enhanced nurses knowledge and adherence to best practices toward patients risk for bleeding. **Recommendations:** Integrating Risk for Bleeding Training program into routine nursing education can improve patient safety and clinical out comes.

Keywords: Risk for Bleeding, Training program, practice

Introduction

A common definition of bleeding risk is the potential for a decrease in blood volume significant enough to compromise health. Assessing this risk and implementing appropriate interventions are crucial for improving patient outcomes by preventing and quickly identifying bleeding complications. Bleeding disorders are a category of conditions characterized by the blood's inability to clot effectively **(Urban et al.,2021)** In normal clotting, platelets, a type of blood cell, stick together and form a plug at the site of an injured blood vessel. Proteins in the blood called clotting factors then interact to form a fibrin clot, essentially a gel plug, which holds the platelets in place and allows healing to occur at the site of the injury while preventing blood from escaping the blood vessel. While too much clotting can lead to conditions such as heart attacks and strokes, the inability to form clots can be very dangerous as well, as it can result in excessive bleeding. Bleeding can result from either too few or abnormal platelets, abnormal or low amounts of clotting proteins, or abnormal blood vessels hence, the medical staff should focus on the accompanying symptoms **(Alamin et al., 2012).**

Bleeding is a severe complication of critical illness in children, which has been associated with longer hospital stays, increased blood product and vasoactive utilization, as well as increased mortality **(Baker et al., 2024)** Despite the burden bleeding places on the critically ill pediatric community, to date there remains little clarity regarding its incidence, with wide variations recorded in pediatric populations of different ages **(Berkley et al., 2025)** Additionally, adult studies make use of different clinical definitions of bleeding, which when coupled with the intrinsic differences in incidence and physiology of disease states in the adult population, make generalization to the pediatric population difficult. This lack of pediatric epidemiological data presents a major obstacle in designing studies that evaluate interventions to prevent or stop bleeding **(Nellis et al., 2025)**

Assessment of bleeding symptoms is commonly done at first contact with a patient and is an important means of determining the

likelihood of an abnormality being present upon laboratory testing. Accurate assessment of a bleeding history is essential in order to reduce inappropriate laboratory testing, over-treatment and, in the case of young children, potentially distressing venepuncture. **(Gomez et al., 2021)** Difficulty arises in the fact that a significant number of 'normal' subjects also report bleeding symptoms, with up to 25% of adults reporting at least one bleeding symptom In children **(ElAlfy et al., 2022)** symptoms such as cutaneous bleeding and epistaxis are particularly frequent, occurring in 24% and 39% of normal children, respectively, although significantly more frequent in children with a confirmed bleeding disorder 67% and 69% for cutaneous bleeding and epistaxis, respectively**(Schrag et al., 2023)**.

Nurses play an integral role in caring for patients with bleeding disorders , assist in developing a comprehensive nursing care plan and implementing appropriate interventions for patients at risk for bleeding By considering their unique needs and promoting their overall well-being, nursing can provide optimal care. Gain a thorough understanding of the nursing assessment, diagnosis, and interventions required to effectively manage bleeding risk. **(Ballmann et al., 2022)** Continuing medical education is essential for nurses to provide quality patient care and upgrade their professional skills and competence. The need for continuing medical education (CME) has become more apparent in the face of advances in medical science, the ever-changing healthcare system, and nurses' vital role in improving health care. It is, therefore, imperative to explore the nurses' experience of CME courses and the extent to which such programs are effective **(Ballmann et al., 2022).**

Significance of the study

Bleeding is a significant clinical concern in adult patients, particularly in acute care settings. The incidence and prevalence of bleeding risk vary depending on patient populations, underlying medical conditions, and clinical interventions such as anticoagulation therapy. For instance, in hospitalized adults, the prevalence of bleeding risk may range from 10% to 25%, with higher rates observed in critical care units, oncology patients, and those receiving antithrombotic medications. Early identification and stratification of bleeding risk are crucial to prevent adverse outcomes and guide appropriate management strategies **(Patell et al., 2017).**

Bleeding-related presentations constitute approximately 3–5% of pediatric emergency department visits. The most common causes include epistaxis (especially in children aged 2–10), minor trauma, and soft tissue injuries. Although most cases are self-limiting, prompt assessment is essential to exclude serious underlying disorders **(Newman et al., 2020).**

In pediatric intensive care units (PICUs), bleeding complications occur in up to 10–20% of critically ill patients, often related to coagulopathies, thrombocytopenia, sepsis, or anticoagulant therapy. These cases require immediate intervention to prevent morbidity **(Sequeira et al., 2021).**

According to a national survey conducted in Saudi Arabia involving 1,138 young adult reported that 1,138 young adult reported that 74.5% experienced at least one bleeding symptom , regional disparities were evident, with Riyadh showing the highest prevalence at 32.3% while Dammam had the lowest at 14.03% **(AlSaleh et al 2021).**

Currently, there are no precise statistics available regarding the percentage of nursing education programs specifically focused on classifying patients at risk for bleeding. However, evidence indicates a growing interest in enhancing nursing education related to bleeding risk assessment, particularly in the context of acute bleeding situations such as upper gastrointestinal bleeding, third-trimester bleeding, and postpartum hemorrhage **(Gulanick et al., 2021).**

Aim of the study

The study aimed to assess the effect of using Risk for Bleeding Nursing Training Program on nursing performance.

Research questions:

1- What is the effect of using "Risk for Bleeding Nursing Training Program" on nursing performance?

2- What is the level of nurses' performance in managing risk for bleeding before implementing the training program?

3- What is the level of nurses' performance in managing risk for bleeding after implementing the training program?

4- Is there a statistically significant difference in nurses' performance regarding bleeding risk management before and after the training program?

Design

A quasi-experimental research design was used to conduct this study that focuses on determining Effect of Risk for Bleeding Nursing Training Program on Nursing Performance obtained before and after the implementation of research intervention.

Settings

The study was conducted in Pediatric and Adult Hematology Department affiliated to King Saud Medical City (KSMC), Riyadh, Saudi Arabia. Which is considered as one of the largest in Ministry of Health (MOH) with an occupancy.

Subjects

A convenience sample of 77 staff nurses was recruited, including 47 nurses from the Adult Hematology Department in Medical Tower 1 at KSMC, and 30 nurses from the Pediatric Department in Medical Tower 2 at the same institution.

Tool of the Study

A structured survey questionnaire was utilized to collect the necessary data. It comprised three main parts:

Part I: Demographic Characteristics It was adapted from **(Isam et al 2014)**

This section captured essential demographic and professional information about the participating nurses, including age, gender, educational qualifications, hospital affiliation, department, years of clinical experience, nationality, participation in any training courses related to the nursing assessment and management of patients at risk for bleeding, and awareness of existing guidelines, posters, or sources of information on bleeding risk assessment.

Part II: Nurses' Knowledge Regarding Bleeding Risk Assessment It was adapted from **(Isam et al., 2014)**

This part assessed the nurses' knowledge concerning the evaluation of patients' risk for bleeding. It covered areas such as identifying signs in the patient's medical history that are associated with bleeding risks, understanding the correlation between hypertension and bleeding risk, interpreting abnormal coagulation laboratory results, recognizing signs on the skin and mucous membranes (e.g., petechiae, bruising, hematoma, or oozing), and the utilization and importance of bleeding assessment tools in determining bleeding risk.

Part III: Nurses' Practices Toward Patients at Risk for Bleeding It was adapted from **(Isam et al., 2014)**

This section explored nurses' practical measures regarding bleeding risk management. It included two domains encompassing a total of 20 items:

The first domain focused on the preventive measures undertaken by nurses to minimize the risk of bleeding.

The second domain examined the advice and education provided by nurses to patients for bleeding prevention.

All items were evaluated using a 3-point Likert scale to measure the frequency and consistency of these practices.

Scoring system

A scoring system was followed to assess Knowledge Regarding Bleeding Risk Assessment , comprised six items related to the assessment of patients' risk for bleeding. Each correct answer was assigned a score of 1, while incorrect or "don't know" responses were scored as 0. The total score for each participant ranged from 0 to 6.

Based on the total score, the level of knowledge was categorized as follows:

- Poor knowledge: Score of 0–2 (less than 50%)

- Fair knowledge: Score of 3–4 (50% to less than 75%)
- Good knowledge: Score of 5–6 (75% and above)
- Scoring System for the Practices Section

Part III: Nurses' Practices Toward Patients at Risk for Bleeding :

It was adapted from **(Isam et al., 2014)**

The practices section included 20 items, each evaluated based on a three-point Likert scale to assess the frequency of nurses' practice behaviors regarding the management of bleeding. Each item was scored as follows:

- Always = 2 points
- Sometimes = 1 point
- Never = 0 points

The total possible score ranged from 0 to 40. The overall level of practice was categorized according to the following cut-off points:

- Poor practice: Score of 0–13 (less than 50%)
- Fair practice: Score of 14–27 (50% to less than 75%)
- Good practice: Score of 28–40 (75% and above)

This scoring system was applied to both pre-intervention and post-intervention data to evaluate the change in nursing practices regarding bleeding management.

Instrument Validity and Reliability

The data collection instrument utilized in this study was adapted from a previously published and validated tool developed by Isam (2020), which assessed nurses' knowledge regarding the management of bleeding in patients with leukemia. The original tool was reviewed and approved by a panel of eleven subject matter experts, all of whom were faculty members at the College of Nursing, University of Baghdad. For the purposes of the current study, the adapted version was further reviewed by a panel of five experts from the Nursing Education Administration Department at King Saud Medical City to ensure the relevance, clarity, and appropriateness of the items for the target subjects and clinical context. Regarding reliability, the original study by Isam (2020) reported a Cronbach's alpha of 0.89, indicating good internal consistency.

The ethical research consideration include the following

The study primarily focused on preventing bleeding rates through the improvement of nursing practices related to prevention and care. No direct patient data/information was utilized for the study; hence, no patient treatment plan was affected nor was confidentiality threat implicated. The confidentiality and anonymity of the data collected were maintained and only made accessible to research team members.

The entire research population was treated equally in this study. The demographical data e.g. gender, age, academic qualification, and years of nursing experience in hematologic pediatric and adult units, will be obtained for the purpose of describing the characteristics of the population and were not intended for any inclusion/exclusion from the study.

In line with this, a request for a waiver of informed consent will be obtained based on the following:

- The risk and benefit are balanced for the subjects.
- The waiver does not adversely affect the rights and welfare of subjects.
- The subjects were provided with pertinent information after participation whenever possible.

A comprehensive cover letter is attached to the measurement tool that includes the objective of the study, voluntary participation, confidentiality and anonymity.

Before starting the study, IRB approval will be obtained from KSMC ethics committee. The study will be conducted in accordance with the tenets of the Declaration of Helsinki for research involving human participants and in line with current legislation on clinical research and GCP. In addition, the privacy of the research subjects is protected, and the confidentiality of their data is assured".

Permissions are obtained for all adopted instruments/tools utilized in this study.

Field Work

Prior to the commencement of data collection, an official task facilitation letter was obtained from the Research Center and addressed to the Director of Nursing (DON) at both the First Medical Tower and the Second Medical Tower, granting permission to access nursing departments for the purpose of conducting the study.

The pre-intervention phase began with the baseline assessment of participants' knowledge and practice using validated study tools. No educational materials were provided at this stage. The pre-test questionnaire was distributed at 7:30 AM and 2:30 PM to ensure full coverage of all nursing shifts - morning, evening, and night. The primary researcher Selwan Hamza personally distributed the questionnaire to the Adult Oncology Unit staff over a period of seven consecutive days, while the co-investigator, Ms. Randa, handled data collection in the Pediatric Oncology Unit located in the Second Medical Tower, also over one week.

The training intervention phase followed, lasting four weeks. Training was delivered through interactive workshops, hands-on simulations, demonstrations, and case-based learning. Sessions were conducted three times per week at 7:30 AM and 2:30 PM, targeting all shifts. The educational content focused on:

Patient risk factors, Clinical assessment techniques, Interpretation of laboratory findings, Evidence-based interventions,Simulation scenarios and peer discussions

The primary researcher (Selwan Hamza) led the sessions in the Adult Oncology Unit, while Ms. Randa led the training in the Pediatric Oncology Unit. This ensured consistency and relevance of the training across units.

After completion of the educational phase, a three-month follow-up period was observed to allow for retention and real-life application of knowledge in clinical settings.

The post-intervention phase involved the reassessment of participants' knowledge and practices using the same tools from the pre-intervention stage. The post-test was distributed electronically to all nurses who had completed the initial phase, allowing for a comparative analysis of the intervention's impact.

Administrative designed

This study was conducted following the necessary administrative and ethical procedures. A formal facilitation letter was obtained from the Research Center at King Saud Medical City and was addressed to the Directors of Nursing (DON) at both the First and Second Medical Towers. This letter served as an official approval to conduct the study within the respective departments and provided access to the target nursing staff.

The research team coordinated closely with the head nurses and unit supervisors to schedule data collection and educational sessions in a manner that minimized disruption to patient care. Time slots were strategically chosen at 7:30 AM and 2:30 PM to ensure inclusion of nursing staff across all shifts - morning, evening, and night.

Ethical approval was secured prior to data collection, and informed consent was obtained from all participants. Confidentiality and anonymity were maintained throughout the study, with all data stored securely and used strictly for research purposes.

The study design followed a structured timeline comprising three main phases: pre-intervention, training intervention, and post-intervention, with clear administrative planning to ensure smooth implementation across multiple units.

Statistical Analysis

All collected data, including demographic characteristics, pre-test scores, and post-test scores, were entered into a Microsoft® Excel® spreadsheet using participant ID numbers to ensure confidentiality. Data were then imported into IBM SPSS Statistics version 24.0 for analysis. A significance level of $p < 0.05$ was used for all statistical tests.

To assess the effectiveness of the educational program, comparisons between pre- and post-test results were conducted using the Chi-square test. The McNemar test was

also applied to evaluate the significance of changes in responses from incorrect to correct. Participant satisfaction levels were analyzed and presented as percentages.

Pearson's correlation coefficient (r) was used to assess the strength and direction of relationships among continuous variables. Furthermore, independent and paired t-tests were employed, as appropriate, to evaluate differences in mean scores before and after the intervention.

Significance of the results was interpreted as follows:

- Highly significant at p-value < 0.001
- Statistically significant at p-value < 0.05
- Not significant at p-value > 0.05

Results

Table (1): shows that (49.3%) of studied nurses were in age group 30 - < 40 years old with a mean age 35.61±793 of years. In relation to qualifications. (76.6%) of them had bachelor nursing degree and (46.7%) of them had experience ranged from 5 to 10 years. Concerning the hospital and department, (61.0%) of them were working in Medical hospital; especially in adult oncology department. Pertaining to their nationality, (66.2%) of them were Non-Saudi. As well as, (88.3%) of them didn't attend any training program / courses about nursing assessment of risk patient for bleeding and nursing intervention. Additionally, (89.6%) of them didn't have in their department any guidelines or posters about nursing assessment and intervention for patient risk for bleeding. Finally, (70.1%), (61.0%) and (50.6%) of them obtained their information from Portal, UCNE and HCNE respectively.

Table (2): clears that there was a highly statistical significant difference between the results of post-intervention phase compared to pre- intervention phase in favor of post-intervention regarding all items of studied sample's knowledge about assessment of patients' risk for bleeding with p≤0.001.

Table (3): clarifies that, there was a marked improvement in practices of studied nurses toward assessment patients risk of bleeding with a highly statistical significant difference (p<0.001) between pre and post-intervention phases.

Table (4): clarifies that, there was a statistically significant relation between total knowledge score and (qualifications and years of experience) of the studied nurses at pre-intervention phase (P≤0.05). While, there was no statistically significant relation between total knowledge score and demographic characteristics of the studied nurses at post-intervention phases (P>0.05).

Table (5): demonstrates that there was a highly significant statistical positive correlation between total score of knowledge and total score of practices of the studied nurses at pre-intervention and post-intervention phases (P≤ 0.001).

Figure (1): shows that, (88.3%) of studied nurses didn't attend any training Program / courses about nursing assessment of risk patient for bleeding and nursing intervention.

Figure (2): cleared that, (70.1%), (61.0%) and (50.6%) of studied nurses obtained their **information** from Portal, UCNE and HCNE respectively.

Figure (3): displays that, about (31.2%) and (88.3%) of studied nurses had good knowledge regarding assessment of patients' risk for bleeding and nursing intervention at pre and post-intervention phases respectively.

Figure (4): displays that, about (61.0%) and (84.4%) of studied nurses had satisfactory level of practices toward management of bleeding at pre and post-intervention phases respectively.

Table (1): Distribution of the studied nurses according to their Demographic characteristics (n=77)

Demographic characteristics	No	%
Age (in years):		
20 - < 30	19	24.7
30 - < 40	38	49.3
40 - 50	17	22.1
> 50	3	3.9
Mean ± SD = 35.61±793		
Min.=23 Max.=55		
Qualifications:		
Diploma nursing	13	16.9
Bachelor nursing	59	76.6
Master degree or higher	5	6.5
Hospital:		
Medical hospital	47	61.0
Pediatric hospital	30	39.0
Department:		
Adult oncology department	47	61.0
Pediatric oncology department	30	39.0
Years of experience:		
Below 5 years	15	19.5
5 to 10 years	36	46.7
11 to 15 years	17	22.1
More than 15 years	9	11.7
Nationality:		
Saudi	26	33.8
Non-Saudi	51	66.2
Attending any training Program / courses about nursing assessment of risk patient for bleeding and nursing intervention?		
Yes	9	11.7
No	68	88.3
Do you have in your department any guidelines or posters about nursing assessment and intervention for patient risk for bleeding?		
Yes	8	10.4
No	69	89.6
Source of information about assessment of patient risk for bleeding and intervention?		
LMS (learning management system)	12	15.6
Portal	54	70.1
LIPPINCOTT	24	31.2
Internet	31	40.3
UCNE (unit continuous nursing education)	47	61.0
HCNE (hospital nursing education)	39	50.6

Table (2): Distribution of studied nurses regarding their knowledge about assessment of patients' risk for bleeding at pre and post- intervention phases (n=77).

Knowledge items	Pre-intervention				Post-intervention				X^2	p-value
	Correct		Incorrect or don't know		Correct		Incorrect or don't know			
	No	%	No	%	No	%	No	%		
Patient's health history for signs associated with a risk for bleeding.	50	64.9	27	35.1	72	93.5	5	6.5	19.09	0.000**
Relation between hypertension and risk for bleeding.	46	59.7	31	40.3	75	97.4	2	2.6	32.43	0.000**
Laboratory results for coagulation profile for any abnormality.	37	48.1	40	51.9	66	85.7	11	14.3	24.65	0.000**
Signs of patient skin and mucous membranes for petechiae, bruising, hematoma formation, or oozing of blood to assess if patient is risk for bleeding or not.	48	62.3	29	37.7	70	90.9	7	9.1	17.54	0.000**
Bleeding assessment tool to evaluate whether the patient is at risk of bleeding or not.	45	58.4	32	41.6	68	88.3	9	11.7	17.58	0.000**
Importance bleeding assessment tool.	40	51.9	37	48.1	68	88.3	9	11.7	24.30	0.000**

*A Statistical significant $p \leq 0.0$ **A Highly Statistical significant $p \leq 0.001$

Table (3): Distribution of studied nurses according to their practices toward patients risk for bleeding at pre and post-intervention phases (n=77).

Practices items	Pre-intervention						Post-intervention						X^2	P-value
	Always		Sometimes		Never		Always		Sometimes		Never			
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%		
Assess the patient's bleeding signs and symptoms before any medical procedure	20	26.0	37	48.1	20	26.0	49	63.6	15	19.5	13	16.9	**22.89**	**0.000****
Taking temperature through anal	12	15.6	17	22.1	48	62.3	28	36.4	20	26.0	29	37.7	**11.33**	**0.003***
Taking temperature through mouth	25	32.5	21	27.3	31	40.3	46	59.7	22	28.6	9	11.7	**18.33**	**0.000****
Taking temperature through axilla	30	39.0	23	29.9	24	31.2	52	67.5	23	29.9	2	2.6	**24.51**	**0.000****
Avoid intramuscular injection	19	24.7	30	39.0	28	36.4	60	77.9	12	15.6	5	6.5	**45.02**	**0.000****
Taking precaution during intravascular injection	34	44.2	25	32.5	18	23.4	74	96.1	3	3.9	0	0.0	**50.10**	**0.000****
Pressure on injection site for a while	55	71.4	22	28.6	0	0.0	77	100.0	0	0.0	0	0.0	**25.66**	**0.000****
Measure blood pressure in the non-invasive hand	51	66.2	16	20.8	10	13.0	77	100.0	0	0.0	0	0.0	**31.28**	**0.000****
Avoid giving anticoagulant medications	60	77.9	17	22.1	0	0.0	77	100.0	0	0.0	0	0.0	**19.10**	**0.000****
Avoid using sharp objects during wound caring	18	23.4	32	41.6	27	35.1	46	59.7	16	20.8	15	19.5	**21.01**	**0.000****
Advising patients to use electric razor	9	11.7	18	23.4	50	64.9	24	31.2	20	26.0	33	42.9	**10.40**	**0.006***
Advising patients to use soft tooth brush	14	18.2	26	33.8	37	48.1	33	42.9	21	27.3	23	29.9	**11.47**	**0.003***
Advising patients to use flossing in cleaning teeth	7	9.1	13	16.9	57	74.0	26	33.8	25	32.5	26	33.8	**26.30**	**0.000****
Inform patient to avoid crowded places	5	6.5	26	33.8	46	59.7	29	37.7	24	31.2	24	31.2	**23.93**	**0.000****
Inform patient wearing shoes during waling to avoid any injury	37	48.1	30	39.0	10	13.0	68	88.3	4	5.2	5	6.5	**30.70**	**0.000****
Advising patients to cut nails carefully	31	40.3	20	26.0	26	33.8	57	74.0	12	15.6	8	10.4	**19.21**	**0.000****
Washing wounds with warm water and using detergents	56	72.7	21	27.3	0	0.0	77	100.0	0	0.0	0	0.0	**24.31**	**0.000****
Advising patients to avoid uncooked meals and fruits	23	29.9	18	23.4	36	46.8	59	76.6	10	13.0	8	10.4	**35.90**	**0.000****
Take precaution while using sharp or contaminated equipment	47	61.0	21	27.3	9	11.7	70	90.9	7	9.1	0	0.0	**20.52**	**0.000****
Reporting Physician when feeling sudden sign or symptom of bleeding.	62	80.5	15	19.5	0	0.0	77	100.0	0	0.0	0	0.0	**16.61**	**0.000****

*A Statistical significant $p \leq 0.0$ **A Highly Statistical significant $p \leq 0.001$

Table (4): Relation between total knowledge score and selected socio-demographic characteristics of the studied staff nurses at pre-intervention and post-intervention phases (n=77).

Demographic characteristics	Total knowledge score															
	Pre-intervention								Post-intervention							
	Good n= (24)		Average n= (41)		Poor n= (12)		Chi - square test	P-value	Good n= (68)		Average n= (6)		Poor n= (3)		Chi - square test	P-value
	No	%			No	%			No	%	No	%	No	%		
Age (years):																
20 - < 30	6	25.0	11	26.8	2	16.7	**1.73**	**0.942**	16	23.5	2	33.3	1	33.3	**1.12**	**0.981**
30 - < 40	11	45.8	20	48.8	7	58.3			34	50.0	3	50.0	1	33.3		
40 - 50	6	25.0	9	22.0	2	16.7			15	22.1	1	16.7	1	33.3		
> 50	1	4.2	1	2.4	1	8.3			3	4.4	0	0.0	0	0.0		
Qualifications:																
Diploma nursing	1	4.2	10	24.4	2	16.7	**14.79**	**0.005***	11	16.2	1	16.7	1	33.3	**1.82**	**0.768**
Bachelor nursing	18	75.0	31	75.6	10	83.3			53	77.9	4	66.7	2	66.7		
Master degree and more	5	20.8	0	0.0	0	0.0			4	5.9	1	16.7	0	0.0		
Hospital:																
Medical hospital	14	58.3	26	63.4	7	58.3	**0.208**	**0.901**	41	60.3	4	66.7	2	66.7	**1.36**	**0.934**
Pediatric hospital	10	41.7	15	36.6	5	41.7			27	39.7	2	33.3	1	33.3		
Department:																
Adult oncology department	14	58.3	26	63.4	7	58.3	**0.208**	**0.901**	41	60.3	4	66.7	2	66.7	**1.36**	**0.934**
Pediatric oncology department	10	41.7	15	36.6	5	41.7			27	39.7	2	33.3	1	33.3		
Years of experience:																
Below 5 years	1	4.2	12	29.3	2	16.7	**14.99**	**0.020***	12	17.6	2	33.3	1	33.3	**3.17**	**0.787**
5 to 10 years	10	41.7	19	46.3	7	58.3			32	47.1	3	50.0	1	33.3		
11 to 15 years	6	25.0	8	19.5	3	25.0			16	23.5	0	0.0	1	33.3		
More than 15 years	7	29.2	2	4.9	0	0.0			8	11.8	1	16.7	0	0.0		
Nationality:																
Saudi	9	37.5	14	34.1	3	25.0	**0.565**	**0.754**	22	32.4	3	50.0	1	33.3	**0.768**	**0.681**
Non-Saudi	15	62.5	27	65.9	9	75.0			46	67.6	3	50.0	2	66.7		

*A Statistical significant $p \leq 0.05$ **A Highly Statistical significant $p \leq 0.001$

Table (6): Correlation between total knowledge score and total practices score of the studied nurses at pre and post-intervention phases (n=77).

Variables	Total knowledge score			
	Pre-intervention		Post-intervention	
	r	P-value	r	P-value
Total practices score	0.592	**0.000****	0.557	**0.000****

**A Highly Statistical significant p ≤ 0.001

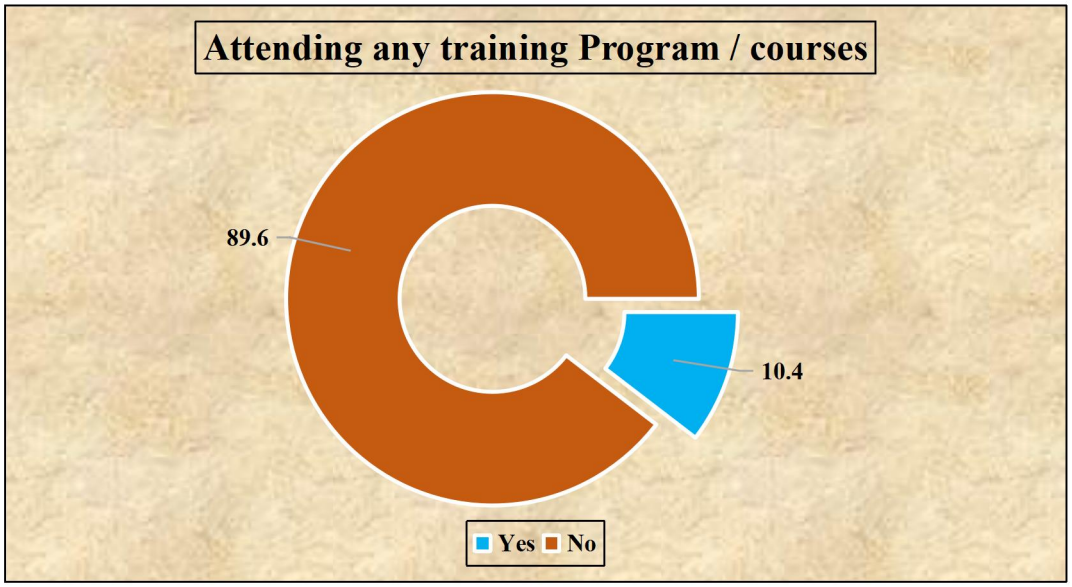

Figure (1): Distribution of studied nurses according to attending any training program / courses about nursing assessment of risk patient for bleeding and nursing intervention (n=77).

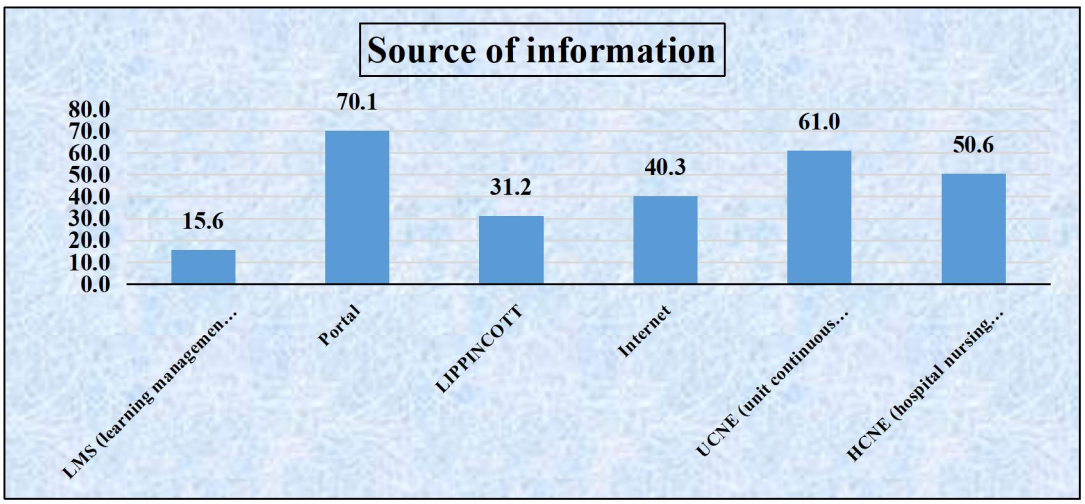

Figure (2): Distribution of studied nurses according to source of information about assessment of patient risk for bleeding and intervention (n=77).

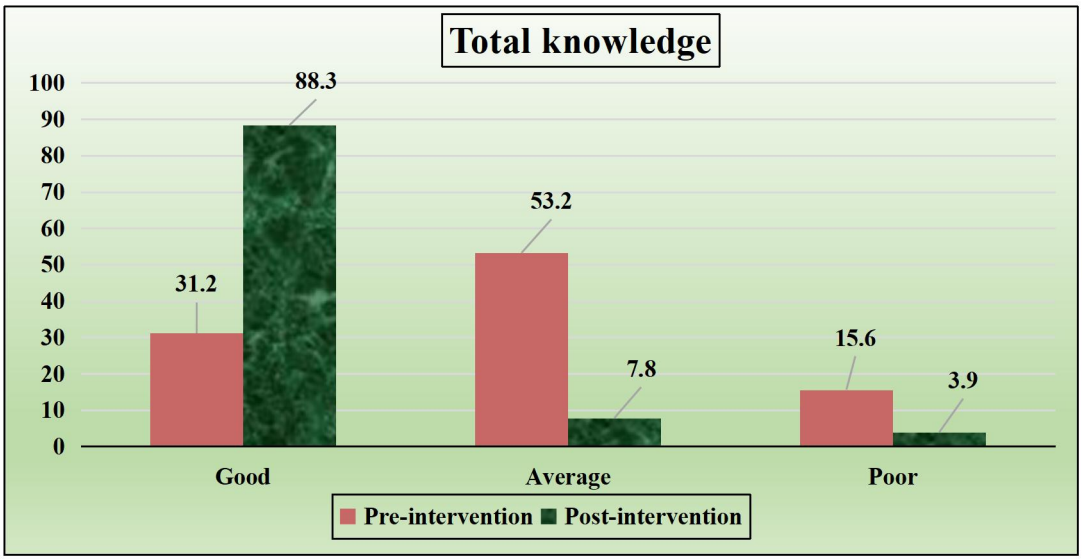

Figure (3): Distribution of studied staff nurses according to their total knowledge score regarding assessment of patients' risk for bleeding and nursing intervention at pre and post-intervention phases (n=77).

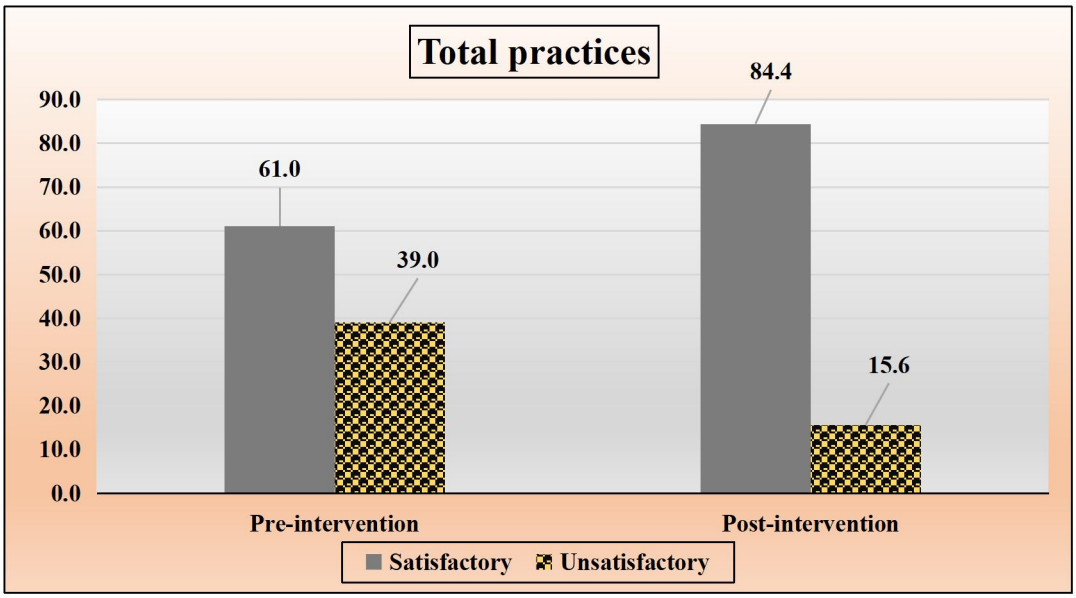

Figure (4): Distribution of studied nurses according to their total practices score toward management of bleeding at pre and post-intervention phases (n=77).

Discussion

Bleeding is a critical complication that can rapidly escalate into life-threatening conditions, especially in emergency settings where time-sensitive decisions are vital. Nurses, as frontline caregivers, play a pivotal role in the early identification and management of bleeding risks. Enhancing their performance through targeted training programs is therefore essential to improving patient outcomes and ensuring safety **(Charlton et al., 2021).**

This study aimed to assess the effect of a risk for bleeding training program on nursing performance. The post-intervention results

demonstrated notable improvements in nurses' knowledge, clinical judgment, and hands-on skills. These findings provide valuable insights into the effectiveness of structured educational interventions in bridging performance gaps among nurses. To further contextualize these results, it is essential to compare them with findings from other scholarly works and to explore how this study contributes to the broader body of evidence on clinical education and nursing practice **(Karunarathna et al., 2024).**

Regarding the demographic characteristics of the studied nurses, the current studied showed that (49.3%) of studied nurses were in age group 30 - < 40 years old with a mean age 35.61±793 of years. In relation to qualifications. (76.6%) of them had bachelor nursing degree and (46.7%) of them had experience ranged from 5 to 10 years. Concerning the hospital and department, (61.0%) of them were working in Medical hospital; especially in adult oncology department. Pertaining to their nationality, (66.2%) of them were Non-Saudi. As well as, (88.3%) of them didn't attend any training program / courses about nursing assessment of risk patient for bleeding and nursing intervention. Additionally, (89.6%) of them didn't have in their department any guidelines or posters about nursing assessment and intervention for patient risk for bleeding. Finally, (70.1%), (61.0%) and (50.6%) of them obtained their information from Portal, UCNE and HCNE respectively. (table 1)

These findings reflect a relatively young and moderately experienced nursing workforce, consistent with trends reported in previous studies in Saudi Arabia. Notably, over two-thirds of participants were non-Saudi, which aligns with **Alotaibi et al. (2024),** who emphasized the critical contributions of expatriate nurses in public health education.

A significant issue identified in this study was the marked lack of training and the unavailability of resources related to bleeding risk assessment and appropriate nursing interventions. This finding is consistent with the results of **Lazure et al. (2019),** who similarly reported a substantial deficiency in structured educational programs and clinical guidelines addressing this critical area. Such a gap supports the broader body of literature emphasizing the urgent need for comprehensive, evidence-based in-service training programs to improve nursing competency—particularly in high-acuity and emergency care settings. Moreover, the study revealed a heavy reliance on digital platforms such as the MOH Portal, UCNE, and HCNE as primary sources of information. This reliance highlights the critical need to strengthen and regularly update these platforms to ensure they provide accessible, up-to-date, and evidence-based content. Collectively, these findings underscore the imperative for healthcare institutions to prioritize targeted training initiatives and to enhance the professional development infrastructure for nurses working in high-risk clinical environments.

The current work clarified that, there was a highly statistical significant difference between the results of post-intervention phase compared to pre- intervention phase in favor of post-intervention regarding all items of studied sample's knowledge about assessment of patients' risk for bleeding with $p \leq 0.001$.(table2)

This was supported by **Bertini-Pérez et al. (2024),** who conducted a study about the Effectiveness of a Haemorrhage-Control Task Simulator for Training Nursing Students: A Quasi-Experimental Before-After Study. Their findings demonstrated a statistically significant improvement in participants' knowledge and practical skills related to hemorrhage control following the training intervention. This aligns with the current study's outcomes, reinforcing the effectiveness of targeted, simulation-based educational programs in enhancing nurses' competence in managing bleeding risks and improving patient safety outcomes.

The current work clarified that, there was a marked improvement in practices of studied nurses toward assessment patients risk of bleeding with a highly statistical significant difference ($p<0.001$) between pre and post-intervention phases. (Table 3)

This finding is supported by the study of **Roudsari, Feizi, and Maghsudlu (2021)**,, who examined the effects of different educational methods on nurses' performance in hemovigilance practices. Their results indicated a significant enhancement in post-intervention

performance scores across all educational approaches, particularly among those who received interactive and structured training. These outcomes are consistent with the present study, underscoring the effectiveness of evidence-based training programs in improving practical competencies in critical nursing assessments such as bleeding risk.

The current work clarified that there was a statistically significant relation between total knowledge score and (qualifications and years of experience) of the studied nurses at pre-intervention phase (P≤0.05). While, there was no statistically significant relation between total knowledge score and demographic characteristics of the studied nurses at post-intervention phases (P>0.05). **Table (4)**

This suggests that nurses with higher academic preparation and longer clinical exposure exhibited better baseline knowledge regarding bleeding risk assessment. However, no statistically significant relationship was observed between total knowledge scores and any demographic characteristics in the post-intervention phase ($p > 0.05$), indicating that the training program effectively equalized knowledge levels among participants, regardless of their background. This finding is supported by **Albagawi, Alkubati, and Abdul-Ghani (2023),** who, in their study on nurses' knowledge of diabetes care and management, reported a significant association between actual knowledge and years of experience, while also highlighting disparities between perceived and actual knowledge levels. Their results reinforce the importance of structured educational interventions in minimizing knowledge gaps among healthcare providers.

The current work clarified that there was a highly significant statistical positive correlation between total score of knowledge and total score of practices of the studied nurses at pre-intervention and post-intervention phases (P≤ 0.001). **Table (5)**

This finding suggests that enhanced knowledge was directly associated with improved clinical practice in assessing and managing patients at risk for bleeding. These results are consistent with those reported by **Roudsari, Feizi, and Maghsudlu (2021)**, who examined the impact of various educational strategies—namely teach-back, concept mapping, and traditional lectures—on nurses' hemovigilance knowledge and performance. Their study demonstrated a notable improvement in practice that was significantly correlated with increased knowledge levels, reinforcing the notion that well-structured educational interventions can lead to meaningful improvements in both cognitive and practical nursing competencies.

The current work clarified that: (88.3%) of studied nurses didn't attend any training Program / courses about nursing assessment of risk patient for bleeding and nursing intervention. Figure (1)

This finding is supported by the study of Ahmed Mandour et al. (2021), who highlighted a significant lack of prior training among nurses providing care to patients with upper gastrointestinal bleeding. Their results emphasized the critical role of structured educational programs in improving nurses' knowledge and clinical preparedness, reinforcing the present study's recommendation for institutional investment in targeted training initiatives.

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