Arab American University Faculty of Graduate Studies Department of Health Sciences Master Program in Adult Nursing



Nurses' Knowledge, Perception of Practice, and Their Related Factors Regarding Venous Thromboembolism Prevention in Southern West Bank Hospitals

Ayoub Abd Almonem Rabaei

202113179

Supervision Committee:

Dr. Faeda Eqtait Dr. Bahaeldin Hammad Dr. Imad Thultheen

> This Thesis Was Submitted in Partial Fulfillment of the Requirements for the Master Degree in Adult Nursing

> > Palestine, August / 2024

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Thesis Approval

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Ayoub Abd Almonem Rabaei

202113179

This thesis was defended successfully on 24 August 2024 and approved by:

Thesis Committee Members:

Name

Title

Signature

- 1. Dr. Faeda Eqtait Main Supervisor
- 2. Dr. Bahaeldin Hammad Members of Supervision Committee
- 3. Dr. Imad Thultheen Members of Supervision Committee

Palestine, August / 2024

Declaration

I declare that, except where explicit reference is made to the contribution of others, this dissertation is substantially my own work and has not been submitted for any other degree at the Arab American University or any other institution.

Student Name : Ayoub Abd Almonem Rabaei

Student ID: 202113179

Signature: Ayoub A Rabaei

Date of Submitting the Final Version of the Thesis: 28-10-2024

Dedication

I would like to dedicate this thesis to my parents, whose unwavering love and support have been my constant motivation. Their encouragement and belief in me have pushed me to overcome challenges and strive for excellence. I am forever grateful for their sacrifices and the countless hours they have spent cheering me on. This thesis is a testament to their belief in my abilities and their belief in the power of education. Thank you for always being there for me. Your sacrifices and encouragement have shaped me into the person I am today, and I am forever grateful for their presence in my life.

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I would also like to dedicate this thesis to the martyrs of Gaza, whose bravery and sacrifice in the pursuit of justice and freedom serve as a constant reminder of the importance of standing up for what is right. Their courage in the face of adversity and occupation inspires me to use my education to make a positive impact in the world and to advocate for peace and justice.

May the memory of the martyrs of Gaza live on, and may their sacrifices never be forgotten. This thesis is a small tribute to their indomitable spirit and a symbol of my commitment to continue their fight for freedom and for a better future.

In loving memory of the martyrs of Gaza and with heartfelt gratitude to my parents and to my supervisor this thesis is dedicated.

Ayoub Abd Almonem Rabaei

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Ayoub Abd Almonem Rabaei Dr. Faeda Eqtait Dr. Bahaeldin Hammad Dr. Imad Thultheen

Abstract

Introduction: Venous thromboembolism is a preventable health problem in hospitalized patients. Effective Venous thromboembolism care necessitates coordination among various healthcare professionals. Nurses play a vital role by identifying at-risk patients and providing appropriate preventive measures, significantly improving VTE prevention during clinical care.

Aim: To assess the level of knowledge among nurses and their perceived practices about venous thromboembolism prevention in southern West-Bank hospitals.

Methods: A descriptive cross-sectional design with census sample of 131 registered nurses was recruited from private and governmental hospitals in the South West Bank. Data were collected using an anonymous electronic questionnaire (google form).

Results: The result show that 84.7% of nurses had inadequate knowledge regarding venous thromboembolism, while 69.5% demonstrated good practices in preventing deep vein thrombosis. Additionally, it highlighted that most nurses were unfamiliar with the deep vein thrombosis protocols at their hospitals.

Conclusion: The study revealed that most participants had a low overall level of knowledge regarding venous thromboembolism. Despite this, nurses exhibited a high level of practical application. To enhance both knowledge and practice in deep vein venous thromboembolism, it is crucial to implement targeted training, foster a collaborative learning environment, and encourage ongoing education.

Key words: knowledge, practice, venous thromboembolism, Nurses.

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List of Definitions of Abbreviations

Abbreviations	Title		
VTE	Venous Thromboembolism		
DVT	Deep Vein Thrombosis		
PE	Pulmonary Embolism		
HA-VTE	Hospital-Acquired Venous		
	Thromboembolism		
CDC	Center for Disease Control and Prevention		
ICU	Intensive Care Unit		
PE-LDVT	Pulmonary Embolism or Lower Extremity		
	Deep Vein Thrombosis		
NLDVT	Non-Leg Deep Vein Thrombosis		
UFH	Unfractionated Heparin		
LMWH	Low-Molecular-Weight Heparins		
DOACs	Direct Oral Anticoagulants		
GCS	Graduated Compression Stockings		
IPCD	Intermittent pneumatic compression device		
SAPS II	Simplified Acute Physiology Score II		
ISS	Injury Severity Score		
RAM	Risk Assessment Model		

Chapter One: Introduction

1.1 Introduction

Venous thromboembolism poses a severe health problem in hospitalized patients, especially life-threatening for high-risk groups like critically ill patients and postoperative surgical patients (Mahlab-Guri et al, 2020). Venous thromboembolism (VTE) includes deep vein thrombosis (DVT) and pulmonary embolism (PE). Furthermore, this medical problem considered the most common source of morbidity and mortality. About 60% of high-risk surgical patients and 40% of inpatients at risk for VTE. This highlights the need for suitable preventive measures (Pavon, et al, 2016).

In the United States, over 900,000 individuals struggle with the impact of VTE annually, constituting a significant public health concern. The mortality rate reaches 60,000–100,000 deaths each year, (McBane, 2020).

The burden of venous thromboembolism extends to the European Union, where around 684,019 cases of DVT, 434,723 instances of PE, and 610,138 events of post-thrombotic syndrome are reported yearly. The economic ramifications amount to billions of dollars each year, (Barcom, et al, 2016).

To address the critical issue of venous thromboembolism (VTE) prevention in cancer surgery patients, a study at Aswan Oncology Center in Egypt evaluated nurses' knowledge and practices regarding VTE preventive measures. The findings indicated that there were significant gaps in both the nurses' knowledge and their observed practices in this area. This underscores the need for targeted interventions and ongoing training programs to enhance the standard of care and effectively prevent VTE among cancer surgery patients in similar healthcare settings (Ahmed et al., 2020).

To better understand the challenges of venous thromboembolism (VTE) prevention in certain healthcare systems, a study in Ethiopian teaching hospitals found that 93% of patients admitted for medical conditions had two or more risk factors. Despite this high prevalence, only 40% of these patients received appropriate thromboprophylaxis. Encouragingly, 32.8% of those who underwent preventive interventions did not experience VTE. These findings highlight the urgent need for improved VTE prevention strategies in similar healthcare settings, emphasizing the

importance of targeted interventions and further research to enhance patient outcomes (Ahmed et al., 2019).

About 10% of hospital-related deaths have venous thromboembolism as a contributing cause, and more than half of these cases occur during the hospital stay. Reducing the incidence of VTE in medical and surgical patients by 70% has been demonstrated rely on the use of effective preventive methods, such as pharmacological and mechanical prophylaxis (Abboud, et al, 2020).

According to the Centers for Disease Control and Prevention (CDC), 70% of hospital-acquired venous thromboembolism (HA-VTE) cases, which account the sixth most common reason for unplanned hospital readmissions after surgery, can be prevented (Yohannes, et al, 2022). Also, Vein thrombosis, which includes DVT and PE, is the third most frequent cause of vascular mortality worldwide (Nicholson, et al, 2020).

Nurses always have important role in patient care, play a dynamic role in assessing and determining the risk factors for DVT in the hospital care environment (Yohannes, et al, 2022). Their experience with adequate knowledge, coupled with effective patient care measures such as the use of graduated stockings for compression, accurate administration of appropriate anticoagulant doses, and continuous assessment and monitoring of risk factors contribute significantly in reducing this medical problem (Shaaban et al., 2021). Studies indicate that knowledge deficit and proper use of preventive measures for DVT may increase length of stay in hospital and finally contribute undesired healthcare consequences (Khalid et al, 2018).

In light of the growing concern over venous thromboembolism (VTE) and its impact on patient outcomes, this study was designed to comprehensively evaluate the knowledge and practice gaps related to deep vein thrombosis (DVT) prevention among nurses working in intensive care units (ICUs) at hospitals in Southern West Bank, Palestine. The research focuses on identifying specific areas where nurses' understanding and application of DVT preventive measures may fall short.

Additionally, it explores the factors associated with these gaps and examines the current practices employed for DVT prevention. By delving into these aspects, the study aims to shed light on the critical deficiencies and challenges faced in the ICU setting, ultimately guiding the development of targeted interventions and educational programs.

These efforts are essential to improving the quality of care and enhancing patient safety by addressing and bridging the identified knowledge and practice gaps related to DVT prevention.

1.2 Problem Statement

Despite the well-recognized importance of preventing VTE among hospitalized patients, especially those classified as high-risk groups like critically ill and post-operative surgical patients, there remains a significant gap in the understanding and application of protective measures among nurses in ICUs (Yohannes, et al. 2021).

Venous thromboembolism; PE and DVT stands as severe and life-threatening complication for individuals in various healthcare settings worldwide (Mahlab-Guri et al., 2020). Existing literature tourist attractions to prevalence of VTE and its considerable impact on morbidity and mortality, emphasizing the urgent need for effective prevention strategies (Pavon et al., 2016). Furthermore, VTE contributes significantly to hospital-related deaths, and the implementation of appropriate preventive strategies has proven crucial in reducing VTE occurrence by 70% in medical and surgical inpatients (Abboud et al., 2020).

As frontline healthcare providers, nurses are a key in identifying risk factors for VTE, implementing preventive measures, and monitoring patients in the ICUs (Shaaban et al., 2021). However, studies suggest that knowledge deficit and proper use of preventive measures by nurses may increase hospitalization rates and contribute to poor healthcare outcomes (Khalid et al., 2018).

Studies from different regions, including Egypt and Ethiopian teaching hospitals, reveal suboptimal scores in nurses' knowledge and observed practices for prevention of VTE, indicating a critical need for targeted interventions and continuous education (Ahmed et al., 2020; Ahmed et al., 2019).

However, after searching different databases, studies in Palestine have yet to examine nurses' knowledge and perception of practice toward VTE prevention.

In order to advance patient outcomes in the ICUs, lower incidence of VTE, and rise the quality of care, this study intends to fill in the knowledge and practice gaps that currently exist, identify contributing factors, and evaluate the state of VTE prevention practices among ICU nurses in Southern Palestinian hospitals.

Despite the critical role that nurses play in preventing VTE in hospitalized patients, there is limited understanding of their knowledge and practices related to VTE prevention in the Southern West Bank hospitals. This gap in understanding is concerning given that inadequate knowledge and inconsistent practices can significantly impact patient outcomes. The problem lies in determining the extent of nurses' awareness about VTE prevention, their own practices, and the factors influencing these aspects. Addressing these issues is essential to improve VTE prevention strategies and enhance patient care in the region's healthcare settings.

1.3 Significance of the study

The significance of this study lies in its potential to improve venous thromboembolism prevention practices in Southern West Bank hospitals by addressing key gaps in nurses' knowledge and perceptions. Understanding nurses' current knowledge levels and perceptions of VTE prevention practices will provide valuable insights into the effectiveness of existing protocols and identify areas for improvement. By examining the related factors that influence these aspects, the study aims to inform targeted educational and policy interventions. Enhancing nurses' competence and confidence in VTE prevention can lead to better patient outcomes, reduced incidence of VTE, and overall improvement in the quality of care provided in these healthcare settings.

1.4 Objectives of the study

Assess ICU nurses' knowledge about VTE prevention for ICU patients in Southern Palestinian governmental and nongovernmental hospitals in the West Bank.

Assess the ICU nurses' perception of VTE prevention practices for ICU patients in Southern Palestinian governmental and nongovernmental hospitals in the West Bank.

Evaluate the related issues that affect nurses' knowledge and perception of practice to prevent VTE among ICU patients in Southern West Bank governmental and nongovernmental hospitals.

1.5 Research questions

1. What is the level of ICU nurses' knowledge regarding the prevention of venous thromboembolism at governmental and non-governmental hospitals in the Southern West Bank?

- 2. What is the level of ICU nurses' perception of their practices regarding venous thromboembolism prevention at governmental and non-governmental hospitals in the Southern West Bank?
- 3. What factors influence nurses' knowledge and perceptions of practice regarding VTE prevention for ICU patients in governmental and non-governmental hospitals in the West Bank?
- 4. Is there an association between ICU nurses' knowledge and practices regarding VTE prevention and demographic factors in governmental and non-governmental hospitals in the Southern West Bank?

1.6 Study variables

1.6.1 Dependent Variable

Nurses' Knowledge, Perception of Practice regarding Venous Thromboembolism (VTE) Prevention in ICU Departments.

1.6.2 Independent Variables

Demographic variables (Age, gender, years of experience, educational background, training received on VTE prevention), availability of VTE prevention protocols/guidelines, nurse-patient ratio.

1.7 Conceptual Framework

The conceptual framework was defined and scientifically organized to provide an interpretation of information. This research framework was used to discover the nurses' knowledge, perceptions of practice, and related factors regarding venous thromboembolism prevention in ICU departments.



Figure 1. 1: Conceptual Framework

1.8 Conceptual and Operational Definitions

Main Variables (conceptual)

Nurses' knowledge: refers to the collective understanding, information, and expertise possessed by nursing professionals, encompassing a diverse range of theoretical, practical, and experiential insights essential for delivering high-quality patient care (Polit, & Beck, 2017).

Perception of Practice: Nurses' Perception of Practice refers to the subjective understanding, interpretation, and awareness of nursing professionals regarding their clinical activities, roles, and responsibilities within the healthcare setting. It encompasses the cognitive and emotional aspects of how nurses view their professional engagement, clinical decision-making, and interactions with patients, colleagues, and the broader healthcare environment. This concept recognizes the individualized nature of nurses' experiences, attitudes, and beliefs that shape their perception of the nursing profession and influence their daily practice. (Rodríguez-Pérez et al., 2022).

Related Factors: These are additional elements that might influence nurses' knowledge and perception of practice. These could include education level, years of experience, availability of resources, hospital policies, training programs, and cultural factors (Abdelaliem & Alsenany, 2022).

Operationally:

Knowledge of VTE Prevention

Variable: Nurses' knowledge of venous thromboembolism (VTE) prevention.

Operational Definition: This variable is assessed using a set of knowledge questions in the anonymous electronic questionnaire. These questions are designed to evaluate the participants' understanding of various aspects of VTE, including its causes, risk factors, and preventive measures. Each question requires respondents to select one of the following options: "I don't know," "No," or "Yes." This format allows for a clear assessment of the nurses' theoretical knowledge about VTE and its prevention.

Instrument: The knowledge section of the questionnaire includes statements related to VTE, such as the relationship between DVT and risk factors, the effectiveness of preventive measures, and the impact of various conditions on VTE risk. The responses to these questions will provide insights into the extent of the nurses' knowledge and identify areas where further education may be needed.

Perception of VTE Prevention Practices

Variable: Nurses' perception of VTE prevention practices.

Operational Definition: This variable is evaluated by assessing how often nurses engage in specific VTE prevention practices. The perception of practice is measured using a set of items in the questionnaire where respondents rate their frequency of performing various prevention activities. The response options are "Never," "Sometime," "Neutral," "Often," and "Always."

Instrument: The perception of practice section includes questions about actions such as providing information to patients, encouraging exercises, administering anticoagulants, and educating patients on fluid intake and injury prevention. The frequency with which these practices are implemented will help determine the alignment between nurses' perceptions and actual practices.

Related Factors Affecting VTE Prevention

Variable: Factors related to VTE prevention practices.

Operational Definition: This variable encompasses various elements that might influence VTE prevention practices, including continuous education, protocol availability, and personal experience. It is assessed through demographic and background questions in the questionnaire, such as the presence of a continuous learning committee, familiarity with VTE protocols, and prior participation in relevant workshops.

Instrument: The related factors section includes questions about hospital protocols for VTE, participation in educational workshops, and access to ongoing training. These questions provide context for understanding how external factors and personal experiences may impact the nurses' ability to effectively prevent VTE.

1.9 Summary

Chapter one introduces the research study, focusing on addressing nurses' knowledge and perception of practice regarding Venous Thromboembolism (VTE) prevention in Intensive Care Units (ICUs) within Southern Palestinian hospitals. The chapter emphasizes the life-threatening nature of VTE, its prevalence, and the critical role of nurses in preventing its occurrence. The problem statement highlights the gap in understanding and implementing preventive measures among ICU nurses, citing studies from various regions, and emphasizes the need for more research in the Palestinian context. The significance of the study is underscored in addressing these knowledge gaps, designing tailored interventions, and contributing to the literature. The objectives, research questions, and hypotheses are clearly outlined, focusing on assessing nurses' knowledge, perception of practices, and related factors. The conceptual framework visually represents the research components, while operational and conceptual definitions clarify vital terms. Overall, Chapter One sets the stage for the comprehensive investigation into ICU nurses' understanding and practices related to VTE prevention in Southern Palestinian hospitals.

Chapter Two: Literature Review

2.1 Introduction

In this chapter, the researcher reviewed the previous related studies about venous thromboembolism (VTE) that are related to perception of nurses, knowledge, practice, prevention, and high- risk group, prevalence and incidence and VTE protocols and guidelines. The researcher searched multiple databases, like EBSCO, PubMed, and Google Scholar, between 2017 and 2024 to gather up-to-date information related this topic.

Preventing venous thromboembolism (VTE) in intensive care units (ICUs) is essential for patient care due to the serious risks linked to deep vein thrombosis (DVT) and pulmonary embolism (PE). VTE continues to be a major issue, especially in critically ill patients, who face an increased risk. This chapter examines the existing literature to explore nurses' knowledge, perceptions of practice, and related factors concerning VTE prevention in the ICU department. First, researcher started with providing an overview of the pathophysiology of VTE, emphasizing the importance of preventive measures. Mechanical prevention, pharmacological prophylaxis, and the Triad of Virchow are identified as crucial elements in the prevention of VTE. Following this, the researcher reviewed existing literature regarding the prevalence, incidence, and risk factors associated with VTE in critically ill patients, highlighting the necessity for customized prophylactic strategies. Subsequently, the focus shifts to the knowledge of nurses in ICU settings regarding VTE prevention, as well as their role in mitigating the risks associated with this condition. Assessments of nurses' knowledge, attitudes, and practices are explored, highlighting the gaps and areas for improvement. In conclusion, I addressed educational interventions and resources designed to improve nurses' readiness in managing VTE, emphasizing the significance of ongoing education and institutional guidelines. By conducting a thorough review, this chapter seeks to identify gaps in the existing literature and stresses the necessity of continuous learning and focused interventions. It serves as a basis for further investigation into nurses' roles and the creation of strategies to bolster VTE prevention in critical care environments.

2.2 Deep vein thrombosis (DVT) and Pulmonary embolism (PE)

Deep vein thromboembolism refers to the development or existence of a blood clot within the deep veins, predominantly occurring in the lower limbs and occasionally the upper limbs can be affected in various ways. When blood clot blocks the pulmonary artery its branches, this problem is known as PE. Furthermore, this blockage can also result from fat or air. Typically, these clots in the pulmonary arteries originate from embolization of clots formed in the deep veins of the lower limbs. (Badireddy, et al, 2023). Nevertheless, several strategies have been identified to either prevent this condition or mitigate its severity.

2.3 The Prevention of Venous Thromboembolism

Strategies to prevent venous thromboembolism include basic prevention methods, mechanical interventions, and pharmacological approaches.

Among these, mechanical prevention stands out as a fundamental and crucial approach to preventing deep vein thrombosis (DVT). This approach utilizes various auxiliary tools and devices to simulate the compression applied to the veins in the lower limbs during physical activities, effectively mimicking the contractions of the leg or plantar muscles. This simulation promotes venous reflux in the lower limbs, effectively mitigating stasis and reducing the occurrence of DVT and venous thrombosis, Mechanical prevention serves as a vital complement to drug-based prevention, offering an alternative avenue in specific situations (Xiaoxiao, et al, 2023). Eck et al. (2021) conducted research to examine prognostic variables, prevalence, and effects associated with VTE in patients in critical condition using modern prophylaxis for thrombosis. The study revealed that, in the three months leading up to admission to the critical care unit, the prevalence of any VTE was 3.6%. Out of the 2,166 patients analyzed, 2.2% experienced PE or LDVT, while 1.8% had non-leg deep vein thrombosis (NLDVT) during or after their ICU stay. Notably, NLDVT was connected with use of Central Venous Catheters and Infections, whereas renal replacement therapy was associated with PE-LDVT (Eck et al., 2021). Overall, these results show the importance of mechanical prevention in combination with drug-based prevention to effectively reduce the risk of VTE in different clinical scenarios.

Respiratory failure and a prior history of VTE were found to be associated with PE-LDVT. Furthermore, PE-LDVT correlated with an increased 90-day mortality rate,

in contrast to NLDVT. The study highlights the prevalence of thrombotic events in high-risk clients, prior to and during their hospitalization days, emphasizing the necessity for ongoing research aimed at enhancing risk assessment and VTE prevention strategies within this patient group. One of the strategies suggested by Badireddy and Mudipalli (2023) is discussing the imperative role of prophylaxis in preventing its severe consequences, including life-threatening pulmonary embolism. They clarify the Triad of Virchow—venous stasis, endothelial injury, and hypercoagulability—as essential contributors to the development of DVT. Their study concentrated on hospitalized clients during hospitalization days, who are at high Risk for DVT, revealing that only about half of these individuals currently receive prophylactic treatment. The discussion includes preventive strategies targeting venous stasis through mechanical methods and decreasing hypercoagulability with pharmacological interventions.

Moreover, Badireddy and Mudipalli provides more insights into DVT prophylaxis in specific populations, including cancer patients, ambulatory cancer patients, longdistance travelers, and those undergoing orthopedic and non-orthopedic surgeries. In addition, one of the significant points that the authors stress importance of interprofessional teamwork, involving clinicians, surgeons, nursing staff, and pharmacists, in implementing effective prophylaxis strategies and ultimately enhancing patient outcomes. {Onwuzo, 2023 #38} emphasizes the vital role of protective strategies for VTE in inpatients, particularly among surgical patients. The study discusses both pharmacological approaches and mechanical methods as key strategies. Pharmacological interventions, such as low-molecular-weight heparins (LMWH), unfractionated heparin (UFH), and direct oral anticoagulants (DOACs), have proven effective in minimizing the risk of VTE. Additionally, mechanical methods, including Graded Compression Stockings and Intermittent Pneumatic Compression devices, are highlighted as significant contributors to VTE prevention. Also, one of the recommended strategies to prevent it is chemoprophylaxis. Chemoprophylaxis is extensively studied; the literature identifies research focused on improving compliance with non-pharmacological interventions. Studies underscore the significance of addressing patient barriers to VTE prevention, such as discomfort associated with graduated compression stockings (GCS). Solutions like knee-high GCS are suggested to enhance comfort (Sajid, 2016). Concerns regarding the misuse or underuse of chemoprophylaxis due to patient refusal, as well as the impact of nursing knowledge on preventing missed doses, are also examined (Kreutzer et al., 2019). Furthermore, gaps in the literature are noted, attributed to biases, variations in studied populations, and a lack of consensus on chemoprophylaxis techniques.

Individualized approaches taking into account patient risk factors is emphasized, particularly for conditions like cancer or critical illness. Additionally, gaps exist regarding the discussion of patients' quality of life preferences, which can affect satisfaction and compliance with VTE prophylaxis (Kakkos et al., 2016; Wang et al., 2019). Literature highlights necessity for addressing these gaps through further research and customized educational strategies.

Studies indicate that combining interventions, such as intermittent pneumatic compression with LMWH, may lead to better outcomes, especially among critically ill patients (Wan et al., 2015). It is also emphasized that assessing patient functional status and goals of care is crucial to guiding treatment decisions (Zhang et al., 2018).

2.4 Studies Assessing Prevalence, Incidence, and Risk Factors

Numerous studies have been conducted to search prevalence, contributing factors for VTE in ICU inpatients. One investigation by Beitland et al. (2019) showed that out of 70 inpatients who took thromboprophylaxis, 27% were found to have VTE, 21% suffered from DVT and 6% had PE. Recognized factors for VTE included malignancy, abdominal surgery, and a Simplified Acute Physiology Score (SAPS II) of less than 41. Notably, the presence of VTE did not appear to affect patient outcomes, as ICU length of stay and mortality rates did not differ for patients with and without VTE.

A meta-analysis encompassing 42 studies with 27,344 patients corroborated these findings, reporting a combined VTE prevalence of 10.0% among ICU patients. The main Risk factors included thromboprophylaxis strategies, SAPS II scores, age, malignancy, sex, spinal cord injury, and injury severity score (ISS). These results highlight the need for increased attention to high-risk groups for VTE in ICU environments (Gao et al., 2022).

Similarly, research by Miri et al. (2017) at Imam Hossein Hospital in Tehran, Iran, assessed the incidence of DVT among medical and surgical ICU patients. They discovered a strong correlation between longer ICU stays and the development of DVT. The prevalence of DVT in their research was lower than in some other populations, which may be attributed to the relatively younger demographic and heightened physician awareness. The researchers emphasized the importance of DVT prophylaxis, particularly for patients with extended ICU stays and advanced age. Overall, these studies highlight the necessity of recognizing VTE risk factors and implementing suitable prophylactic measures to prevent VTE in ICU patients.

2.5 Assessment of Clinical Practice Adherence to Guidelines

Several studies focus on established tools to help healthcare specialists to choose the proper VTE prophylactic guideline, such as the Padua Prediction Score (PPS) and the Caprini risk assessment model (RAM). For instance, research conducted in China showed that the Caprini RAM outperformed the PPS for predicting VTE cases among patients in a general hospital setting (Zhou et al., 2018). The Caprini RAM, already utilized in research, offers comprehensive guidelines for VTE prophylaxis tailored to patients' risk levels (Caprini, 2020).

Some studies differentiate between DVT and PE and advocate for combined strategies to tackle the various factors contributing to VTE. Approaches such as intermittent pneumatic compression (IPC) and low-molecular-weight heparin (LMWH) are recommended, highlighting necessity for a multifaceted strategy for enhancing DVT prevention (Kakkos et al., 2016).

Additionally, Abukhalil et al. (2023) examined the alignment of clinical practices to well-known VTE prophylaxis strategies in a Palestinian Teaching Hospital. Their sample was 408 inpatients, and the researchers found that only 54.4% received thromboprophylaxis, with 27.5% identified as high-risk for VTE. Although 60.3% of entitled high-risk patients took appropriate prophylaxis, a significant 80.18% of patients overall were given unfitting prophylactic strategy. The findings highlight the crucial need to align clinical practices to improve prophylaxis management and therapy selection in clinical environments, emphasizing the necessity for enhanced VTE prevention strategies for hospitalized medically ill patients.

2.6 The Knowledge of Nurses & their Role in ICU in Preventing

Venous Thromboembolism

Given the critical importance of preventing and managing VTE in the ICU, it is essential for medical staff to possess adequate knowledge to address these cases effectively. Numerous studies highlight the significance of improving nurses' understanding of VTE prevention in intensive care settings. For instance, a comprehensive national survey conducted in China evaluated nurses' knowledge regarding VTE prevention (Ma, 2018).

The survey encompassed various dimensions, including foundational knowledge, risk primary prophylaxis, physical preventive measures, assessment, and pharmacological strategies. Involving 5,218 nurses from AAA-grade hospitals, the findings revealed an average correct response rate of 59.90%. The results indicated that nurses exhibited a better understanding of thromboprophylaxis when they had higher educational attainment, significant experience, participation in continuous education programs, employment in intensive care units, or held leadership roles. While respondents demonstrated satisfactory results in primary prophylaxis, essential knowledge, and risk assessment, there was a significant gap in understanding both physical and pharmacological prophylaxis. The research highlighted the need for continuing learning for nurses, especially to address gaps related to VTE prevention strategies. The results Suggest the necessity for thorough educational programs. targeting specific areas of deficiency to enhance nurses' understanding of thromboprophylaxis. The findings contribute valuable insights for improving clinical nursing practices related to VTE management.

Additionally, Yan (2020) examined the understanding, attitudes, and practices of 1,121 registered nurses at a hospital affiliated with a Chinese university regarding VTE prophylaxis. The findings revealed that the overall knowledge level among nurses was inadequate, with only 55.43% providing completely correct responses. Various factors, including the department, educational background, professional rank, and VTE-related experience, affected these outcomes. Nurses in the ICU department had the highest Knowledge Scores, and those in pediatrics had the lowest. While nurses normally held a Positive Attitude for VTE prophylactic strategies, they expressed concerns about financial repercussions, increased workloads, and potential difficulties in implementing preventive strategies. The research also indicated that only 56.19% of nurses displayed positive behaviors, with nearly half unable to advise patients on VTE. Knowledge scores were linked to factors such as nursing experience, departmental affiliation, and length of employment.

The research highlights the necessity for focused educational initiatives and structured training programs to improve nurses' understanding and overcome obstacles

to effective VTE prophylaxis practices in clinical environments. Furthermore, Yohannes (2022) conducted an assessment in Northwest Ethiopia to evaluate nurses' knowledge, practices, and the aspects related to prevention of DVT. The findings revealed that 55.6% of nurses exhibited good knowledge, while 48.8% demonstrated good practice in preventing DVT. Factors such as working in medical wards, higher educational qualifications (BSc or master's degree), formal training on DVT prevention, and longer work experience (≥ 11 years) were positively associated with better knowledge. Moreover, nurses with good knowledge and those with ≥ 11 years of experience were more likely to implement effective practices for DVT prevention. The research underscores the impact of education besides a supportive environment to improve nurses' knowledge and practices concerning DVT avoidance. Therefore, some scholars found the significance of assessing nurses' knowledge and their vital role in preventing this issue. Haut, E. R. et al. (2015) outlines a research initiative to address the public health impact of VTE in the USA. The aim of their research was to enhance nurses' understanding about the advantages, risks associated with VTE prophylaxis and to reduce the instances of non-administration of prescribed prophylactic measures. The main hypothesis suggests that nurse participants who undergo targeted educational interventions will show an increase in the administration of the prescribed VTE prophylaxis. This research utilizes a cluster-randomized trial design, comparing an interactive, dynamic, learner-centered education module based on real-life scenarios with a traditional, linear PowerPoint presentation. The interventions are directed at nurses assigned permanently to specific hospital units. Key outcomes include the rate of unadministered doses of pharmacological VTE prophylaxis, nurses' perceived relevance and satisfaction with the educational modules, and patient-level outcomes concerning the incidence of VTE.

Finally, one of the suggested strategies that scholars suggest is e-learning intervention. The study aimed to understand the mechanisms through which these interventions work and the contextual factors that influence their effectiveness. The authors analyzed various studies and identified several key findings. Firstly, they found that e-learning interventions can improve nurses' knowledge and awareness of VTE prevention strategies. These interventions often include interactive modules, case studies, and quizzes to enhance learning outcomes. Secondly, the review revealed that e-learning interventions can positively impact nurses' attitudes and beliefs towards VTE

prevention. By offering evidence-based information and encouraging critical thinking, these interventions can assist nurses in recognizing the significance of VTE prevention and inspire them to incorporate preventive strategies into their practice. Additionally, the authors underscored the necessity of organizational support and resources for the successful implementation of e-learning initiatives. Key factors such as access to computers, a reliable internet connection, and allocated time for learning were identified as essential for enabling nurses to engage meaningfully with these interventions. This realist review overall indicates that e-learning initiatives hold promise for enhancing nursing Knowledge, Attitudes, and Practices related to VTE avoidance among inpatients. Nonetheless, the authors stress the importance of customized interventions that take into account the unique context and requirements of both nurses and healthcare organizations. (Dyke et al, 2023)

2.7 Nurses Knowledge & Education Assessment

Nurses are integral to healthcare, and their expertise and commitment are vital for the well-being of patients, particularly in the ICU. Al-Mugheed (2023) conducted a review to evaluate different facets of nurses' involvement in managing venous thromboembolism (VTE). Although most nurses displayed a commendable level of knowledge about VTE, the review revealed a significant deficiency in their understanding of risk assessment practices. This deficiency was particularly concerning as proper risk assessment is pivotal in preventing VTE complications. Moreover, the review revealed suboptimal practices related to VTE prophylaxis among nurses, indicating potential shortcomings in the implementation of preventive measures. The findings also brought to light the existence of low self-efficacy levels among nurses, suggesting a need for interventions to boost their confidence in handling VTE-related scenarios. Additionally, the review highlighted diverse attitudes and beliefs among nurses, emphasizing the importance of tailored educational programs to address specific misconceptions. The researchers recommended the implementation of continuous educational initiatives and the establishment of institutional protocols to standardize VTE practices. These measures, they argued, would contribute to enhancing nurses' overall preparedness in VTE management and subsequently improve patient outcomes. The study, therefore, not only sheds light on the existing challenges in nurses' VTErelated knowledge and practices but also proposes concrete strategies for addressing these issues in the healthcare setting. Salman (2022) highlighted the significance of evaluating ICU nurses' knowledge regarding venous thromboembolism (VTE) guidelines, examining the facilitators and barriers to guideline implementation, and utilizing the Caprini risk assessment model (RAM) in order to find inpatients at risk for VTE. He stressed the need for ongoing training for ICU nurses and noted the lack of policy utilization in the studied hospitals. The Caprini score was identified as a significant predictor of complications, with older patient age correlating with a higher likelihood of adverse outcomes. These findings emphasize the need for targeted educational initiatives and the potential advantages of incorporating risk assessment models in ICUs to improve VTE prevention strategies.

Furthermore, nursing education plays a crucial role in overcoming barriers to implementing VTE prophylaxis. Focus group interviews have explored nurses' misconceptions and uncertainties, highlighting the importance of real-time alerts and education bundles to increase the usage of prophylactic measures (Kreutzer et al., 2019; Haut et al., 2018). Additional studies have identified inadequate knowledge among nursing staff regarding VTE prophylaxis, reinforcing the need for continuous education to boost compliance and advance inpatient results (Zhou et al., 2019; Dong et al., 2020).

Moreover, the literature points out the existing gap in nursing training and knowledge concerning VTE prophylactic measures. It emphasizes the responsibility of nurses to bridge the gaps concerning inpatients' conditions and physicians' knowledge, recognizing the vital role of direct care nurses in patient advocacy (Ma et al., 2018). Research indicates that ongoing nursing education can significantly enhance nurses' knowledge and implementation of appropriate VTE prophylaxis, ultimately contributing to improved patient care and reduced healthcare costs (Ma et al., 2018; Nana et al., 2020).

2.8 Conclusion

This review of literature offers thorough examination of diverse strategies implemented for avoidance of VTE within ICUs. It highlights various preventive measures, including both mechanical and pharmacological approaches, while emphasizing the necessity of tailored strategies for distinct patient populations. The review delves into prevalence, incidence, and risk factors associated with VTE, illuminating complexities of this condition for critically ill patients. Moreover, it identifies notable gaps in the current literature, particularly concerning patients' quality of life preferences and the demand for customized interventions. Knowledge and Practices by nurses in ICU settings are also recognized as vital components, with findings indicating deficiencies in their understanding and adherence to established guidelines. Continuous education for nurses is identified as a crucial element in addressing these gaps and enhancing patient outcomes. Overall, the literature sets the groundwork for the subsequent chapters, underscoring the significance of a comprehensive and targeted approach to VTE prevention.

Chapter Three: Methodology

3.1 Introduction

The study methodology for nurses' knowledge, practice perception, and relevant factors connected to VTE prevention is outlined in this chapter. By using a questionnaire, data will be gathered. A quantitative, cross-sectional, non-observational study design was used to evaluate nurses' perceptions of practice, knowledge, and related factors connected to VTE prevention in ICU departments of southern Palestinian hospitals (both governmental and non-governmental) in the West Bank. This chapter also included definitions for the study population, design, and setting, as well as sample standards, data gathering procedures, and the strategy and outcomes for statistical analysis.

3.2 Research Design

The study used a quantitative methodology with a descriptive, cross-sectional design. The quantitative approach allowed for systematic measurement and analysis of the data, providing an objective assessment of the variables involved. The descriptive design aimed to document the current state of VTE prevention practices, offering a detailed snapshot of the existing conditions without manipulating variables. The cross-sectional design involved collecting data from ICU nurses at a single point in time to examine the relationships between different variables, such as knowledge and practice. Data were gathered through a self-administered electronic questionnaire and analyzed using descriptive statistics to identify trends and gaps in VTE prevention practices. This design effectively captures the current practices and informs potential improvements in VTE prevention strategies.

3.3 Study Setting

All Southern Palestinian hospitals in the West Bank, both governmental and nongovernmental, were included in the study. (Table1).

Number	Hospital name/Location	Number of	Number of	Type of hospital
		nurses	beds in ICU	
1.	Beit Jala Hospital – Bethlehem	25	9	Governmental
2.	Al-Yamamah Hospital -	6	2	Non- Governmental
	Bethlehem			
3.	Arab Society Hospital –	15	5	Non- Governmental
	Bethlehem			
4.	Alia Hospital – Hebron	35	15	Governmental
5	D. Handist Habara	10	4	C
5.	Dura Hospital – Hebron	12	4	Governmental
6.	Al-Mizan Hospital – Hebron	18	11	Non- Governmental
7	Vatta Hoonital Habron	0	2	Carrommantal
7.	retta Hospital – Hebron	0	3	Governmentar
8.	President Mahmoud abbas	12	5	Governmental
	Hospital – Hebron			
Total	8 Hospitals	131	54 Bed	5 Gov /3 non-Gov
		Nurse		

Table 3.1: Study setting and population

3.4 Study Population

Study population includes all 131 nurses who are working in all intensive care departments in all Southern Palestinian governmental and non-governmental hospitals with academic qualification of bachelorette, diploma, MSN degrees with different job title.

3.5 Study Sample

The study targeted all nurses who work in ICU departments of the southern Palestinian governmental & non-governmental hospitals in West Bank area with the total population sample (Census Sample).

Is sample size of 131 nurses is adequately represents the entire population of ICU nurses in the region??

Using a formula for estimating a representative sample size. One common approach is to use Cochran's formula:

$$n = \frac{N}{1 + N(e)^2}$$

Where:

n = sample size

N = population size (131in this case)

e = margin of error (a value you choose based on desired confidence level, typically between 0.03 and 0.05)

For example, if we choose a margin of error of 0.05 (5%), the formula would be:

$$n = \frac{131}{1 + 131(0.05)^2}$$

n≈98.681

Therefore, I need approximately 98 nurses to have a representative sample with a margin of error of 5%.

3.5.1 Inclusion and Exclusion Criteria

The study included all nurses working in ICU units of Southern Palestinian (GOV & Non-GOV) hospitals in the West Bank, specifically in the Hebron and Bethlehem areas, during the study period with academic qualification of bachelorette, diploma, MSN degrees with different job title.

While it excluded nursing directors, administrators not involved in direct patient care, as well as nurses on annual or maternity leave, sick leave, part-time nurses, and those who declined to participate.

3.6 Instrument of the Study

By using google electronic questionnaire form, data was collected after obtaining the approval of Ministry of Health and Arab American University Ethical Boards. Also, the questionnaire was written and sent to the nurses with an English language.

The study utilized an electronic google form questionnaire divided into three distinct sections, each designed to assess different aspects of ICU nurses' knowledge and practice perceptions regarding VTE prevention.

1. Demographic Section:

Content: This section comprises 10 questions aimed at gathering demographic information, including age, gender, marital status, educational level, and years of experience working in intensive care units.

Purpose: It provides context for understanding the background of participants and potential factors influencing their knowledge and practices.

2. Knowledge Section:

Content: This section consists of 34 questions with three response options: "True," "False," and "I don't know." These questions are designed to evaluate the nurses' knowledge about various aspects of VTE prevention, including risk factors, preventive measures, and general understanding of VTE.

Scoring: Each correct answer is assigned a score of 1 point, while incorrect answers and "I don't know" responses receive 0 points. The total score for this section ranges from 0 to 34.

Score Interpretation: Higher scores indicate a better understanding of VTE prevention. The total score is used to categorize participants into different levels of knowledge: low (0-11), moderate (12-22), and high (23-34).

3. Perception of Practice Section:

Content: This section includes 13 questions using a Likert scale with three points: "Always" (2 points), "Sometimes" (1 point), and "Never" (0 points). These questions gauge how frequently nurses engage in practices related to VTE prevention, such as patient education and risk assessment.

Scoring: The total score for this section ranges from 0 to 26. Scores are summed to determine the frequency of VTE prevention practices.

Score Interpretation: Higher scores reflect more frequent engagement in VTE prevention practices. The total score can be categorized as low (0-8), moderate (9-17), and high (18-26) to indicate the perceived frequency of preventive practices.

For detailed descriptions and scoring methods, refer to:

Mr. Senay Yohannes's published article titled "Deep Venous Thrombosis (DVT) Prevention in Amhara Region Comprehensive Specialized Hospitals, Northwest Ethiopia, 2021: A Cross-Sectional Study."

3.7 Validity and Reliability

In order to improve the study's validity and reliability, the researcher utilized a questionnaire adapted from Mr. Senay Yohannes's published article titled "Deep Venous Thrombosis (DVT) Prevention in Amhara Region Comprehensive Specialized Hospitals, Northwest Ethiopia, 2021: A Cross-Sectional Study." This questionnaire was originally designed to investigate nurses' knowledge, perceived practice, and associated factors. This instrument is relevant to research questions and objectives of this study.

The study questioner was adapted from previous study which has a free open access to use, also the questionnaire was forwarded to four experts at the Faculty of Nursing at Arab American University to evaluate its validity " I would like to request the opinion of your expert panel regarding the validity of the instrument used in my study. Your insights on its effectiveness and appropriateness would be greatly appreciated". They advise me to use the same questionnaire with minor editing.

3.8 Reliability & Pilot Study

Pilot study was conducted in ICU departments in Palestine Medical Complex in Ramallah with a sample of 13 nurses (10% of my sample which is 131 nurses) before starting the actual study. The pilot study sample was convenience among thirteen nurses especially the nurses who work in ICU departments. The pilot study done to identify expected problems before the data collection procedure, and the appropriateness of the items in the questionnaire. This step revealed the clarity of the questionnaire's words form the participants' viewpoint. All participants declare that questions clear and easily understood. Reliability test Cronbach's alpha performed for knowledge questions and the result was 0.853, and for practice questions Cronbach's alpha conducted and its results was 0.784 which indicates that questionnaire were internally consistent.

3.9 Data Collection Process and analysis

The data were collected from all governmental and non-governmental hospitals, especially from the nurses who work in intensive care departments. Data were collected from 15, FEB 2024 to 30, MAY 2024.

The data collected from five gov & three non-gov hospitals, researcher met all nursing director and explain the process of data collection, questionnaire variables and the aim of the study. Then questionnaire as electronic link was sent to the nursing directors who then disseminated it to ICU head nurses to keep in contact between researcher and participants. Researcher informed the nursing directors and head nurses to call him when they faced any problem or obstacle.

Statistical plan

To assess the significant differences between demographic characteristics related to general knowledge and practice, the data were analyzed using the independent sample t-test and ANOVA techniques. The analysis was conducted using SPSS version 23.0. A significance level of P<0.05 was employed to determine the statistical significance of the results.

Prior to performing the tests, the normality of the data was checked using the Shapiro-Wilk test to ensure the appropriateness of parametric testing. In cases where the assumption of normality was violated, non-parametric alternatives were considered. Missing data were addressed by implementing appropriate imputation methods or by conducting a sensitivity analysis to evaluate their impact on the results. Additionally, Levene's test was used to assess the homogeneity of variances before applying the ANOVA technique. Also, Reliability test Cronbach's alpha performed for knowledge questions and the result was 0.853, and for practice questions Cronbach's alpha conducted and its results was 0.784 which indicates that questionnaire were internally consistent.

3.10 Ethical Consideration

Permission was obtained from the IRB committee in the AAUP and Palestinian Ministry of Health (MOH) and Non-governmental hospitals included in the study.

Then, the researcher obtained a verbal approval from the nursing director of each hospital, and obtaining implied consent from all participating nurses, ensuring confidentiality of their data, and emphasizing voluntary participation without coercion. Participants were informed of their right to either participate or withdraw from the study at any time, and they can refrain from answering any question. Names are not required during participation in the study, the information obtained in this study is used only for

research purposes and nobody can reach the information of any participant except researcher and adviser.

Chapter Four: Results

4.1 Overview

This research was conducted to assess level of knowledge between ICU nurses and their perception regarding VTE prevention for ICU patients in Southern Palestinian governmental and nongovernmental hospitals in the West Bank. And to evaluate the related issues that influence knowledge of nurses and their perception of practice toward VTE prevention for ICU patients.

4.2 Participant's characteristics

Table 1 illustrates the demographic characteristics for nurses participated in this research. The bulk of them were male as their percentage was 58.8%. In terms of age distribution, 38.16% were between 26-30 years old, and 16% their ages between 36-40 years old. The majority of nurses (70.5%), work in governmental hospitals in the South of West Bank, while 28.8% of them work in private hospitals. 58% of nurses have a bachelor degree on nursing, 20.6% have a diploma degree and 21.37% have a master degree, 80.67% of nurses have worked for no more than ten years of experience, while 18.32% have worked for more than 11 years.

Variables		Frequency	Percentage
Age	20-25	29	22.13%
	26-30	50	38.16%
	31-35	32	23.66%
	36-40	21	16%
Sex	Male	77	58.8%
	Female	54	41.2%
Education	Diploma	27	20.6%
	BA	76	58%
	Master	28	<u>21.37%</u>
Work place	Private	38	28.8%
	Governmental	93	70.5%
Read articles	Yes	51	38.93%

Table 4. 1: Demographic characteristics of nurses (N =131)

	No	80	61.06%
Work Years	1-10 years	107	81.67%
	11-20 years	24	18.32%

Testing research questions

<u>Question number one:</u> what is the level of Knowledge among ICU nurse's about VTE Prevention for ICU patients in Southern Palestinian governmental and nongovernmental hospitals in the West Bank?

table 2 explained the overall score of Knowledge of responded nurses, the total number of nurses who had a Good Knowledge were 20 (15.3%), whereas nurses with poor Knowledge were 111 (84.7%).

Table 4. 2: knowledge Score About Deep V	in Thrombosis (DVT) Among nurses. (N	J=131)
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				Cumulative
		Frequency	Valid Percent	Percent
Valid	Good Knowledge	20	15.3	15.3
	Poor Knowledge	111	84.7	100.0
	Total	131	100.0	
Missing	System	0		

<u>Question Two:</u> what is the level of Perception about practice Among ICU Nurses regarding VTE Prevention for ICU patients in Southern Palestinian governmental and nongovernmental hospitals in the West Bank?

Table 3 illustrate the overall practice scores of responded nurses, the total number of nurses who had a good practice were 91 (69.5%), while the number of nurses with poor practice were 40 (30.5%).

		Frequency	Valid Percent	Cumulative Percent
Valid	Good practice	91	69.5	69.5
	Poor practice	40	30.5	100.0
	Total	131	100.0	
Missing	System	0		

Table 4. 3: Total practice score regrading deep vein thrombosis (DVT) among nurses. (N=131)

<u>Research question three:</u> What factors influence nurses' knowledge and perception of practice toward VTE prevention for ICU patients in Southern Palestinian governmental and nongovernmental hospitals in the West Bank?

Table 4 demonstrates the Relation among the nurses' overall Knowledge score and their sociodemographic characteristics, there was No Statistically Significant difference in the knowledge about VTE and its Prevention among sociodemographic factors such as age, gender, and educational attainment as the P value >0.05, except the number of work years and reading articles about VTE.

sociodemographic		Mean	P value
characteristic			
Age group	20-25	1.34±0.995	0.945
	26-30		0.175
	31-35		0.534
	36-40		0.974
Gender	Male	18.88±2.86	0.140
	Female	17.90±4.08	
Level of education	Diploma	19.42±2.72	0.324
	BA	18.93±2.86	
	Master	16.22±4.58	
Work Years	1-10 years	18.27± 3.64	0.047
	11-20 years	19.41± 2.16	

 Table 4. 4: Comparison of mean knowledge scores based on nurses' Demographic characteristics. (N=131)

Work place	Governmental	18.41±3.49	0.746
	Private	18.63±3.34	
Read literature about	Yes	17.35±4.01	0.005
DVT	No	19.20±2.81	

Table 5 demonstrates the frequencies and percentages of nurses' responses to the 13 questions assessing their practices for DVT prevention. Among the practices evaluated, the question regarding "administering anticoagulants as preventive in clinic" received the highest frequency, with 82 nurses (62.59%) indicating that they "always" perform this practice. In contrast, the question "educating patients and their families on sufficient fluid intake" was the least frequently reported practice, with only 22 nurses (16.79%) selecting "always." These results highlight a disparity in the frequency of preventive practices among ICU nurses, suggesting areas where additional training or intervention may be needed.

	Perception of Practice	Always		Sometimes		Never	
		N	%	N	%	N	%
1.	Providing information to patients and/or relatives about risks and prevention of VTE.	40	30.53%	54	41.22%	37	28.24%
2.	Encouraging patients to do foot and leg exercises by themselves or relatives help if patients are unable to do so.	36	27.48%	63	25.19%	32	47.32%
3.	Encouraging early Ambulation of surgical patients	48	36.64%	50	38.16%	33	25.19%
4.	Assessing the VTE risks of patients regularly.	71	54.19%	53	40.45	7	5.34%
5.	Giving Anticoagulants as prophylactic measure	82	62.59%	34	25.95%	29	22.13%

6.	monitoring the Side Effects for	44	33.58%	39	29.77%	48	36.64%
	Anticoagulants						
7.	Patients Education on	29	22.13%	36	27.48%	66	50.38%
	Anticoagulants						
8.	Teach patients to avoid injury.	80	61.83%	35	25.95%	16	12.21%
9.	Encourage patients to elevate legs.	75	57.25%	39	29.77%	17	12.97%
10.	Educating the patients and their	22	16.79%	46	35.11%	63	48.09%
	family on sufficient fluid intake.						

Table 6 shows the relationship between the overall nursing practice scores and sociodemographic characteristics. It indicates that there was no significant variation in perceived practices regarding VTE prevention based on factors such as age, gender, and educational attainment (P value > 0.05). However, variations were observed in relation to years of work experience, workplace, and reading articles about DVT.

 Table 4. 6: Comparison of mean practice scores based on nurses' Demographic characteristics. (N=131)

sociodemographic		Mean	P value
characteristic			
Age group	20-25		.071
	26-30	-	.620
	31-35	-	.461
	36-40	-	0.319
Gender	Male	3.467±3.38	0.891
	Female	3.55±3.96	
Level of education	Diploma	BA	0.901
		Master	0.108
	BA	Diploma	0.901
		Master	0.067
Work Years	1-10 years	3.149±3.56	0.020
	11-20 years	5.083±3.51	
Work place	Governmental	3.860±2.953	0.04
	Private	2.631±3.818	

Read literature about	Yes	2.333±3.121	0.002
DVT			
	No	4.25±3.73	

<u>Research questions four:</u> Is there an association between nursing level of knowledge and practice in relation to deep venous thromboembolism prevention and Demographic factors Among ICU patients in Southern Palestinian governmental and nongovernmental hospitals in the West Bank?

Table 7 Describes how knowledge and practice are correlated. The results indicated an important relation among practice score and total Knowledge scores between nurses.

		TOTALD	
		TOTAL_P	TOTAL_K
Total_P Pe	arson Correlation	1	.237**
Sig	g. (2-tailed)		.006
N		131	131
Total _K Pe	arson Correlation	.237**	1
Sig	g. (2-tailed)	.006	
N		131	131
**. Relationship is	s significant at the 0.05 le	evel (2-tailed).	

Table 4. 7: The correlation between nurses' knowledge and practice about DVT.

Chapter Five: Discussion

5.1 Introduction

This study was conducted to assess the level of knowledge and practices of nurses in preventing VTE. VTE is a fatal problem; leading cause of death for hospitalized individuals.

deep vein thromboembolism is a dangerous health problem that increases hospital stays and as a result increased the medical expenses, the expenses related to DVTs increased significantly between 2001 and 2015, rising by 20.9% (Elkhadir, 2018).

5.2 Discussion

The bulk of the researched nurses were males, and over half of them were under 30 years old, according to the study's findings, this was supported by the results of (Alyousef et al., 2022).

The majority study participants held BSA degree (58%), which is consistent with the study findings by Shrestha et al., 2018, whose results indicated that most nurses had Bs degrees. On the other hand, result was incongruent with Afaya et al., (2017) who revealed that half of participants had diploma degree. About ICU experience the majority of participants were of less than 10 years' experience. These finding were incongruent with El-Sayed et al., (2017) where nurses had 10 years of experience or more.

Most study participants (81.7%) had not received any previous DVT instruction or education. About (80.9%) answered with no about the availability of a hospital prevention program, this may relate to lack of structured orientation program for employee in the hospitals and it's may relate to lack of frequent assessment of nurse during their work. For improvement quality department in all hospitals required to carry out a regular workshop to discuss the latest scientific guidelines about DVT with nurses. This was fatherly highlighted by Sláinte and Forbairt (2018), who has noted that increasing use of prophylactic measures need establishment of a VTE prevention policy. Journals and shemey (2015) advocated enabling nurses with updating education, appropriate resources and advanced access to care protocol that focus on prevention of local and general problems.

Overall knowledge scores of nurses who participated in the study was poor, this finding supported by Ahmed et al. (2020) results as their research revealed 96.7% of participants had substandard knowledge level regarding DVT/VTE. While results contradicted with Alyousef et al. (2022) finding as they revealed that nurses had a high Level of Knowledge, this may be

related to lack of focus of DVT management and prevention guidelines in nursing schools, to improve the nurse's overall knowledge a recent guideline of DVT should be included in nursing courses for both theoretical and practical courses.

Regarding perceived practices to prevent DVT/VET nurses had a good score, this result consists with Alyousef et al. (2022) as overall practices scores of their study nurses were high. On the other hand, this finding contradicted with Antony A et al. (2022) as the majority of their study nurses 86% had poor practices for prevention of DVT among patients during hospitalization days. This is may be due to long years of work experience, which enable nurses' ability to master the practical skills.

Concerning the correlation between nurse's demographic features and their knowledge scores about DVT, the results of current research showed no difference concerning gender, age group, work place, educational level and the total Score of Knowledge. These findings consist were with Aghababaeian et al. (2017) and Alyousef et al. (2022) results as they found no major relation between Age and Knowledge. Lin et al. (2011) results also agreed with this study as there is no relation between of educational level and Knowledge level. This study revealed that all nurses regardless they have a master, BA or diploma education, this can be interpreted as lack of focus on DVT pathophysiology and management in nursing schools, To enhance nurses knowledge regarding this point a special focus in coagulopathy disorder causes, prevention and management. On the other hand, Ibrahim et al. (2015) found in his study that nurse's level of knowledge affected by their level of education. While the studied nurses showed an association between knowledge scores and their work experience this finding agreed with Uba et al. (2015) and Yohannes et al. (2022) study results. this research indicated a positive relationship between Practice and Knowledge which was supported by the result of Alyousef et al. (2022), this can be explained that nurses practice increased as their level of knowledge increased, to improve both the knowledge and practice an integrated program links theory and practice together should be used specially in hospitals training.

5.3 Recommendations

- 1. Conduct a monthly workshop in hospitals to improve nurses' knowledge and practices regarding VTE prevention.
- 2. Quality department in ministry of health should conduct an orientation about all protocols in governmental hospitals specially for new employees.
- 3. Carry out this research on all hospitals in West-Bank.

- 4. Develop and implement standardized VTE prevention protocols across all hospitals.
- 5. Encourage ongoing research and development in the field of VTE prevention.
- 6. Conduct regular evaluations of nurses' performance in VTE prevention.

5.4 Limitations

- 1. **Geographical Scope:** The study was limited to hospitals in the southern West Bank, which may affect the generalizability of the findings to other regions within the West Bank or to different healthcare settings with varying practices and resources.
- 2. **Data Collection Method:** The use of an electronic Google Form for the questionnaire may have introduced limitations such as potential technical issues and limited accessibility for some participants, which could affect the completeness and accuracy of the data collected.

5.5 Strengths

- Comprehensive Assessment of Knowledge and Practices: The study provides a thorough evaluation of nurses' knowledge and practices related to VTE prevention. By addressing multiple dimensions of knowledge and practice, the research offers valuable insights into both theoretical understanding and practical application.
- 2. Focus on a Critical Area: The study targets a crucial aspect of patient care—VTE prevention in intensive care units. By focusing on this area, the research contributes to improving patient safety and outcomes, which is essential for enhancing the quality of care in hospitals.
- 3. **Relevance to Regional Context:** Conducted in the southern West Bank, the study addresses specific regional needs and challenges. This localized focus ensures that the findings are directly applicable to the context of the participating hospitals, providing actionable recommendations tailored to the local healthcare environment.
- 4. **Methodological Rigor:** The use of validated instruments and rigorous statistical analysis, including t-tests and ANOVA, ensures the reliability and validity of the study's findings, supporting robust and credible conclusions.
- 5. Emphasis on Practical Implications: The study's findings have practical implications for nurse training and development. By identifying gaps in knowledge and practice, the research provides a foundation for targeted educational interventions and policy improvements aimed at enhancing VTE prevention strategies.

5.6 Study Implication

- Implications for Research: Future research should investigate the effectiveness of specific training programs and interventions on improving nurses' knowledge and practices related to VTE prevention. Longitudinal studies could assess how these educational initiatives impact patient outcomes and practice changes over time.
- 2. **Implications for Practice:** Hospitals should integrate comprehensive VTE prevention protocols into everyday nursing practice. Regular workshops and training sessions should be implemented to ensure nurses are consistently updated on the latest evidence-based practices and guidelines for preventing VTE.
- Implications for Education: Nursing education programs should incorporate detailed modules on VTE prevention and management. This will ensure that nursing students are well-prepared with the knowledge and skills necessary to effectively prevent VTE in their future clinical practice.
- 4. Implications for Policy: A National Quality Improvement Program should be established to standardize VTE prevention practices across hospitals. This program should include a structured orientation for nurses on VTE protocols and ongoing workshops to discuss the latest evidence-based practices, promoting consistent and high-quality care nationwide.

5.7 Conclusion

The results of this study indicate that most participants had a relatively low overall knowledge score concerning VTE prevention. Despite this, the nurses demonstrated a high level of practical application regarding DVT prevention. The study found a statistically significant correlation between higher knowledge scores and both years of work experience and engagement with VTE-related literature. Furthermore, practice scores were influenced by factors such as years of experience, the type of hospital (private vs. governmental), and reading relevant literature. These findings suggest that while practical application of VTE prevention is strong, enhancing nurses' theoretical knowledge through targeted educational programs could further improve both understanding and practice.

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Appendices

Appendix 1: Research Tool

بسم الله الرحمن الرحيم
الجا معة العربية الأمريكية ARAB AMERICAN UNIVERSITY
Adult Nursing Master Program
Dear Nursing colleagues, The researcher is preparing a study to explore and evaluate the extent of Nurses' Knowledge, Perception of Practice, and their Related Factors Regarding Venous Thromboembolism Prevention in ICU Departments in Southern West Bank Hospitals- palestine.
This questionnaire was prepared as part of a study to obtain a master's degree in adult nursing
(medical-surgical), and you have been selected to be part of the study sample.
answering the paragraphs of the questionnaire, noping to provide assistance by
ereat impact on obtaining accurate results. Note: everything that is contained in your answers
will be respected, and will be treated with complete confidentiality, and will only be used for
scientific research purposes only. Therefore, there is no need to write the name or any
Identification information.
You will need approximately 13 minutes to complete this questionnaire. The researcher is ready to provide you with the results of this study if requested With many thanks for your cooperation For more inquiries, you can call: 0598739073 or 0568839073 Or write an E-Mail to: Ayoubrabaei1995@gmail.com. Researcher: Ayoub. A. Rabaei. The supervision Dr. Faeda qtait
<u>Part One: Demographic Data:</u> Please read the questions and mark your answer with an (X) or $(\sqrt{)}$ in the appropriate place:
1. Age in Years: 20-25 26-30 31-35 36-40
□ 41-45 □ more than 46
2. Gender: Male Female
3. Marital status: Single Married Other
 4. Educational Level: Practical Nurse Bachelorette Nurse Master and above 5. Your Position: Practical Nurse Staff Nurse Head Nurse 6. Number of years in Nursing: Year/s.
7. Number of years in ICU Department: Year/s.
8. Is there a Continuous Learning Committee in your Hospital: Yes No

9. Please choose in which hospital do you work?

Governmental hospitals: Dura Yatta Alia Halhoul

- Beit Jala
- Non-Governmental Hospitals:
 Ahli
 Almizan
 Arab Society
- Yamameh

10. Is there a Venous thrombo-Embolism Protocol that followed in your hospital while you

deal with high-risk patients?

11. Did you ever read an article or guideline related to Venous thrombo-Embolism?

12. Did you participate in Workshops that related to deal with Venous thrombo-Embolism patients?YesNo

Part Two: The phrases in the following table aim to check your knowledge of VTE prevention for ICU patients, so please answer the following questions using the (X) or (/) in the place that suits you:

No. Knowledge Questions	Yes	No	I don't know
-------------------------	-----	----	-----------------

1.	DVT occurs as a result of stasis of blood (venous stasis), vessel wall injury, and altered blood coagulation		Î
2.	Venous thromboembolism (VTE) is a fatal complication of DVT.		
3.	DVT occurs most frequently in the veins of the lower extremities.		
4.	There is no relationship between cancer or cancer treatment and DVTE/VTE.		
5.	There is no relationship between respiratory disease and DVT		
6.	DVT also occurs frequently in the upper limbs.		
7.	There is no relationship between family history of DVT/VTE and DVT		
8.	Prolonged immobilization predisposes to DVT in hospitalized patients.		
9.	VTE is a major cause of sudden death in hospitalized patients.		
10.	Surgical patients are more prone than medical patients to DVT/VTE.		
11.	Indwelling intravenous devices such as central venous catheters may predisposes to DVT.		
12.	Paralysis, paresis, or recent plaster cast on lower extremities may predispose to DVT.		
13.	Obesity may predispose to DVT.		
14.	Low body mass index may predispose to DVT.		
15.	Advancing age may predispose to DVT.		
16.	Previous DVT/VTE history may predispose to DVT		-
17.	Major surgery may predispose to DVT	 	
18.	Varicose veins may predispose to DVT		-
19.	Exercises may predispose to DVT.		
20.	Trauma may predispose to DVT.	 	
21.	Smoking may predispose to DVT.	 	

22.	Alcohol may predispose to DVT.	
23.	Cardiac diseases may predispose to DVT.	
24.	Infections or inflammations may predispose to DVT	
25.	Pregnancy or postpartum may predispose to DVT	
26.	Oral contraceptives or hormonal replacement therapy may predispose to DVT	
27.	Foot and leg exercises may prevent DVT	
28.	Elevating legs is necessary to prevent DVT/VTE.	
29.	Early ambulation after surgery may prevent DVT development.	
30.	Bed rest is necessary after major surgery to prevent DVT	
31.	Heparin or low-molecular-weight heparin (LMWH) may prevent DVT development	
32.	Fluid restriction is necessary to prevent DVT.	
33.	Elastic compression stockings may prevent DVT development.	
34.	The use of intermittent pneumatic compression devices may prevent DVT development	

Part Three: The phrases in the following table aim to explore the Perception of practice about VTE prevention for ICU patients, so please answer the following questions using the (X) or (/) mark in the place that suits you:

Q. Number	Perception of Practice	Always	often	Neutral	Sometime	Never
1.	Providing information to patients and/or relatives about risks and prevention of DVT					

2.	Encouraging patients to do foot and leg exercises by themselves or relatives help if patients are unable to do so.		
3.	Encouraging early ambulation surgical of patients		
4.	Assessing the DVT risks of patients regularly.		
5.	Administering anticoagulants as preventive in clinic		
6.	Monitoring the side effects of the anticoagulants		
7.	Educating the patients on anticoagulants		
8.	Educating the patients to avoid injury.		
9.	Encouraging patients to do elevate legs.		
10.	Educating the patients and their family on		

Part Three: The phrases in the following table aim to explore the Perception of practice about VTE prevention for ICU patients, so please answer the following questions using the (X) or (/) mark in the place that suits you:

Q. Number	Perception of Practice	Always	often	Neutral	Sometime	Never
1.	Providing information to patients and/or relatives about risks and prevention of DVT					8

2.	Encouraging patients to do foot and leg exercises by themselves or relatives help if patients are unable to do so.		
3.	Encouraging early ambulation surgical of patients		
4.	Assessing the DVT risks of patients regularly.		8
5.	Administering anticoagulants as preventive in clinic		
6.	Monitoring the side effects of the anticoagulants		
7.	Educating the patients on anticoagulants		
8.	Educating the patients to avoid injury.		
9.	Encouraging patients to do elevate legs.		
10.	Educating the patients and their family on sufficient fluid intake		

Additional Comments if you want:

..... Thanks For Your Participation

Appendix 2: IRP Approval

	IRB Appr	roval Letter	
Study Title: "Nu Venous Thrombo	ses' Knowledge, Perception of I embolism Prevention in ICU De	Practice, and their Related Factors I epartments in Southern Palestinian	Regardi Hospit:
Submitted by: Ay	oub Abdalmunem Rabaei		
Date received:	24nd April 2024		
Date reviewed:	6th May 2024		
Date approved:	6 th May 2024		
Your Study titled * Venous Thrombo with the code numl Review Board - Ra	Nurses' Knowledge, Perception mbolism Prevention in ICU De er "R-2024/A/55/N" was review mallah and it was approved on the	of Practice, and their Related Facto partments in Southern Palestinian H ed by the Arab American University In e 6 th of May 2024.	ors Rega Iospita Institutio
Your Study titled * Venous Thrombo with the code numl Review Board - Ra Sajed Ghawadra, IRB-R Chairman Arab American U	Nurses' Knowledge, Perception mbolism Prevention in ICU De er "R-2024/A/55/N" was review mallah and it was approved on the PhD niversity of Palestine	of Practice, and their Related Facto partments in Southern Palestinian H ed by the Arab American University In e 6 th of May 2024. Ikao American University asthw Ick end I bay 2024. Ikao American University IRB-R	ors Reg Iospita Institutio

Appendix 3: Hospital Approval "Non-GOV"

State of Palestine **Ministry of Health** Education in Health and Scientific **Research Unit**

Ref.: Date:....

دولة فلسطين وزارة الصحة وحدة التعليم الص والبحث العلمي



عطوفة الوكيل المساعد لشؤون المستشفيات والطوارئ المحترم ،،، تدية واحترام...

الموضوع: تسهيل مهمة بحث

يرجى تسهيل مهمة الطالب: أيوب عبد المنعم ربعي برنامج تمريض البالغين الجامعة العربية

الامريكية، في عمل بحث بعنوان:

"معرفة الممرضين وتصورهم حول الممارسات والعوامل المرتبطة بها فيما يتعلق بالوقاية من التخثر

الوريدي في أقسام العناية الحثيثة في مستشفيات جنوب الضفة الغربية- فلسطين"

تحت اشراف د. فائدة اقطيط حيث سيتم جمع معلومات من خلال توزيع استبانة وذلك في :

. - مستشفى عاليه - مستشفى دورا - مستشفى يطا - مستشفى حلحول

على ان يتم الالتزام باساليب واخلاقيات البحث العلمي، وعدم التعرض للمعلومات التعريفية للمشاركين. على ان يتم تزويد الوزارة بنسخة PDF من نتائج البحث. والتعهد بعدم النشر لحين الحصول على موافقة الوزارة على نتائج البحث.

مع الاحتدام...



Telfax.:09-2333901

نسخة: عميد كلية الدراسات العليا المحترم/ الجامعة العربية الامربكية

scientificresearch.dep@gmail.com

تلفاكس: 09-2333901

Appendix 4: Hospital Approval "GOV

الجامعـــة العربيـــة الأمريكيــة

كلية الدراسات الهليا

Re ALINA LANG

Faculty of Graduate Studies

Arab American University

2024/5/11

إلى من يهمه الأمر

تسهيل مهمة بحثية

تحية طيبة وبعد،

تُهديكم كلية الدراسات الغليا في الجامعة العربية الأمريكية أطيب التحيات، وبالإشارة الى الموضوع أعلاه، تشهد كلية الدراسات الغليا في الجامعة الغليا أن الطالب أ**يوب عبد المنعم محمد ربعي و**الذي يحمل الرقم الجامعي 202113179 هو طالب ماجستير في برنامج تمريض البالغين ويعمل على رسالة الماجستير الخاصة به بعنوان:

" معرفة الممرضين وتصور هم حول الممارسات والعوامل المرتبطة بها فيما يتعلق بالوقاية من التخثر الوريدي في أقسام العناية الحثيثة في مستشفيات جنوب الضفة الغربية- فلسطين"، تحت إشراف الدكتورة فائدة اقطيط نأمل من حضرتكم الإيعاز لمن يلزم لمساعدته للحصول على المعلومات اللازمة للدراسة، علماً أن المعلومات ستستخدم لغاية البحث فقط وسيتم التعامل معها بغاية السرية، وقد أعطى هذه الرسالة بناءً على طلبه.

وتفضلوا بقبول فانق الاحترام

عميد كلية الدر اسات العليا

د. نوار قطد

11 كلية الدراسات العليا ACULTY OF GRADUATE STUDIES

Page 1 of 1

 Jenin Tel:
 +970-4-2418888
 Ext.:1471,1472
 Fax: +970-4-2510810
 P.O. Box:240

 Ramallah Tel:
 +970-2-2941999
 Fax: +970-2-2941979
 Abu Qash - Near Alrehan

 E-mail:
 FGS@aaup.edu
 ;
 PGS@aaup.edu
 Website: www.aaup.edu

Appendix 5: Participants Consent form

AAUP-IRB-R Code No.: AAUP-IRB-R Date:

The for the batter that the second se	
I, part in the clinical research (clinical study/que	
<u>Title of Study</u> : Nurses' Knowledge, Percept Venous Thromboembolism Prevention in S	tion of Practice, and their Related Factors Regarding outhern West-Bank Hospitals.
Fulfillment of master degree, in adult nursing	(medical-surgical) in AAUP. (Name of program)
The nature and purpose of which has been exp Rabaei to the best of his/her ability in English.	plained to me by Ayoub Rabaei, and interpreted by Ayoub
I have been told about the nature of the rest complications (as per Participant Information After knowing and understanding all the voluntarily consent of my own free will to par I understand that I can withdraw from this rest	earch in terms of methodology, possible adverse effects and Sheet). possible advantages and disadvantages of this research, I ticipate in the clinical research specified above. earch at any time without assigning any reason whatsoever.
Date:	Signature: (Participant)
Name: Designation: .	Signature:

معرفة الممرضين، وإدراكهم للممارسات، والعوامل المرتبطة بها فيما يتعلق بالوقاية من الجلطات الدموية الوريدية في مستشفيات جنوب الضفة الغربية. أيوب عبد المنعم ربعي د. فائدة قطيط د. بهاء الدين حماد

د. عماد ثلثين

ملخص

مقدمة: الجلطات الدموية الوريدية هي مشكلة صحية يمكن الوقاية منها لدى المرضى في المستشفى. تتطلب الرعاية الفعالة للجلطات الدموية الوريدية التنسيق بين مختلف المتخصصين في الرعاية الصحية. يلعب الممرضين دورًا حيويًا من خلال تحديد المرضى المعرضين للخطر وتوفير التدابير الوقائية المناسبة، مما يحسن بشكل كبير الوقاية من الجلطات الدموية الوريدية أثناء الرعاية السريرية.

هدف الدراسة: تقييم مستوى المعرفة بين الممرضين وادراكهم للممارسات حول الجلطات الدموية الوريدية في مستشفيات جنوب الضفة الغربية.

منهجية الدراسة: تم استخدام تصميم وصفي عرضي مع عينة شاملة من 131 ممرضًا مسجلاً تم اختيارهم من مستشفيات خاصة وحكومية في جنوب الضفة الغربية. تم جمع البيانات باستخدام استبيان إلكتروني مجهول (نموذج جوجل).

نتائج الدراسة: 84.7% من المشاركين كانت درجات معرفتهم الشاملة حول الجلطات الدموية الوريدية ضعيفة، في حين أن 69.5% من الممرضين المشاركين كان لديهم ممارسة جيدة للوقاية من تجلط الأوردة العميقة. وكشفت الدراسة أيضًا أن غالبية الممرضين يفتقرون إلى المعرفة حول بروتوكولات تجلط الأوردة العميقة في المستشفيات التي يعملون فيها.

الاستنتاج: كشفت الدراسة أن معظم المشاركين كانوا يمتلكون مستوى منخفضًا من المعرفة فيما يتعلق بالجلطات الدموية الوريدية. وعلى الرغم من ذلك، أظهر الممرضون مستوى عالٍ من التطبيق العملي. لتعزيز كل من المعرفة والممارسة في مجال الجلطات الدموية الوريدية العميقة، من الضروري تنفيذ تدريبات مستهدفة، وتعزيز بيئة تعليمية تعاونية، وتشجيع التعليم المستمر.

الكلمات الرئيسية: المعرفة، الممارسة، الجلطات الدموية الوريدية، الممرضين.