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Patient Characteristics and Care Problems Associated with Prolonged Mechanical Ventilation (PMV) in Critical Care Units in Palestine

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Thesis Approval

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Declaration

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

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Dedication

﴿ وَهُوَ اللَّهُ لَا إِلَٰهَ إِلَّا هُوَ ۖ لَهُ الْحَمْدُ فِي الْأُولَىٰ وَالْآخِرَةِ ۖ وَلَهُ الْحُكْمُ وَإِلَيْهِ تُرْجَعُونَ﴾

[القصص: 70]

This thesis is dedicated to my mother and father (God blessed them) and also to my family (Odai, Rawan, Manar, Nomi, Qusai), whose unending love, compassion, and belief in my abilities have always pushed me ahead. It would never have been achievable to accomplish this without your advice and assistance.

I am grateful to my teachers and role models for encouraging me to pursue excellence and for encouraging my passion for learning.

I want to express thanks to my friends and colleagues for their encouragement, support, and company along this journey.

Lastly: to all martyrs and injuries in Palestine, this work is dedicated to your sacrifice and enduring strength. May your struggle never be forgotten, and may peace and justice prevail

Dareen Khalid Ahmad Abudayyah

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Abstract

Background: The large number and frequency of patients with prolonged mechanical ventilation will raise care issues, which will raise the mortality rate. Inadequate standards and protocols for treating prolonged mechanical ventilation patients led to a higher rate of complications, obstacles, and hospital stays. Objectives: To determine the characteristics of intensive care unit Patients, as well as the consumption of intensive care unit bed days by these admissions, another goal is to investigate care problems associated with prolonged mechanical ventilation in the Palestinian critical care units that need mechanical ventilation of 7 to 21 days or more Methodology: The researcher was used cross-sectional, descriptive quantitative design, Sample: all intensive care nurses were included in the study because the research sample consisted of convenience samples from 15 hospitals and was purposive. The number of participants in the study is determined by the response rate, which for government and non -governmental hospitals is 75.1 percent (n=290). Time of data collection: from 30 May to 20- July. Tool: the researcher used a questionnaire that was developed based on a study that was done in Swedish with 59 questions Results: most respondents(n=201) (69.3 %) were working in general intensive care units and using a 1:2 nurse-to-patient ratio (n=156) (53.8%). More than half of them(n=171) (59.0%) received in-service intensive care unit training. Cardiac patients(n=243) (85.0%) followed by respiratory patients (n=231)(80.8%) were more common in Palestinian adult intensive care units . Acute respiratory distress syndrome(n=264) (91.0%), followed by cardiovascular disorders (n=179) (61.7%) was the most frequent primary diagnosis for prolonged mechanical ventilation. Most respondents adopted an individualized weaning approach (n=257) (88.6%), swallowing assessment(n=241) (83.1%), and person-centered care routines (n=205) (70.7%). A low level of respondents followed nutrition (n=109) (37.6%), weaning(n=69) (23.8%), and mobilization(n=49) (16.9%) protocols. Conclusions: Overall, the level of implementation of care practices policies specific to prolonged mechanical ventilation patients was more common in non -governmental Palestinian intensive care units.

Key words :ICUs, patient characteristics, care problems, care practices.

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Abbreviations	Title

MV: Mechanical Ventilation

ICU: Intensive Care Unit

PMV: Prolonged Mechanical Ventilation

ARDS: Acute Respiratory Distress Syndrome

NAMDRC: National Association for Medical Direction of Respiratory Care

VAP: Ventilator Association pneumonia

PCC: Patient-centered care

COPD: Chronic obstructive pulmonary diseases

APACHE: Acute Physiology and Chronic Health Evaluation

CBT: Cognitive Behavior Therapy

VAS: Visual Analog Scale

CAM-ICU: Confusion Assessment Method

ASV: Adaptive Support Ventilation

NRS-D: Numeric Rating Scale For Dyspnea

STAI: State-Trait Anxiety Inventory

HAM-A: Hamilton Anxiety Rating Scale

MBS-D: Modified Borg Dyspnea Scale

ICDSC: Intensive Care Delirium Screening Checklist

Nu-DESC: Nursing Delirium Screening Scale

NAVA: Neutrally Adjusted Ventilator Assist

SAS: The Riker Sedation-Agitation Scale

RASS: The Richmond Agitation-Sedation Scale

PAV: Proportionna Assista Ventilation

SBT: Spontaneous breathing trial

Chapter One: Introduction

1.1 Background of Study

Intensive care has been defined: an organized system for the provision of care to critically ill patients that provides intensive and specialized medical and nursing care, an enhanced capacity for monitoring, and multiple modalities of physiologic organ support to sustain life during a period of acute organ system insufficiency' (Marshall et al., 2017). Therefore, the primary goals of care are to improve patients' chances of survival in life-threatening situations and to support their most basic physiological needs, such as breathing and circulation (Marshall et al., 2017).

Also, one of the most expensive and resource-consuming types of medical care is intensive care, which is provided by teams of doctors, nurses, physiotherapists, and other medical professionals who are all specially trained in ICU care (Ervin et al., 2018).

Moreover, patients with worsening health conditions typically come to an intensive care unit (ICU) from the emergency room, hospital wards, operating rooms, or other ICUs. Restoring bodily functions with a priority diagnosis and treatment is the main goal of the first few hours in the intensive care unit (SIR, 2020). For example by Samuelsson et al. (2015), the median age of patients in the Swedish ICU in 2015 was 64 years old, with 57% of the patients being male. When a patient has respiratory insufficiency, they may also have intubation, drowsiness, and a critical health condition that prevents them from communicating. Therefore, these patients have tubes and lines within their bodies, are completely dependent on their healthcare providers, live in an unfamiliar, highly technical environment, and are in a terrible critical state (Engstrom et al., 2013).

Patients requiring prolonged mechanical ventilation are often older adults, although younger patients with severe trauma or chronic illnesses may also require extended ventilation (Kahn et al., 2021). Age is a significant factor, as older patients tend to have more comorbidities and a reduced physiological reserve, making recovery more challenging. Underlying conditions such as chronic obstructive pulmonary disease

(COPD), neuromuscular disorders, severe pneumonia, and acute respiratory distress syndrome (ARDS) are common among patients who require PMV (Esteban et al., 2020). These conditions often lead to prolonged respiratory failure, necessitating extended mechanical support.

The severity of illness at the time of ICU admission is another critical factor. Patients with higher severity scores on scales such as the Acute Physiology and Chronic Health Evaluation (APACHE) are more likely to require PMV (Higgins et al., 2021). These scores consider various physiological parameters and underlying health conditions, providing a comprehensive assessment of the patient's overall health status. Comorbidities play a significant role in the need for PMV. The presence of multiple comorbidities, such as diabetes, heart disease, and renal failure, can increase the likelihood of requiring prolonged mechanical ventilation (Damuth et al., 2020). These conditions can complicate the clinical course and make weaning from the ventilator more difficult. Therefore, when patients are unable to maintain normal pulmonary function, artificial ventilation is necessary to promote gas exchange and acid-base balance. This may result from pulmonary dysfunction, either acute or chronic, or other illnesses that limit the patient's ability to breathe normally in their alveoli (Goligher et al., 2016).

While MV can save lives, there is a risk that patients may experience life-threatening side effects. Despite advances in technology, positive pressure is still needed for ventilators to function, which affects patients' hemodynamic and ventilator functions and raises intrathoracic pressure, which lowers cardiac afterload and may cause hemodynamic instability (Pham et al., 2017). In addition, long periods of regulated ventilation modes provide a risk of damaging ventilator-induced lung injury due to the positive pressure produced by ventilators (Hess, 2014). Additionally, for patients on MV to accept the endotracheal tube and the artificial breathing circumstances, they first require sedation and high opioid doses. Additionally, sedative medications might cause hemodynamic instability as a side effect. High doses of sedation over time can also lead to delirium, prolonged MV, and unfavorable long-term results (Pham et al., 2017).

As a result, caregivers work to implement ventilator support modes that allow patients to breathe autonomously in the ventilator, given that this can help to successfully remove MV and minimize the need for sedative medications (Goligher et al., 2016)

Previous studies highlight the potentially stressful nature of receiving care in an intensive care unit while on PMV. In addition to suffering voice loss, worry, nervousness, and loneliness, patients on MV also need medical staff and modern technology to survive (Baumgarten & Poulsen, 2015).

Patients on PMV longer than 21 days make up an increasing percentage of the MV patients who survive their ICU stay today. The majority of patients in this increasing patient category are elderly and have many medical conditions, which puts more pressure on the intensive care staff (Cox, Carson, Govert, et al., 2007; Zilberberg et al., 2008). In addition, the definitions of PMV are time-based; however, recent data indicate that a change from acute care to a more chronic condition with a higher risk of complications and mortality occurs after around seven days on MV (Carson, 2012; Iwashyna et al., 2015) , according to the National Association for Medical Direction of Respiratory Care (NAMDRC) by MacIntyre et al., (2005) Prolonged Mechanical Ventilation (PMV) is MV > 21 days , also prolonged weaning was defined by the European Respiratory Society (ERS)(2018) Task Force as requiring more than seven days of weaning following the initial spontaneous breathing trial (SBT). .

This study will discuss adult patients in Palestine who are on prolonged mechanical ventilation (PMV) in ICUs that need MV of 7 to 21 days or more. In addition, to determine the Patient's characteristics according to Samuelsson et al., (2015), patients in the intensive care unit (ICU) include a diverse population of patients with conditions like trauma, infection, and cardiac or respiratory failure. Baumgarten and Poulsen (2015) emphasized that receiving treatment in an ICU while using PMV can be a distressing experience. Additionally, patients on MV report voice loss, anxiety, dread, and loneliness Cox et al., (2007); Zilberberg et al., (2008) found that patients on PMV > 21 days represent an expanding subset of the patients on MV who survive their period in the ICU today.

Another goal is to investigate care problems associated with prolonged mechanical ventilation (PMV) in Palestinian critical care units , Rak et al., (2020); Rose et al., (2019) found that the management of patients with PMV is very complicated, and patients protracted stays in the ICU, starvation, muscular weakness, significant problems, and advanced age with several coexisting conditions all affect them, also the treatment of individuals on PMV includes extended mechanical ventilation (MV), mobilization, nutrition, and delirium, engagement of the family, person-centered care.

Pham et al . (2017) found that for patients on MV to accept the endotracheal tube and the artificial breathing situation, they initially need to be sedated and have high amounts of opioids. Hemodynamic instability is one of the side effects of sedative medications, and extended MV, delirium, and negative long-term consequences can all be caused by excessive doses of sedation over time.

According to Loss et al., (2015), long stays in the ICU are linked to several complications and bad outcomes, making it unlikely that the number of patients needing prolonged mechanical ventilation (PMV) will rise, an increased risk of pulmonary embolism, acute respiratory distress syndrome (ARDS), sepsis, gastrointestinal bleeding, and pressure ulcers are also associated with PMV, like that described above, so according to (Rak et al., 2020; Rose et al., 2019). While there are many crucial topics to consider while providing appropriate care for patients on PMV, it has been suggested that ventilator care and weaning, mobilization, nutrition, and symptom management be the key areas of emphasis. Furthermore, patients and their families should be a part of the care team and have a significant role in the treatment process.

1.2 problem Statement

Prolonged mechanical ventilation (PMV) in intensive care units (ICUs) is associated with a significantly increased risk of complications, extended hospital stays, and higher mortality rates, particularly among older adults and those with multiple comorbidities (Dettmer et al., 2017; Leroy et al., 2014). Studies have reported hospital mortality rates ranging between 40% and 65%, and ICU mortality rates between 26% and 52% for patients requiring PMV for longer than 21 days (Lone & Walsh, 2011; Loss et al., 2015). Despite the high prevalence of PMV patients and the growing demand they place

on ICU resources, there is a notable lack of standardized care protocols, particularly in areas such as ventilator weaning, mobilization, communication, nutrition, and psychological support. These care gaps contribute to increased complications, prolonged ICU stays, and heightened mortality.

In Palestine, there is a critical gap in the literature and practice regarding the care of adult patients requiring PMV, especially in terms of identifying care practices, organizational structures, and protocol implementation in ICUs. No comprehensive study has yet examined the characteristics of these patients, the resource consumption they represent, or the specific care challenges faced by healthcare providers. Therefore, this study aims to fill this gap by investigating care practices for adult patients on PMV (7 days or more) in Palestinian ICUs, exploring variations between governmental and non - governmentalsectors, and identifying potential relationships between patient demographics, care practices, and outcomes.

Therefore, the high numbers and prevalence of patients who are under PMV will increase the care problems that will increase the mortality rate, also lack of protocols and standards about caring for PMV patients increases complication and obstacles rate and elongation at the hospital. **In Palestine, there is a lack of studies about** patients who are under PMV**.** So, this study will discuss adult patients in Palestine who are on prolonged mechanical ventilation (PMV) in ICUs that need MV of 7 to 21 days or more. In addition, to determine the characteristics of ICU Patients, as well as the consumption of ICU bed days by these admissions, also to investigate care problems associated with prolonged mechanical ventilation (PMV) in Palestinian critical care units.

1.3 Significant of the Study

According to Cederwall (2021), long stays in the ICU are linked to several complications and negative outcomes, making it unlikely that the number of patients needing prolonged mechanical ventilation (PMV) will rise. An increased risk of pulmonary embolism, acute respiratory distress syndrome (ARDS), sepsis, gastrointestinal bleeding, and pressure ulcers are also associated with PMV, much as what was previously mentioned. The management of patients with PMV is very complicated, and patients' protracted stays in the ICU, starvation, muscular weakness,

significant problems, and advanced age with several coexisting conditions all affect them. In addition, Patients on PMV > 21 days represent an expanding subset of the patients on MV who survive their period in the ICU today (Cederwall .,(2021).

This expanding patient population is primarily made up of older individuals with several coexisting conditions, which places extra stress on the intensive care personnel (Cox et al., 2007; Zilberberget al., 2008).

According to research conducted by Lone & Walsh (2011); and Rose et al., (2015) they found that patients on PMV longer than 21 days make up roughly 4% of all ICU admissions but take up 11% to 29% of all ICU bed days.

Currently, there is a lack of data and studies to investigate the patients characteristics and problems of care for patients needing PMV among West Bank and East Jerusalem ICUs, so this study represents the first time in our region to identify the: Patient characteristics and care problems associated with prolonged mechanical ventilation (PMV) in Palestinian critical care units, also there is no statistics or numbers exist about Patient characteristics and care problems associated with prolonged mechanical ventilation (PMV) in Palestinian critical care units.

1.4 Aim of study

This study will determine adult patients in Palestine who are on prolonged mechanical ventilation (PMV) in ICUs that need MV of 7 to 21 days or more. In addition, to determine the characteristics of ICU Patients, as well as the consumption of ICU bed days by these admissions, another goal is to investigate care problems associated with prolonged mechanical ventilation (PMV) in Palestinian critical care units.

1.5 objectives

1- To determine care practices in Palestinian ICUs specific to patients requiring prolonged mechanical ventilation (PMV) (i.e., more than 7 days).

2-To determine existing patient and unit characteristics, unit policies, and care practices, organization of care, and protocols for ventilator weaning, mobilization, communication, nutrition, symptom assessment, and psychological support for adult patients undergoing PMV in Palestinian ICUs.

3-To determine possible relationships between some care practices for PMV patients and demographic data among participants.

4- To assess nurses' care practices (scales, protocols, strategies, etc.) for PMV patients in governmental ICUs with their counterparts in non – governmental ICUs.

1.6 Research Questions

In this study, the following questions were examined:

1) What are the most common care practices for PMV patients among nurses in Palestinian adult ICUs?
2) What are the most common primary reasons associated with PMV patients in Palestinian adult ICUs?
3) Are there any significant differences between Palestinian nurses in adult non – governmental ICUs and their counterparts in governmental ICUs regarding care practice implementation for PMV patients?
4) Are there any significant associations between nurses' view of early mobilization as a priority for PMV patients in Palestinian adult ICUs and their general characteristics?
5) Are there any significant associations between nurses' adoption of weaning strategies for PMV patients in Palestinian adult ICUs and their socio-demographic and professional characteristics?
6) Are there any significant associations between nurses' adoption of person-centered care routines and some care practice strategies for PMV patients in Palestinian adult ICUs?

1.7 Research Hypothesis

In this study, the following alternative hypotheses were tested.

1) There are no significant differences between Palestinian nurses in adult non – governmental ICUs and their counterparts in governmental ICUs regarding care practices for PMV patients (i.e., following weaning, mobilization, sedation, and nutrition protocols; use delirium, anxiety, dyspnea scales, ... etc.) at a significance level of 5%.
2) There are no significant associations between nurses' view of early mobilization as a priority for PMV patients in Palestinian adult ICUs and their general characteristics (i.e., age, gender, education, experience, ICU training, etc.) at a significant level of 0.05.
3) There are no significant associations between nurses' adoption of weaning strategies for PMV patients in Palestinian adult ICUs and their general characteristics (i.e., age, gender, education, experience, ICU training, etc.) at a significance level of 0.05.
4) There are no significant associations between nurses' adoption of person-centered care routines and some care practices for PMV patients in Palestinian adult ICUs (i.e., strategies that support patient and family well-being, such as access to psychiatrists or psychologists to support patients' mental health issues, access to a psychologist or a social worker to address family issues, … etc.) at a significance level of 0.05.

1.8 Conceptual Definition

Prolonged Mechanical Ventilation (PMV): According to the National Association for Medical Direction of Respiratory Care (NAMDRC), PMV is defined as mechanical ventilation lasting more than 21 days, a criterion supported by existing literature (MacIntyre et al., 2005). However, recent studies suggest that the transition from acute to chronic care, with increased risks of complications and mortality, occurs after approximately seven days of mechanical ventilation (Carson, 2012; I was hyna et al., 2015). Additionally, the standard practice of performing a tracheostomy after seven days of mechanical ventilation may predict PMV and indicate the patient's likelihood of surviving the acute and early intensive care stages (Cheung & Napolitano, 2014).

Mechanical Ventilator: A mechanical ventilator is a device that mimics lung function by delivering oxygen-rich air and removing carbon dioxide. It is used when lung

function is compromised due to various conditions, such as respiratory disorders or neurological issues that impair breathing (Walter, 2021).

Patients' Characteristics for Prolonged Mechanical Ventilation: Patients requiring prolonged mechanical ventilation often have complex medical conditions, including chronic respiratory diseases, neuromuscular disorders, or severe infections. They may also exhibit poor nutritional status, limited mobility, and a higher likelihood of developing complications such as infections or organ failure (Smith et al., 2020).

Care Problems with Prolonged Mechanical Ventilation (PMV): Care problems associated with PMV include increased risk of infections, such as ventilator-associated pneumonia, difficulty in weaning from the ventilator, prolonged hospital stays, and higher healthcare costs. Additionally, patients may experience physical deconditioning, psychological distress, and a decline in quality of life (Jones et al., 2020).

Weaning from Ventilation: defined as the transition from full ventilator support to spontaneous breathing (Mancebo, 1996). It involves gradually reducing respiratory support until the patient either reaches their maximum potential or no longer needs assistance (Crocker, 2009). The Sixth International Consensus Conference on Intensive Care Medicine (2007) recommends a scientific approach to weaning, which includes treating acute respiratory failure, assessing readiness for weaning, conducting spontaneous breathing trials (SBT), and extubating patients (Boles et al., 2007). This process requires both clinical and objective evaluations, such as clinical stability, adequate oxygenation, pulmonary function, and ventilation (Blackwood, 2000).

Mobilization: the early and progressive movement of patients who are on mechanical ventilation. It includes activities such as passive range-of-motion exercises, sitting up in bed, and eventually walking with assistance. Early mobilization has been shown to improve outcomes by reducing muscle atrophy, enhancing respiratory function, and decreasing the length of hospital stay (Schweickert & Kress, 2020).

Communication: Effective communication is crucial for patients on mechanical ventilation, as they often cannot speak due to intubation. Methods include using communication boards, writing tools, and technology-assisted devices to facilitate

interaction between patients and healthcare providers, thereby reducing anxiety and improving patient satisfaction (Happ et al., 2020).

Nutrition: Proper nutrition is vital for patients on mechanical ventilation to support healing and recovery. Nutritional support should be tailored to meet the individual needs of the patient, considering factors such as caloric requirements, protein intake, and micronutrient supplementation. Enteral nutrition is preferred over parenteral nutrition when feasible (McClave et al., 2020).

Ventilator-associated pneumonia (VAP): a type of nosocomial pneumonia that occurs in patients who have been on mechanical ventilation for at least 48 hours and did not show signs of lower respiratory tract infection before intubation. It significantly increases hospital costs and patient length of stay (Özen & Armutçu, 2018; Wami et al., 2018).

Delirium: is defined as a sudden onset disturbance of consciousness with fluctuating attention and changes in perception or cognition (Kotfis et al., 2018).

Anxiety: Anxiety in patients on mechanical ventilation can result from the inability to communicate, fear of the unknown, and physical discomfort. It is important to assess and manage anxiety through both pharmacological and non-pharmacological interventions to improve patient outcomes (Wang et al., 2020).

Dyspnea: Dyspnea, or difficulty breathing, is a common symptom in patients on mechanical ventilation. It can be caused by underlying respiratory conditions, the mechanical ventilation process itself, or anxiety. Effective management includes optimizing ventilator settings, providing supplemental oxygen, and addressing any underlying causes (Parshall et al., 2020).

Patient-Centered Care: Patient-centered care involves tailoring healthcare to meet the individual needs, preferences, and values of patients. For those on mechanical ventilation, this includes involving patients and their families in decision-making, providing clear and compassionate communication, and ensuring comfort and dignity throughout the care process (Epstein et al., 2020).

Psychosocial Support: Psychosocial support for patients on mechanical ventilation includes addressing emotional, social, and psychological needs. This can involve counseling, support groups, and interventions to reduce stress and anxiety, thereby improving overall well-being and recovery (Davidson et al., 2020).

1.9 Operational Definition

Patients' Characteristics for Prolonged Mechanical Ventilation: This is measured by section two of the questionnaire.

Weaning from Ventilation: is measured by section three of the questionnaire.

Mobilization: This is measured by section four of the questionnaire.

Communication: is measured by section five of the questionnaire.

Nutrition: measured by section six of the questionnaire.

Ventilator-associated pneumonia (VAP): is measured by section seven of the questionnaire.

Delirium: is measured by section seven of the questionnaire

Anxiety: is measured by section seven of the questionnaire

Dyspnea: is measured by section seven of the questionnaire

Patient-centered care: is measured by section two of the questionnaire

Psychosocial Support: is measured by section eight of the questionnaire

Chapter Two: Literature Review

2.1 Introduction

An overview of the studies on patient characteristics and care problems related to prolonged mechanical ventilation in critical care units is provided in this chapter. To gather the most recent information on this subject, the researcher decided to expand the literary study's focus to include more countries. Literary research revealed that this is an important and developmental issue in the mentioned countries.

2.2 Prolonged Mechanical Ventilation

2.2.1 Patients & Definitions and Patient Characteristics

Prolonged Mechanical Ventilation (PMV) is a critical issue in intensive care units (ICUs) worldwide, including in Palestinian critical care settings. PMV is generally defined as the need for mechanical ventilation for more than 21 days (MacIntyre et al., 2020). This definition, however, can vary slightly depending on the clinical setting and specific patient population. The need for PMV is often associated with a range of patient characteristics that can influence both the duration of ventilation and the outcomes.

Patients requiring PMV are often older adults, although younger patients with severe trauma or chronic illnesses may also require extended ventilation (Kahn et al., 2021). Age is a significant factor, as older patients tend to have more comorbidities and a reduced physiological reserve, making recovery more challenging. Underlying conditions such as chronic obstructive pulmonary disease (COPD), neuromuscular disorders, severe pneumonia, and acute respiratory distress syndrome (ARDS) are common among patients who require PMV (Esteban et al., 2020). These conditions often lead to prolonged respiratory failure, necessitating extended mechanical support.

The severity of illness at the time of ICU admission is another critical factor. Patients with higher severity scores on scales such as the Acute Physiology and Chronic Health Evaluation (APACHE) are more likely to require PMV (Higgins et al., 2021). These scores take into account various physiological parameters and underlying health

conditions, providing a comprehensive assessment of the patient's overall health status. Comorbidities play a significant role in the need for PMV. The presence of multiple comorbidities, such as diabetes, heart disease, and renal failure, can increase the likelihood of requiring prolonged mechanical ventilation (Damuth et al., 2020). These conditions can complicate the clinical course and make weaning from the ventilator more difficult.

Functional status before ICU admission is also a crucial determinant. Patients with pre-existing functional impairments and lower baseline functional status are more likely to require PMV (Unroe et al., 2021). This is particularly relevant in the context of neuromuscular diseases and other chronic conditions that affect mobility and respiratory function. The interplay between these various factors underscores the complexity of managing patients who require prolonged mechanical ventilation.

2.2.2 Complications of Prolonged Mechanical Ventilation

The complications associated with PMV are numerous and can significantly affect patient outcomes. Ventilator-associated pneumonia (VAP) is one of the most common and serious infections that occur in patients receiving mechanical ventilation for extended periods (Klompas et al., 2020). VAP is associated with increased morbidity, longer ICU stays, and higher mortality rates. Preventing VAP requires stringent infection control measures and vigilant monitoring.

Barotrauma is another significant complication, resulting from excessive pressure from the ventilator, which can lead to conditions such as pneumothorax (Fan et al., 2021). This complication can exacerbate respiratory failure and prolong the need for mechanical ventilation. Muscle weakness is a common issue in patients with PMV. Prolonged immobility and disuse of respiratory muscles can lead to significant muscle atrophy and weakness, complicating weaning from the ventilator (Hermans et al., 2020). This condition, known as ICU-acquired weakness, can have long-term implications for patient recovery and quality of life.

Psychological effects are also prevalent among patients with PMV. Anxiety, depression, and delirium are common due to prolonged ICU stays and mechanical ventilation (Needham et al., 2020). These psychological issues can affect the patient's

ability to participate in their care and rehabilitation, further complicating the weaning process. Tracheostomy-related issues are another concern. Long-term ventilation often necessitates a tracheostomy, which can lead to complications such as infection, bleeding, and tracheal stenosis (Mehta et al., 2021). Managing these complications requires careful monitoring and timely interventions.

Nutritional deficiencies are a significant challenge in patients with PMV. Ensuring adequate nutrition is difficult, leading to potential deficiencies and related complications (Heyland et al., 2020). Malnutrition can impair wound healing, immune function, and overall recovery. Pressure ulcers are another common issue. Extended periods of immobility increase the risk of developing pressure ulcers, which can lead to further complications and infections (Cox et al., 2020). Preventing pressure ulcers requires meticulous skin care and frequent repositioning of the patient.

Cardiovascular complications are also a concern. Prolonged mechanical ventilation can exacerbate cardiovascular issues, including arrhythmias and hemodynamic instability (Pinsky et al., 2021). These complications can further complicate the clinical course and prolong the need for mechanical ventilation. The management of PMV patients requires a multidisciplinary approach to address these various complications and optimize patient outcomes.

Care Problems associated with PMV are multifaceted. Resource allocation is a significant issue, as PMV patients require substantial healthcare resources, including specialized equipment and trained personnel (Rose et al., 2020). This can strain ICU resources, particularly in settings with limited capacity. Care coordination is another challenge. Effective communication and coordination among multidisciplinary teams are crucial but can be difficult in busy ICU settings (Carson et al., 2020). Ensuring that all team members are on the same page regarding the patient's care plan is essential for optimal outcomes.

Family involvement is also critical. Engaging and supporting the families of PMV patients is essential but can be difficult due to the emotional and psychological toll of prolonged ICU stays (Davidson et al., 2020). Providing adequate support and information to families can help them cope with the situation and participate in the

patient's care. Weaning challenges are another significant issue. Successfully weaning patients from mechanical ventilation requires careful planning and execution, often complicated by the patient's underlying conditions and complications (Boles et al., 2020). Developing individualized weaning protocols and closely monitoring the patient's progress is essential for successful weaning.

2.3 Weaning from Mechanical Ventilation

2.3.1 Communication

Effective communication is a cornerstone in the process of weaning patients from mechanical ventilation. Clear and consistent communication among healthcare providers, patients, and their families is essential for successful weaning outcomes. According to Rose et al (2020), interdisciplinary communication in the ICU setting can significantly affect the weaning process. Regular team meetings and the use of standardized communication tools can help ensure that all team members are aligned in their approach to patient care.

The role of communication extends beyond the healthcare team to include interactions with patients and their families. Patients on prolonged mechanical ventilation often experience anxiety and confusion, which can be alleviated through clear and compassionate communication (Davidson et al., 2020). Providing patients with information about their condition and the weaning process can help reduce anxiety and improve cooperation during weaning trials.

Family involvement is another critical aspect of communication in the weaning process. Families need to be kept informed about the patient's progress and the steps involved in weaning from mechanical ventilation (Carson et al., 2020). Effective communication with families can help them understand the challenges and support their loved ones through the process. This can also alleviate some of the emotional burdens on the family members.

The use of communication aids and technologies can also facilitate better communication with patients who are unable to speak due to intubation or tracheostomy. Tools such as communication boards, speech-generating devices, and

mobile apps can help patients express their needs and participate in their care (Happ et al., 2021). These aids can improve patient satisfaction and engagement, which are crucial for successful weaning.

Training healthcare providers in effective communication skills is essential for improving weaning outcomes. According to a study by Blackwood et al. (2020), training programs that focus on communication strategies can enhance the ability of healthcare providers to interact with patients and families effectively. This can lead to better patient outcomes and a smoother weaning process.

Communication also plays a role in the handover process between different shifts and care teams. Ensuring that all relevant information is accurately conveyed during handovers can prevent misunderstandings and ensure continuity of care (Segall et al., 2020). This is particularly important in the ICU setting, where patients' conditions can change rapidly.

The implementation of structured communication protocols, such as the SBAR (Situation, Background, Assessment, and Recommendation) technique, can improve the clarity and efficiency of communication among healthcare providers (Randmaa et al., 2020). These protocols provide a standardized framework for conveying critical information, reducing the risk of errors and omissions.

Effective communication is also crucial for addressing any barriers to weaning that may arise. Identifying and discussing potential obstacles, such as patient discomfort or psychological distress, can help the healthcare team develop strategies to overcome these challenges (Boles et al., 2020). Open and honest communication can foster a collaborative approach to problem-solving.

In summary, effective communication is vital for the successful weaning of patients from mechanical ventilation. It involves clear interactions among healthcare providers, patients, and their families, the use of communication aids, training in communication skills, structured protocols, and addressing barriers to weaning. These elements collectively contribute to better patient outcomes and a smoother weaning process.

2.3.2 Psychosocial Support

Psychosocial support is a critical component of the weaning process from mechanical ventilation. Patients undergoing prolonged mechanical ventilation often experience significant psychological stress, including anxiety, depression, and delirium (Needham et al., 2020). Providing adequate psychosocial support can help mitigate these issues and facilitate a smoother weaning process.

One of the primary aspects of psychosocial support is addressing the emotional needs of patients. According to a study by Choi et al. (2020), patients on mechanical ventilation often feel isolated and fearful. Providing emotional support through regular interactions with healthcare providers, mental health professionals, and family members can help alleviate these feelings. Encouraging patients to express their concerns and fears can also provide a sense of relief and improve their overall well-being.

Family involvement is another crucial element of psychosocial support. Families play a significant role in providing emotional and psychological support to patients during the weaning process (Davidson et al., 2020). Involving family members in care discussions and decision-making can help them feel more connected to the patient's journey and provide the necessary support. Family presence can also provide comfort and reassurance to the patient, which can positively affect the weaning process.

The use of psychological interventions, such as cognitive-behavioral therapy (CBT), can be beneficial for patients experiencing anxiety and depression during weaning (Wang et al., 2020). CBT can help patients develop coping strategies to manage their emotions and reduce psychological distress. Implementing these interventions as part of the weaning protocol can improve patient outcomes and facilitate a smoother transition to mechanical ventilation.

Providing a supportive environment in the ICU is also essential for psychosocial well-being. Creating a calm and reassuring atmosphere, minimizing noise, and ensuring adequate rest can help reduce stress and anxiety for patients (Needham et al., 2020). Simple measures such as adjusting lighting and providing comfort items can make a significant difference in the patient's experience.

Healthcare providers play a crucial role in delivering psychosocial support. Training in empathy and communication skills can enhance the ability of providers to offer emotional support to patients (Blackwood et al., 2020). Building a trusting relationship with patients can help them feel more secure and supported during the weaning process.

Peer support programs, where patients who have successfully weaned from mechanical ventilation share their experiences with current patients, can also be beneficial (Hosey et al., 2020). These programs can provide hope and motivation to patients, showing them that successful weaning is possible. Peer support can also reduce feelings of isolation and provide a sense of community.

Addressing the psychosocial needs of patients also involves managing delirium, which is common in ICU patients on prolonged mechanical ventilation (Ely et al., 2020). Implementing delirium prevention and management strategies, such as regular orientation, cognitive stimulation, and minimizing sedative use, can help reduce the incidence and severity of delirium. This, in turn, can improve the weaning process and overall patient outcomes.

Spiritual support can also play a role in the psychosocial well-being of patients. For some patients, spiritual beliefs and practices provide comfort and strength during challenging times (Balboni et al., 2020). Providing access to spiritual care services, such as chaplaincy, can help address these needs and support the patient's overall well-being.

In summary, psychosocial support is a vital component of the weaning process from mechanical ventilation. It involves addressing emotional needs, involving family members, implementing psychological interventions, creating a supportive environment, training healthcare providers, offering peer support, managing delirium, and providing spiritual care. These elements collectively contribute to better patient outcomes and a smoother weaning process.

2.4 Care of Patients on PMV

2.4.1 Nutrition and Mobilization

Nutrition plays a critical role in the care of patients on prolonged mechanical ventilation (PMV). Adequate nutritional support is essential for maintaining muscle mass, immune function, and overall health. According to Heyland et al (2020), malnutrition is a common issue in critically ill patients, and those on PMV are particularly vulnerable due to their prolonged ICU stays and increased metabolic demands. Ensuring that patients receive adequate calories and protein is crucial for their recovery and ability to wean from mechanical ventilation.

Enteral nutrition is often the preferred method of feeding for patients on PMV, as it helps maintain gut integrity and function (McClave et al., 2020) Early initiation of enteral feeding, within 24-48 hours of ICU admission, is recommended to improve outcomes. However, challenges such as gastrointestinal intolerance and the risk of aspiration must be carefully managed. Regular assessment of nutritional status and adjustment of feeding regimens are necessary to meet the evolving needs of these patients.

Parenteral nutrition may be required for patients who cannot tolerate enteral feeding or have contraindications to it also parenteral nutrition can provide essential nutrients, but it also carries risks such as infections and metabolic complications. Therefore, it should be used judiciously and monitored closely. The goal is to transition to enteral feeding as soon as it is feasible and safe (Casaer et al., 2020).

Micronutrient supplementation is another important aspect of nutritional care for patients with PMV. Deficiencies in vitamins and minerals can impair immune function and wound healing, further complicating the patient's clinical course, regular monitoring and supplementation of micronutrients, such as vitamin D, zinc, and selenium, can help address these deficiencies and support overall health (Singer et al., 2020).

Mobilization is equally important in the care of patients with PMV. Prolonged immobility can lead to muscle atrophy, joint contractures, and increased risk of pressure ulcers, Early and progressive mobilization, including passive and active range-of-

motion exercises, can help mitigate these complications. Mobilization should be tailored to the patient's condition and tolerance, to gradually increase activity levels (Hermans et al., 2020).

Physical therapy plays a crucial role in the mobilization of patients with PMV. According to a study by Schweickert et al. (2020), early physical therapy interventions can improve functional outcomes and reduce the duration of mechanical ventilation. Physical therapists work closely with the ICU team to develop individualized exercise programs that address the specific needs and limitations of each patient.

The use of specialized equipment, such as tilt tables and cycle ergometers, can facilitate early mobilization in patients who are unable to participate in traditional exercises, these devices allow for passive and active-assisted movements, helping to maintain muscle strength and joint flexibility. Incorporating these tools into the care plan can enhance the effectiveness of mobilization efforts (Needham et al., 2020).

Interdisciplinary collaboration is essential for successful nutrition and mobilization strategies. Dietitians, physical therapists, nurses, and physicians must work together to develop and implement comprehensive care plans, regular team meetings, and communication to ensure that all aspects of the patient's care are addressed and adjusted as needed (Blackwood et al., 2020).

In summary, nutrition and mobilization are critical components of the care of patients with PMV. Adequate nutritional support, including enteral and parenteral feeding, micronutrient supplementation, and early mobilization, can significantly affect patient outcomes. Interdisciplinary collaboration and individualized care plans are essential for addressing the unique needs of these patients.

2.4.2 Ventilator-Associated Pneumonia (VAP), Delirium, Anxiety, and Dyspnea

Ventilator-associated pneumonia (VAP) is a significant complication in patients with prolonged mechanical ventilation. VAP is associated with increased morbidity, longer ICU stays, and higher mortality rates. Preventing VAP requires stringent infection control measures, including hand hygiene, oral care, and the use of subglottic secretion

drainage. Regular monitoring and early identification of VAP are crucial for timely intervention and treatment. (Klompas et al., 2020)

The implementation of ventilator care bundles, which include a set of evidence-based practices, has been shown to reduce the incidence of VAP These bundles typically include measures such as elevating the head of the bed, daily sedation vacations, and assessment of readiness to extubate. Adherence to these practices can significantly improve patient outcomes and reduce the risk of VAP. (Bonten et al., 2020).

Delirium is another common issue in patients with PMV. Delirium is characterized by acute confusion, disorientation, and fluctuating levels of consciousness it is associated with longer ICU stays, increased mortality, and long-term cognitive impairment. Preventing and managing delirium involves a multifaceted approach, including regular orientation, cognitive stimulation, and minimizing the use of sedatives (Ely et al., 2020).

Non-pharmacological interventions, such as early mobilization, sleep promotion, and the use of hearing aids and glasses can help reduce the incidence and severity of delirium, these interventions aim to create a supportive environment that promotes cognitive function and reduces sensory deprivation. Regular assessment using tools such as the Confusion Assessment Method for the ICU (CAM-ICU) can help identify delirium early and guide appropriate management (Needham et al., 2020).

Anxiety is a prevalent issue in patients on PMV, often resulting from the stress of prolonged ICU stays, the inability to communicate, and the fear of the unknown, addressing anxiety involves providing emotional support, clear communication, and involving patients in their care decisions. Psychological interventions, such as cognitive-behavioral therapy (CBT), can help patients develop coping strategies to manage their anxiety (Choi et al., 2020).

Pharmacological interventions, such as the use of anxiolytics, may be necessary for some patients, but they should be used cautiously due to the risk of sedation and delirium, non-pharmacological approaches, such as relaxation techniques, music therapy, and the presence of family members, can also be effective in reducing anxiety.

Creating a calm and reassuring environment in the ICU can help alleviate anxiety and improve patient comfort (Wang et al., 2020).

Dyspnea, or difficulty breathing, is a common symptom in patients with PMV and can significantly affect their quality of life. Managing dyspnea involves optimizing ventilator settings, providing adequate analgesia, and addressing any underlying conditions that may be contributing to respiratory distress. Regular assessment of dyspnea using tools such as the Visual Analog Scale (VAS) can help guide appropriate interventions (Fan et al., 2021).

Non-pharmacological interventions, such as positioning, breathing exercises, and the use of fans, can help alleviate dyspnea. These interventions aim to improve respiratory mechanics and reduce the sensation of breathlessness. Providing patients with a sense of control over their breathing, such as with patient-controlled analgesia, can also be beneficial in managing dyspnea (Boles et al., 2020).

Interdisciplinary collaboration is essential for addressing VAP, delirium, anxiety, and dyspnea in patients with PMV. Nurses, respiratory therapists, physicians, and other healthcare providers must work together to develop and implement comprehensive care plans. Regular team meetings and communication ensure that all aspects of the patient's care are addressed and adjusted as needed (Blackwood et al., 2020).

Education and training of healthcare providers are crucial for the effective management of these complications. According to a study by Balas et al. (2020), training programs that focus on the prevention and management of VAP, delirium, anxiety, and dyspnea can improve patient outcomes. These programs should include evidence-based practices and emphasize the importance of interdisciplinary collaboration.

Family involvement is also critical in the care of patients with PMV. Families can provide emotional support, help with communication, and participate in care decisions. Educating families about the potential complications and how they can help manage them can empower them to be active participants in the patient's care. Family presence can also provide comfort and reassurance to the patient, which can positively affect their overall well-being (Davidson et al., 2020).

2.5 Conclusion

The care of patients with PMV involves addressing multiple complications, including VAP, delirium, anxiety, and dyspnea ,dealing with weaning from mechanical ventilation. Preventing and managing these complications requires a multifaceted approach, including infection control measures, non-pharmacological interventions, pharmacological treatments, and interdisciplinary collaboration, using an effective communication and psychosocial, mobilization and nutrition, support Education and training of healthcare providers, as well as family involvement, are essential for improving patient outcomes and ensuring comprehensive care.

Chapter Three: Methodology

3.1 Introduction

This chapter includes an overview of the research methodologies applied in this study. It contains the following: research sample, study environment, research duration, data source, and inclusion and exclusion criteria. Sample procedures, sample sizes, validity, reliability, data collection procedure, research design, variables (research measures), ethical considerations, analysis plans, and study limitations are all covered.

3.2 Research Design

This study is a quantitative cross-sectional, according to Polit (2016) quantitative research incorporates numerical data; outcomes are typically supported by empirical data, and, the goal of the research is generalizability.

3.3 Population

In this study, a cross-sectional survey was conducted to explore the existing care practices, protocols, and guidelines used for patients undergoing PMV in all adult Palestinian ICUs in the region of West Bank, see Table 1.

Table 3.1: Nurses' distribution in adult Palestinian ICUs, West Bank

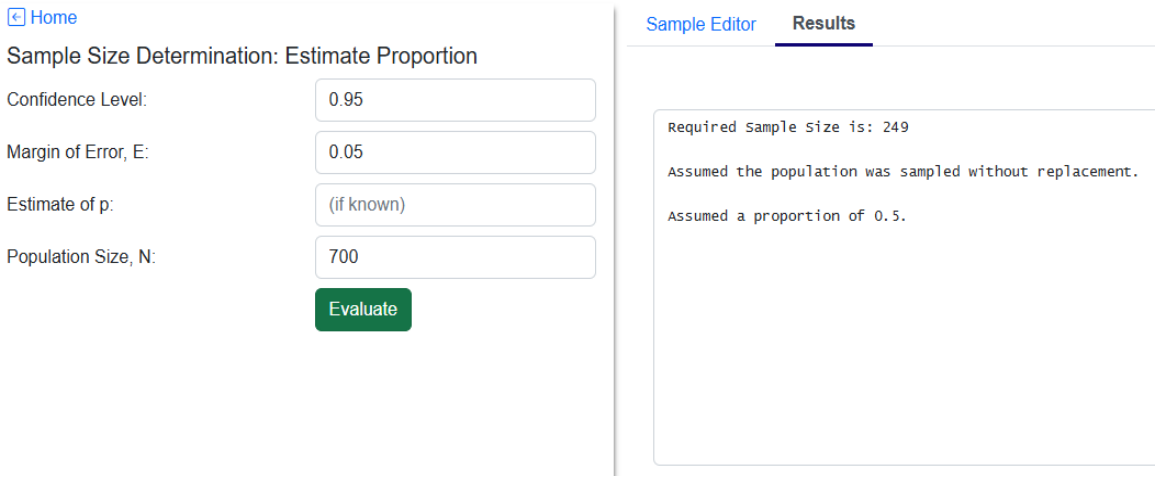
Governmental sector			Non - governmental sector		
Hospital – City		ICU Team	Hospital – City		ICU Team
1	Jericho - Jerico	12	15	Ibn Sina – Jenin	53
2	Turkish – Tubas	14	16	Alrazi – Jenin	34
3	Al-Hussein - Beit Jala	24	17	Specialized Arab – Nablus	19
4	Dura – Dura	15	18	An-Najah – Nablus	41
5	Dr. Thabet Thabet – Tulkarm	18	19	Specialized Nablus – Nablus	44
6	Khalil Suleiman – Jenin	24	20	Specialized Alesraa - Tulkarm	11
7	Yasser Arafat - Salfeet	11	21	Al-Mezan – Hebron	22
8	Abu Al-Hasan Qassem - Yatta	7	22	Al-Ahli – Hebron	57

9	Palestine Medical Complex (PMC)-Ramallah	74	23	Arab Society for Rehabilitation (BASR) – Bethlehem	36
10	Darwish Nazzal – Qalqilya	15	24	Yamamah – Bethlehem	10
11	Al-Watani – Nablus	22	25	H clinic – Ramallah	14
12	Rafidia – Nablus	25	26	Istishari – Ramallah	46
13	Queen Alia – Hebron	40			
14	Mahmoud Abbas – Halhoul	12			
Total cohort			Total cohort		

The study was distributed to all nurses working in ICUs in Palestinian hospitals. The total ICU nurses are 700.

3.4 Sample Size

To determine the minimum required sample size, we adopted the single population proportion formula implemented in the online Stat disk software. The minimal recommended sample size was 249 based on a ±5% margin of error and with a 95% confidence interval.



The sample size depended on the response rate of nurses working in the ICU department.

Table 3.2: Nurses' response rate according to hospital

Hospital		ICU Team	Response n (%)
Governmental sector			
1	Turkish	14	10 (71.4)
2	Al-Hussein	24	20 (83.3)
3	Dura	15	12 (80.0)
4	Khalil Suleiman	24	16 (66.7)
5	Yasser Arafat	11	8 (72.7)
6	Abu Al-Hasan Qassem	7	6 (85.7)
7	PMC	74	58 (78.4)
8	Al-Watani	25	9 (36.0)
9	Rafidia	22	20 (90.9)
10	Queen Alia	40	35 (87.5)
11	Mahmoud Abbas	12	11 (91.7)
Total cohort		268	205 (76.5)
Non - governmentalsector			
12	Specialized Arab	19	13 (68.4)
13	An-Najah	41	22 (53.7)
14	Al-Mezan	22	20 (90.9)
15	BASR	36	30 (83.3)
Total cohort		118	85 (72.0)
Overall cohort		386	290 (75.1)

3.5 Setting of the Study

The following are the government and non – governmental hospitals in the West Bank, which include an intensive care department: the study was carried out in all of the following locations: the south, north, and center of Palestine (the West Bank), covering all of the intensive care departments.

Table 3.3: Nurses' response rate according to hospital and unit specialty

Hospital		**ICU Team**	**ICU specialty**	**n (%)[a]**
Governmental sector				
1	Turkish	14	General	10 (100.0)
2	Al-Hussein	24	General	10 (50.0)
			Cardiac	10 (50.0)
3	Dura	15	General	11 (91.7)

			Cardiac	1 (8.3)
4	Khalil Suleiman	24	General	16 (100.0)
5	Yasser Arafat	11	General	8 (100.0)
6	Abu Al-Hasan Qassem	7	Surgical	6 (100.0)
7	PMC	74	General	29 (50.0)
			Neuro	8 (13.8)
			Cardiac	21 (36.2)
8	Al-Watani	25	General	8 (88.9)
			Cardiac	1 (11.1)
9	Rafidia	22	General	20 (100.0)
10	Queen Alia	40	General	35 (100.0)
11	Mahmoud Abbas	12	General	11 (100.0)
Total cohort		**268**	**General**	**158 (77.1)**
			Neuro	**8 (3.9)**
			Cardiac	**33 (16.1)**
			Surgical	**6 (2.9)**
Non – governmental sector				
12	Specialized Arab	19	General	13 (100.0)
13	An-Najah	41	Cardiac	10 (45.5)
			Medical	12 (54.5)
14	Al-Mezan	22	General	20 (100.0)
15	BASR	36	General	10 (33.3)
			Cardiac	20 (66.7)
Total cohort		**118**	**General**	**43 (50.6)**
			Cardiac	**30 (35.3)**
			Medical	**12 (14.1)**
Overall cohort		**386**	**General**	**201 (69.3)**
			Cardiac	**63 (21.7)**
			Medical	**12 (4.1)**
			Neuro	**8 (2.8)**
			Surgical	**6 (2.1)**
[a] Frequencies and percentages within each unit based on response				

3.6 Duration of the Study

The ethical approval for this project was given on February 18, 2024. According to the information in the proposal, data was gathered from 30 -May to 20 July 2024 to help the researcher with their assignment. Data analysis was place in July of 2024. The completed thesis was turned in for review in August 2024

3.7 Inclusion Criteria

The inclusion criteria set for sample selection are as follows

1- All Registered nurses and all practical nurses, who have been working in Governmental and non – governmental hospitals for more than six months.

2- All head nurses of intensive care departments in governmental and non – governmental hospitals

3.8 Instrumentation

This questionnaire based on recent research that evaluated Swedish care practices and protocols for patients requiring MV for more than 7 days (Cederwall et al., 2023). In Cederwall et al., 2023, the researcher adapted the questionnaire used in a previous study to evaluate Canadian care practices for patients who required MV for more than 21 days (Rose et al., 2015). This final version of the questionnaire included 59 questions distributed in eight domains: (1) respondents work-related sociodemographic information (6 questions) (2) unit and patient characteristics (20 questions); (3) ventilator weaning (11 questions); (4) mobilization (6 questions); (5) communication (2 questions);(6)nutrition(4questions);(7)ventilator-associated pneumonia/delirium/anxiety/dyspnea (7questions); and(8) psychosocial support (3 questions).

3.9 Sample and Sampling

In addition to ICU heads of departments, all intensive care nurses were included in the study because the research sample consisted of convenience samples from 15 hospitals and was purposive. The inclusion criteria also included nurses who had worked in ICUs in both government and non – governmental hospitals for at least six months and those who met the participation requirements. The number of participants in the study is determined by the response rate, which for government and non – governmental hospitals is 75.1 percent (n=290).

3.10 Exclusion Criteria

The exclusion criteria set for sample selection are as follows

1- Part-time nurses
2- All Registered nurses and all practical nurses, who are working in Governmental and non – governmental hospitals for less than six months

3.11 Validity

The validity of the questionnaire through content validity. A research panel comprising faculty members from many universities on Palestine , also Anesthesiologist, and head nurse of the intensive care unit , suggested to add 3 questions regarding ventilator-associated pneumonia (VAP) . Before any data was collected, their suggestions were considered, and changed, and the experts recommended the survey. Furthermore, their feedback was used to construct the questions understandably, where small modifications were made in the wording.

3.13 Data Collection

The cross-sectional study was conducted for 50 days, which started on 30 -May until 20 –July- 2024. All Palestinian nurses in adult ICUs distributed in 15 hospitals in the region of West Bank were invited to participate in the study. For north , center hospitals and South Hospital , managers were emailed with a request to participate in the study. The email included information on the study and an online version of the questionnaire available through the shortened Web link (https://rb.gy/vyw8g2. ,

So the web questionnaire were restrict for target nurses during one response only for each filling attempt by nurse also each page on online website had a mandatory answer for each question on each selection , also they had free time after obtaining agreement from the MOH and the hospital administration for a non – governmental hospital.

Despite repeated requests, two hospitals (Istishari – Ramallah, Al-Ahli - Hebron) declined to participate, after seeking agreement; the researcher screened all ICUs by telephone to confirm eligibility and to follow-up questionnaire completion. Furthermore, weekly reminders were sent to all nurse managers via telephone or email,

3.14 Variables (study measures)

Dependent variable	Independent variable
nurses' view of early mobilization as a priority for PMV patients	Age
nurses' adoption of weaning strategies for PMV patients	Gender
	Education
	ICU experience
	No. of ICU beds
	Monthly admissions
	The nurse-to-patient ratio
	In-service ICU training
	Healthcare sector
Dependent variable	Independent variable
nurses' adoption of person-centered care routines	Patient involvement in developing and evaluating weaning plans
	Family involvement in developing and evaluating weaning plans
	Use communication techniques
	Access psychiatric or psychological counseling
	Offer psychologist or social worker services for the family.
	Held regular care conferences including family participation

3.15 Ethical Consideration

The Health Research Ethics Committee of the AAUP, the Palestinian Ministry of Health, and the hospital administrators in the non – governmental sectors where the study was conducted all provided ethical review and approval for this research. In addition, participant confidentiality was ensured, meaning that no names or personal information were disclosed in the study.

3.16 Data Analysis

Data analysis was performed using SPSS (Statistical Package for Social Sciences) software, edition 29. I examined results using descriptive statistics, where aggregated responses were reported as frequencies and percentages, and continuous responses were described as means and standard deviations, minimums, and maximums. Inferential statistics were used to explore possible relationships between the study variables. For instance, studying the associations between demographic data and the level of implementation of weaning strategies and considering early mobilization as a priority. The chi-square ($\chi 2$) test was used to determine these associations between categorical variables. Furthermore, we compared nurses' care practices for PMV patients in governmental ICUs with their counterparts in non – governmental ICUs using $\chi 2$ tests. A P-value ≤ 0.05 was considered statistically significant.

3.17 conclusion

This study provides a detailed examination of care practices and protocols for patients undergoing prolonged mechanical ventilation (PMV) in adult ICUs across the West Bank. Using a quantitative cross-sectional design, the research was conducted over 50 days and involved a representative sample of 290 ICU nurses, selected through a robust sampling strategy. The study utilized a carefully developed and validated questionnaire, based on established international tools and refined with expert feedback to ensure relevance and clarity. By employing advanced statistical analysis, key relationships were identified between demographic, institutional, and practice-related variables, shedding light on factors influencing early mobilization and weaning strategies in ICU settings. Ethical considerations were meticulously upheld, ensuring participant confidentiality and securing approvals from health and institutional authorities. This research not only highlights current practices but also offers evidence-based insights to guide the enhancement of PMV care in Palestinian ICUs, emphasizing the importance of mobilization, patient-centered approaches, and family involvement in care planning.

Chapter Four: Results

4.1 Introduction

This chapter provides our findings on care practices in Palestinian ICUs specific to patients requiring PMV. Specifically, it explores existing patient and unit characteristics, unit policies, and care practices, organization of care, and protocols for ventilator weaning, mobilization, communication, nutrition, symptom assessment, and psychological support for adult patients undergoing PMV in Palestinian ICUs. It also explores possible relationships between some care practices for PMV patients and demographic data among participants. Furthermore, it compares nurses' practices for PMV patients in both healthcare sectors (governmental and private).

4.2 General Characteristics of the Respondents

The general characteristics of the respondents are presented in Table 4. The mean age of participating nurses was 33.5 ± 5.8 years, ranging from 23 to 50 years old. Most of them (54.5%) in the age group 30 – 39. The majority of the respondents were staff nurses (89.0), men (63.1%), and with a bachelor's degree (83.1%). The mean ICU experience of the participating nurses was 7.4 ± 3.7 years, ranging from 0.5 to 25 years old. Most of them (63.4%) had 5 – 10 years of experience. Of the 59.0% participating nurses who had received in-service ICU training, only 3.4% had received ventilation training.

Table 4.1: General characteristics of the respondents (N = 290)

Characteristic	Categories	n (%)
Age (years)	< 30	85 (29.3)
	30 - 39	158 (54.5)
	≥ 40	47 (16.2)
	Mean ± SD (min-max)	33.5 ± 5.8 (23 – 50)
Gender	Male	183 (63.1)
	Female	107 (36.9)
Job title	Head nurse	18 (6.2)
	Staff Nurse	258 (89.0)
	Practical	14 (4.8)
Education	Diploma	14 (4.8)
	Bachelor	241 (83.1)
	Master	35 (12.1)
ICU Experience (years)	< 5	61 (21.0)

	5 - 10	184 (63.4)
	11 - 15	36 (12.4)
	> 15	9 (3.1)
	Mean ± SD (min-max)	7.4 ± 3.7 (0.5 – 25)
In-service ICU training	None	119 (41.0)
	Critical	101 (34.8)
	Cardiac	58 (20.0)
	Ventilation	10 (3.4)
	Neurosurgery	1 (0.3)
	Renal	1 (0.3)

4.3 Unit and Patient Characteristics

The characteristics of ICUs and PMV patients are summarized in Table 5. We found that more than two-thirds of the respondents (69.3 %) were working in general ICUs and using a 1:2 nurse-to-patient ratio (53.8%). Most respondents (59.3 %) had special rules related to the nurse and patient care. Most respondents (70.7 %) indicated that their routines were based on the concept of person-centered care. Nurses most often participated in routine care planning for MV patients (86.6%), followed by physicians (58.6%). On the other hand, patients and patient's family members participated in these plans by 16.2% and 21.7 % of ICUs, respectively. Only 13.4% of the ICUs had a 24-hour-per-day open visiting policy. More than half (55.5%) of the ICUs were comprised of 5 to 10 ICU beds, where the mean number of ICU beds was 8.3 ± 3.7, ranging from 3 to 17. Most ICUs (71.4%) were equipped with 5 to 10 ventilators and only 9.3% of them were equipped with more than 10 ventilators, where the mean number of ventilators in these units was 7.0 ± 2.5, ranging from 3 to 15. Only 45.5% of the participating nurses reported using modern instruments, e.g., special beds for burned patients. Most of the respondents (92.8%) indicated their need for physiotherapists or respiratory therapists. Of those, only 18.6% of the nurses reported the need for a physiotherapist or respiratory therapist more than once a day.

Cardiac patients (85.0%) followed by respiratory patients (80.8%) were more common in ICU patients. The mean number of admissions in these units during the last month was 25.4 ± 11.1, ranging from 5 to 62, where most of the ICUs (63.8%) comprised 20 to 40 patients. In these admissions, the mean proportion of those who required MV for ≥ 7 days was 23.2%. Furthermore, the mean number of PMV patients during the past month

was 5.1 ± 1.9, ranging from 1 to 9, where more than half (54.5%) of the ICUs had more than 3 to 5 PMV patients. Acute respiratory distress syndrome (ARDS) (91.0%), followed by cardiovascular disorders (61.7%) were the most frequent primary reasons for PMV. The most common comorbidities for PMV patients were cardiovascular diseases (76.2%) and respiratory diseases (72.8%). Most of the participating nurses (39.0%) reported that PMV patients need high set-up parameters for MV occasionally.

Only 30.7% of respondents reported following a sedation protocol for MV patients. The majority of respondents (63.4%) did not use any specific sedation scale, whereas only 29.0% reported using the Richmond Agitation Sedation Scale (RASS). Moreover, the preferred drugs to relax the PMV patients were sedatives (93.8%), and muscle relaxants (56.9%).

Table 4.2: Unit and patient characteristics (N = 290)

Characteristic	Categories	N (%)
ICU specialty	General	201 (69.3)
	Cardiac	63 (21.7)
	Neuro	8 (2.8)
	Medical	12 (4.1)
	Surgical	6 (2.1)
No. of ICU beds	< 5	49 (16.9)
	5 – 10	161 (55.5)
	> 10	80 (27.6)
	Mean ± SD (min-max)	8.3 ± 3.7 (3 – 17)
No. of ventilators	< 5	56 (19.3)
	5 – 10	207 (71.4)
	> 10	27 (9.3)
	Mean ± SD (min-max)	7.0 ± 2.5 (3 – 15)
Visiting times	24 hours per day	39 (13.4)
	Regulated times	251 (86.6)
Patient type	Cardiac	243 (85.0)
	Respiratory	231(80.8)
	Neuro	152 (53.1)
	Renal	175 (61.2)
	Burn	116 (40.6)
	Trauma	139 (48.6)
No. of patients admitted last month	< 20	81 (27.9)
	20 – 40	185 (63.8)
	> 40	24 (8.3)

	Mean ± SD (min-max)	25.4 ± 11.1 (5 – 62)
No. of patients on MV for more than a week last month	1 – 2	18 (6.2)
	3 – 5	158 (54.5)
	6 – 9	114 (39.3)
	Mean ± SD (min-max)	5.1 ± 1.9 (1 – 9)
Special rules related to nurse and patient care (e.g., nurse-patient ratio)	Yes	172 (59.3)
	No	118 (40.7)
Nurse: patient ratio for MV patients	1:1	43 (14.8)
	1:2	156 (53.8)
	1:3	60 (20.7)
	1:4	31 (10.7)
The need for physiotherapists or respiratory therapists	Once a day	81 (27.9)
	More than once a day	54 (18.6)
	Occasionally	134 (46.2)
	No need	21 (7.2)
Use modern instruments (e.g., special beds for burned patients)	Yes	132 (45.5)
	No	158 (54.5)
PMV patients need high set-up parameters for MV	Always	50 (17.2)
	Usually	103 (35.5)
	Occasionally	113 (39.0)
	Rarely	21 (7.2)
	Never	3 (1.0)
"Person-centered care" routines	Yes	205 (70.7)
	No	85 (29.3)
Participants in routine care planning for MV patients	Patient	47 (16.2)
	Physician	170 (58.6)
	Respiratory Therapist	20 (6.9)
	Nurse	251 (86.6)
	Physiotherapist	96 (33.1)
	Family members	63 (21.7)
The primary reason for PMV[a]	Acute respiratory distress syndrome (ARDS)	264 (91.0)
	Pneumonia	124 (42.8)
	Chronic obstructive pulmonary disease (COPD)	174 (60.0)
	Neuromuscular disorders	102 (35.2)
	Traumatic injuries	108 (37.2)
	Sepsis and septic shock	140 (48.3)
	Cardiovascular disorders	179 (61.7)
	Post-operative complications	163 (56.1)
	Overdose or poisoning	95 (32.8)

Comorbidities	Cardiovascular diseases	221 (76.2)
	Respiratory diseases	211 (72.8)
	Endocrine disorders	146 (50.3)
	Renal diseases	163 (56.2)
	Neurological disorders	114 (39.3)
	Gastrointestinal disorders	72 (24.8)
	Cancer	96 (33.1)
	Psychiatric disorders	58 (20.0)
	Immunological disorders	110 (37.9)
	Infectious diseases	144 (49.7)
Medication type used to relax the PMV patients	None	5 (1.7)
	Sedatives	272 (93.8)
	Muscles relaxant	165 (56.9)
	Other	16 (5.5)
Follow protocols for sedation for MV patients	Yes	89 (30.7)
	No	201 (69.3)
The sedation scale used to assess the sedation level for patients on MV	None	184 (63.4)
	The Riker Sedation-Agitation Scale (SAS)	18 (6.2)
	The Richmond Agitation Sedation Scale (RASS)	84 (29.0)
	Ramsay scale	4 (1.4)
[Multiple] responses were possible.		

4.4 Weaning

Table 6 summarizes our findings about clinical practices regarding ventilator weaning for PMV patients from ICU nurses' view. Only 23.8% of respondents reported following weaning protocols. Most respondents reported using a variety of weaning methods for PMV patients with gradual lowering of SIMV frequency being the most common (72.4%). Intelligent- Adaptive Support Ventilation (ASV) was the most frequently utilized automatic mode for weaning (61.0%). Respondents reported that physiological parameters (62.1%) and clinical assessment (61.4%) were the most widely used weaning strategies for PMV patients, whereas (32.1%) of the respondents did not use any specific weaning strategy. Physicians most often determined weaning methods for PMV patients (93.8%), followed by nurses (42.1%). Most ICUs (88.6 %) had their individualized weaning plans for PMV patients. Collaborative weaning decisions by

physicians and ICU nurses were relatively uncommon (34.6%). The individualized weaning plans were most often evaluated and revised daily (50.6%). Patients and patients' family members were involved in the development and revision of these plans by 52.9 % and 51.8% of ICUs, respectively. Airway clearance maneuvers such as lung recruitment manually assisted mucus, and cough machine (nebulizer) was used by 27.6%, 34.1%, and 89.7% of ICUs, respectively.

Table 4.3: Weaning practices for PMV patients (N = 290)

Characteristic	Categories	n (%)
Most common weaning methods for PMV patients	Gradual lowering of SIMV frequency	210 (72.4)
	Gradual reduction of pressure support (PS)	87 (30.0)
	Volume support (VS)	104 (35.9)
	Gradually increased time with CPAP	127 (43.8)
	Gradually increased time with a wet nose and oxygen via tracheostomy (LFO_2)	50 (17.2)
	Gradually increased time with active humidification and high flow system over the tracheostomy (HFO_2)	50 (17.2)
Most frequent automatic modes utilized in weaning training trials	Proportional Assist Ventilation Plus (PAV)	70 (24.1)
	Intelligent- Adaptive Support Ventilation (ASV)	177 (61.0)
	Neutrally Adjusted Ventilatory Assist (NAVA)	107 (36.9)
	Smart mode	84 (29.0)
The choice of weaning method for PMV patients depends on	Physician	272 (93.8)
	Nurse	122 (42.1)
	Respiratory Therapist	22 (7.6)
	Physiotherapist	13 (4.5)
Follow weaning protocols	Yes	69 (23.8)
	No	221 (76.2)
Weaning strategies routinely used for PMV patients	None	93 (32.1)
	Clinical assessment (e.g., stable hemodynamics, adequate oxygenation, awake and cooperative)	178 (61.4)
	Physiological parameters (e.g., tidal volume, vital capacity)	180 (62.1)
	Spontaneous breathing trial (SBT)	102 (35.2)

	Nutritional status	30 (10.3)
Establish and document individualized weaning plans for PMV patients	Yes	257 (88.6)
	No	33 (11.4)
Who establishes the individual plan? [a]	Physician	244 (94.9)
	Nurse	102 (39.7)
	Respiratory Therapist	6 (2.3)
	Physiotherapist	14 (5.4)
	Physician and Nurse	89 (34.6)
How often the individual plan is being evaluated and revised?	Every shift	55 (21.4)
	Daily	130 (50.6)
	Several times each week	45 (17.5)
	Occasionally	27 (10.5)
The patient participates when the weaning plan is established or evaluated	Yes	136 (52.9)
	No	121 (47.1)
Family members take part in the establishment or revision of individualized weaning plans.	Yes	133 (51.8)
	No	124 (48.2)
Routine use of lung recruitment maneuvers	Yes	80 (27.6)
	No	210 (72.4)
Routine use of manual assisted mucus mobilization (vibrator)	Yes	99 (34.1)
	No	191 (65.9)
Routine use of cough machine (nebulizer)	Yes	260 (89.7)
	No	30 (10.3)
[Multiple] responses were possible.		

4.5 Mobilization

Table 7 demonstrates nurses' practices regarding mobilization for PMV patients. Only 16.9% of the respondents reported following mobilization protocols for PMV patients. Less the half of the respondents (47.2%) indicated that they established and documented their individualized mobilization plans. Nearly half of the respondents (47.6%) assessed patients for mobilization on the day of admission, whereas 14.1% did not perform a mobilization assessment. Only 13.8% of the respondents indicated that walking during MV was a routine practice among patients. On the other hand, bed cycling for active mobilization was common (57.2 %). Only 22.1% of the respondents considered early mobilization as a priority.

Table 4.4: Mobilization practices for PMV patients (N = 290)

Characteristic	Categories	n (%)
How early are patients assessed for mobilization?	On admission	138 (47.6)
	2-4 days of admission	88 (30.3)
	5-7 days of admission	23 (7.9)
	No assessment	41 (14.1)
Follow mobilization protocol/algorithm for PMV patients.	Yes	49 (16.9)
	No	241 (83.1)
Establish and document individualized mobilization plans for PMV patients	Yes	137 (47.2)
	No	153 (52.8)
Patients mobilized to walking under ongoing MV	Yes	18 (6.2)
	Sometimes	22 (7.6)
	No	250 (86.2)
Use of bed-cycling to mobilize patients on MV	Yes	50 (17.2)
	Sometimes	116 (40.0)
	No	124 (42.8)
Prioritized early mobilization	Yes	64 (22.1)
	No	226 (77.9)

4.6 Communication

Table 8 demonstrates communication strategies for PMV patients. The traditional communication tools were the most common such as paper and pen (61.0%) and alphabet/word or picture plate (51.4%). On the other hand, fewer respondents (10%) did not use any communication technique. Only 19.3% of the ICUs had access to a speech-language therapist.

Table 4.5: Communication practices for PMV patients (N = 290)

Characteristic	Categories	n (%)
Communication strategies available for PMV patients	Alphabet/word or picture plate	149 (51.4)
	Paper and pencil	177 (61.0)
	Writing pad/ whiteboard	50 (17.2)
	Computer/tablet	20 (6.9)
	Cuffless tracheostomy tubes	14 (4.8)
	Fenestrated tracheostomy tubes	8 (2.8)
	Speaking valve over the tracheal cannula	10 (3.4)
	Signals	3 (1.0)

	None	29 (10.0)
Access to a speech-language therapist	Yes	56 (19.3)
	No	234 (80.7)

4.7 Nutrition

Table 9 illustrates our findings regarding nutrition for PMV patients. Only 37.6% of the respondents follow a nutrition protocol. Most ICUs managed nutrition by physicians (88.3%). Approximately one-quarter (22.4%) of the respondents reported that dieticians assessed the nutritional status of PMV patients and decided on the nutrition plan. Swallowing assessment was performed in most units (83.1%), mostly using clinical examination of oral reflex (73.4%), followed by clinical examination of laryngeal reflex (21.2%).

Table 4.6: Nutrition practices for PMV patients (N = 290)

Characteristic	Categories	n (%)
Follow a nutrition protocol.	Yes	109 (37.6)
	No	181 (62.4)
Who assesses the nutritional status and choice of nutrition for PMV patients? [a]	Physician	256 (88.3)
	Nurse	73 (25.2)
	Dietitian	65 (22.4)
Assess swallowing function for PMV patients.	Yes	241 (83.1)
	No	49 (16.9)
How is swallowing function assessed in your ICU?	Clinical examination of oral reflex	177 (73.4)
	Clinical examination of laryngeal reflex	51 (21.2)
	Swallow test with colored liquid	8 (3.3)
	Swallow test with passed diet	3 (1.2)
	Fibrotic examination of swallowing function	2 (0.8)

[Multiple] responses were possible.

4.8 Symptom Management

Table 10 summarizes our findings about ventilator-associated pneumonia VAP, delirium, anxiety, and dyspnea monitoring and management. More than one-third (35.8%) of the respondents reported the monthly percentage of VAP exceeded 20%. Only 40.7% believed that the percentage of VAP was acceptable. Most respondents believed that the period of mechanical ventilation was the main cause of VAP (81.0%), followed by the lack of protocols for prevention (67.9%). Nearly one quarter (25.5%) of respondents used scales to assess anxiety, mostly (19.3%) used the Faces Anxiety Scale. Fewer respondents (15.5%) used scales to assess dyspnea; most (11.4%) used the Numeric

Rating Scale for Dyspnea (NRS-D). Only 26.9% of the respondents used scales to assess delirium, mostly (14.8%) used the Confusion Assessment method for the ICU (CAM-ICU), where nearly one-quarter (23.4%) of them reported the monthly percentage of delirium exceeded 20%.

Table 4.7: Symptom management (ventilator-associated pneumonia VAP, delirium, anxiety, and dyspnea) (N = 290)

Characteristic	Categories	n (%)
Monthly % of VAP	< 10	103 (35.5)
	10 – 19	83 (28.6)
	20 – 29	72 (24.8)
	≥ 30	32 (11.0)
The % of VAP is acceptable.	Yes	118 (40.7)
	No	172 (59.3)
The primary reason for VAP[a]	Type of patients	116 (40.0)
	Nurse: patient ratio	123 (42.4)
	Occupation rate in the unit	164 (56.6)
	Shortage of the staff	135 (46.6)
	No respiratory therapist	176 (60.7)
	Medical errors	149 (51.4)
	Nurses experience	160 (55.2)
	Lack of protocols for prevention	197 (67.9)
	Period of mechanical ventilation	235 (81.0)
Scale used to assess anxiety for PMV patients	None	216 (74.5)
	Faces Anxiety Scale	56 (19.3)
	State-Trait Anxiety Inventory (STAI)	4 (1.4)
	Visual Analog Scale for Anxiety (VAS-A)	10 (3.4)
	Modified COMFORT Scale	1 (0.3)
	Hamilton Anxiety Rating Scale (HAM-A)	3 (1.0)
Scale used to assess dyspnea for PMV patients	None	245 (84.5)
	Numeric Rating Scale for Dyspnea (NRS-D)	33 (11.4)
	Visual Analog Scale for Dyspnea (VAS-D)	6 (2.1)
	Modified Borg Dyspnea Scale (MBS-D)	4 (1.4)
	Ventilator measures	2 (0.7)
Scale used to assess delirium for PMV patients	None	212 (73.1)
	The Confusion Assessment Method for the ICU (CAM-ICU)	43 (14.8)

	Intensive Care Delirium Screening Checklist (ICDSC)	25 (8.6)
	Nursing Delirium Screening Scale (Nu-DESC)	10 (3.4)
% of delirium	< 10	128 (44.1)
	10 – 19	94 (32.4)
	20 – 29	59 (20.3)
	≥ 30	9 (3.1)
[Multiple] responses were possible.		

4.9 Psychosocial Support

Table 11 illustrates our findings regarding psychosocial support for PMV patients**.** Generally, strategies that supported patient and family well-being were uncommon. Only 23.1% of respondents reported that psychiatric or psychological services were available for PMV patients. Similarly, 27.2 % of the respondents reported that family members had access to a psychologist or a social worker. More than half of ICUs (57.6%) held regular family meetings.

Table 4.8: Psychosocial support for PMV patients (N = 290)

Characteristic	Categories	n (%)
Access to psychiatric or psychological counseling for patients on PMV	Yes	67 (23.1)
	No	223 (76.9)
Offer any psychologist or social worker services for family members	Yes	79 (27.2)
	No	211 (72.8)
Hold regular meetings/care conferences for family members of patients on PMV.	Yes	167 (57.6)
	No	123 (42.4)

4.10 Care Practices for PMV Patients According to Healthcare Sectors

Table 12 presented a comparative analysis among governmental and non - governmental ICU nurses regarding various care practices for PMV patients. Overall, the level of implementation of care practices policies specific to PMV patients was more common in non - governmental Palestinian ICUs. There were no significant differences in the adoption proportions of sedation, mobilization, and weaning protocols in both governmental and non - governmental ICUs (p-value = 0.053, 0.210, and 0.591, respectively). On the other hand, nutrition protocols and swallowing assessments were more common among respondents within non - governmental ICUs (p-value < 0.001

and p-value = 0.029, respectively). The development of individualized mobilization and weaning plans was more common in non - governmental ICUs (p-value was < 0.001 and 0.021, respectively). Delirium scales were more widely used among respondents within non - governmental ICUs (p-value = 0.035), whereas no significant differences were found regarding the levels of using sedation, anxiety, and dyspnea scales among respondents in both governmental and non - governmental ICUs (p-value = 0.605, 0.062, and 0.672, respectively). The use of modern instruments and bed cycling were more common in non - governmental ICUs (p-values < 0.001). Similarly, airway clearance maneuvers such as lung recruitment and manually assisted mucus were more widely used among respondents within non - governmental ICUs (p-values < 0.001). On the other hand, we found no significant differences in the levels of using cough machines in both types of ICUs (p-value = 0.237). Routines based on person-centered care were more common in non - governmental ICUs (p-value = 0.002). No significant difference was found in viewing early mobilization as a priority in both governmental and non - governmental ICUs (p-value = 0.699). Open visiting policy was more common in governmental ICUs (p-value < 0.001). The difference in the rates of received in-service ICU training was not significant (p-value = 0.450). Lastly, psychosocial support practices: access to psychiatrists or psychologists to support patients' mental health issues, access to a psychologist or a social worker to address family issues, and regular care conferences including family participation were more common in non - governmental ICUs (p-values < 0.001).

Table 4.9: Nurses' care practices for PMV patients according to ICU sector (N = 290)

Care practices	**n (%)[a]**			**P-value**
	All ICUs	**Governmental ICUs**	**Non - governmentalICUs**	
Follow sedation protocol	89 (30.7)	56 (27.3)	33 (38.8)	0.053
Follow mobilization protocol	49 (16.9)	31 (15.1)	18 (21.2)	0.210
Follow weaning protocol	69 (23.8)	47 (22.9)	22 (25.9)	0.591
Follow nutrition protocol	109 (37.6)	42 (20.5)	67 (78.8)	< 0.001*
Developing individualized mobilization plans	137 (47.2)	76 (37.1)	61 (71.8)	< 0.001*
Developing individualized weaning plans	257 (88.6)	176 (85.9)	81 (95.3)	0.021*
Use sedation scales	106 (36.6)	73 (35.6)	33 (38.8)	0.605

Use delirium scales	78 (26.9)	48 (23.4)	30 (35.3)	0.035*
Use anxiety scales	74 (25.5)	46 (22.4)	28 (32.9)	0.062
Use dyspnea scales	45 (15.5)	33 (16.1)	12 (14.1)	0.672
Swallowing assessment	241(83.1)	164 (80.0)	77 (90.6)	0.029*
Follow person-centered care routines	205 (70.7)	134 (65.4)	71 (83.5)	0.002*
Prioritized early mobilization	64 (22.1)	44 (21.5)	20 (23.5)	0.699
Access to a speech-language therapist	56 (19.3)	26 (12.7)	30 (35.3)	< 0.001*
Use modern instruments	132 (45.5)	65 (31.7)	67 (78.8)	< 0.001*
Use of lung recruitment maneuvers	80 (27.6)	28 (13.7)	52 (61.2)	< 0.001*
Use of manual-assisted mucus	99 (34.1)	30 (14.6)	69 (81.2)	< 0.001*
Use of cough machine	260 (89.7)	181 (88.3)	79 (92.9)	0.237
Use of bed-cycling	166 (57.2)	93 (45.4)	73 (85.9)	< 0.001*
Access to psychiatric or psychological counseling	67 (23.1)	26 (12.7)	41 (48.2)	< 0.001*
Offer psychologist or social worker services for family	79 (27.2)	31 (15.1)	48 (56.5)	< 0.001*
Held regular care conferences including family participation	167 (57.6)	96 (46.8)	71 (83.5)	< 0.001*
Open visiting	39 (13.4)	37 (18.0)	2 (2.4)	< 0.001*
In-service ICU training	118 (40.7)	118 (57.6)	53 (62.4)	0.450

[a] Frequencies and percentages of care practices implementation within ICUs (all, governmental, and private)
* The relationship was significant using the Pearson Chi-square test; P-value ≤ 0.05

4.11 Early Mobilization as a Priority and General Characteristics

Only 22.1% of the respondents considered early mobilization as a priority for PMV patients. A chi-square test was performed to determine if respondents'/units' general characteristics were significantly associated with considering early mobilization as a priority, see Table 13. Considering early mobilization as a priority was significantly related to the nurse-to-patient ratio, higher levels within ICUs using 1:1 or 1:2 (p-value = 0.031). We also found that lower ICU experience was significantly related to higher levels of viewing early mobilization as a priority (p-value = 0.005). Furthermore, higher monthly admissions were associated with higher levels of prioritized early mobilization (p-value = 0.016). In addition, respondents who received in-service ICU training had a

higher level of viewing early mobilization as a priority than untrained counterparts (p-value < 0.001). On the other hand, prioritized early mobilization was not significantly related to the age, gender, education, healthcare sector, and no. of ICU beds (p-values > 0.05).

Table 4.10: Associations between perceiving early mobilization as a priority and some general characteristics among respondents (N = 290)

Independent characteristic	Categories	n (%)[a]	P-value
Age	< 35	44 (24.6)	0.190
	≥ 35	20 (18.0)	
Gender	Male	38 (20.8)	0.484
	Female	26 (24.3)	
Education	Bachelor/Diploma	53 (20.8)	0.154
	Master	11 (31.4)	
ICU experience (y)	< 5	22 (36.1)	0.005*
	5 – 10	37 (20.1)	
	> 10	5 (11.1)	
No. of ICU beds	< 5	9 (18.4)	0.094
	5 – 10	43 (26.7)	
	> 10	12 (15.0)	
Monthly admissions	< 20	10 (12.3)	0.016*
	20 – 40	45 (24.3)	
	> 40	9 (37.5)	
The nurse-to-patient ratio	1:1 or 1:2	51 (25.6)	0.031*
	1:3 or 1:4	13 (14.3)	
In-service ICU training	Yes	50 (29.2)	< 0.001*
	No	14 (11.8)	
Healthcare sector	Governmental	44 (21.5)	0.699
	Private	20 (23.5)	

[a] Frequencies and percentages of respondents who considered early mobilization as a priority within each category of the independent characteristics

* The relationship was significant using the Pearson Chi-square test; P-value ≤ 0.05

4.13 Implementation of Weaning Strategies and General Characteristics

The analysis showed that more than two-thirds (67.9%) of the respondents reported the use of weaning strategies for PMV patients. A chi-square test was performed to determine if respondents/units' general characteristics were significantly associated with the implementation of weaning strategies, see Table 14. The level of implementing weaning strategies was significantly related to education, higher for respondents with master's degrees (p-value < 0.001). Furthermore, we also found that the no. of ICU beds was significantly associated with the level of adoption of weaning strategies, with higher levels for ICUs with fewer no. of beds (p-value = 0.047). On the other hand, the implementing weaning strategies was not significantly related to the age, gender, experience, monthly admissions, nurse-to-patient ratio, ICU training, and healthcare sector (p-values > 0.05).

Table 4.11: Associations between implementation of weaning strategies and some general characteristics among respondents (N = 290)

Independent characteristic	Categories	n (%)[a]	P-value
Age	< 35	120 (67.0)	0.679
	≥ 35	77 (69.4)	
Gender	Male	126 (68.9)	0.484
	Female	71 (66.4)	
Education	Bachelor/Diploma	163 (63.9)	< 0.001*
	Master	34 (97.1)	
ICU experience (y)	< 5	45 (73.8)	0.546
	5 – 10	122 (66.3)	
	> 10	30 (66.7)	
No. of ICU beds	< 5	33 (67.3)	0.047*
	5 – 10	118 (73.3)	
	> 10	46 (57.5)	
Monthly admissions	< 20	51 (63.0)	0.171
	20 – 40	126 (68.1)	
	> 40	20 (83.3)	
The nurse-to-patient ratio	1:1 or 1:2	133 (66.8)	0.554
	1:3 or 1:4	64 (70.3)	
In-service ICU training	Yes	113 (66.1)	0.419
	No	84 (70.6)	
Healthcare sector	Governmental	143 (69.8)	0.301
	Private	54 (63.5)	

[a] Frequencies and percentages of respondents who prioritized early mobilization within each category of the independent characteristics
* The relationship was significant using the Pearson Chi-square test; P-value ≤ 0.05

4.14 Adopting Person-Centered Care Routines and Care Practices Strategies

Most of the ICU nurses (70.7 %) indicated that their routines were based on the concept of person-centered care. A chi-square test was conducted to determine if some of the care, practices for PMV patients were significantly associated with the adoption of person-centered care routines, see Table 15. Patient and family engagement in developing and revising weaning plans (if exist) were significantly related to adopting person-centered care routines (p-value = 0.033 and 0.002, respectively). In other words, ICUs that engaged patients and families in developing and revising weaning planes were more likely to be considered person-centered care ones (odds ratio = 1.848 and 2.45, respectively). Moreover, strategies that supported patient and family well-being such as access to psychiatrists or psychologists to support patients' mental health issues, access to a psychologist or a social worker to address family issues, and holding regular care conferences including family participation were significantly related to the adoption of person-centered care routines (p-value < 0.001, p-value < 0.001, and p-value = 0.004, respectively). In other words, ICUs that offered psychosocial support practices such as access to psychiatrists or psychologists to support patients' mental health issues, access to a psychologist or a social worker to address family issues, and held regular care conferences including family participation were more likely to consider as person-centered care ones (odds ratio = 8.984, 6.032, and 2.099, respectively). On the other hand, using communication techniques was not significantly associated with the adoption of person-centered care routines (p-value = 0.519).

Table 4.12: Associations between person-centered care routines and some care practices among respondents (N = 290)

Care practices	Person-centered care routines (yes)		P-value	Odds Ratio
	Yes (N = 205)	No (N = 85)		
	n (%)	n (%)		
Patient involvement in developing and evaluating weaning plans (if exist)[a]	109/192 (56.8)	27/65 (41.5)	0.033*	1.848
Family involvement in developing and evaluating weaning plans (if exist)[a]	110/192 (57.3)	23/65 (35.4)	0.002*	2.450
Use communication techniques	186 (90.7)	75 (88.2)	0.519	1.305
Access to psychiatric or psychological counseling	63 (30.7)	4 (4.7)	< 0.001*	8.984
Offer psychologist or social worker services for family	72 (35.1)	7 (8.2)	< 0.001*	6.032
Held regular care conferences including family participation	129 (62.9)	76 (44.7)	0.004*	2.099

[a] Frequencies and percentages of care practices within respondents whose care routines were based on person-centered when individualized weaning plans were developed
* The relationship was significant using the Pearson Chi-square test; P-value ≤ 0.05

4.15 Conclusion

To sum up, this study aimed to identify care practices and the use of protocols for patients undergoing PMV in Palestinian ICUs. We found most respondents (69.3 %) were working in general ICUs and using a 1:2 nurse-to-patient ratio (53.8%). More than half of them (59.0%) received in-service ICU training. Cardiac patients (85.0%) followed by respiratory patients (80.8%) were more common in Palestinian adult ICUs. Acute respiratory distress syndrome (ARDS) (91.0%), followed by cardiovascular disorders (61.7%) was the most frequent primary diagnosis for PMV. The preferred drugs to relax the PMV patients were sedatives (93.8%), and muscle relaxants (56.9%). Most respondents adopted an individualized weaning approach (88.6%), swallowing assessment (83.1%), and person-centered care routines (70.7%), see Figure 1. Collaborative weaning decisions by physicians and ICU nurses were relatively uncommon (34.6%). Patients and families were involved moderately in developing weaning plans (52.9% and 51.8%, respectively). Most ICUs managed nutrition by physicians (88.3%), whereas few respondents reported that they managed nutrition by dieticians (22.4%). Traditional communication tools such as paper and pen (61.0%) and

alphabet/word or picture plates (51.4%) were the most commonly used. Generally, strategies that supported patient and family well-being were uncommon, such as open visiting hours (13.4%), access to psychiatrists or psychologists to support patients' mental health issues (23.1%), access to a psychologist or a social worker to address family issues (27.2%), yet only 57.6% of respondents reported that they held regular structured care conferences including family participation.

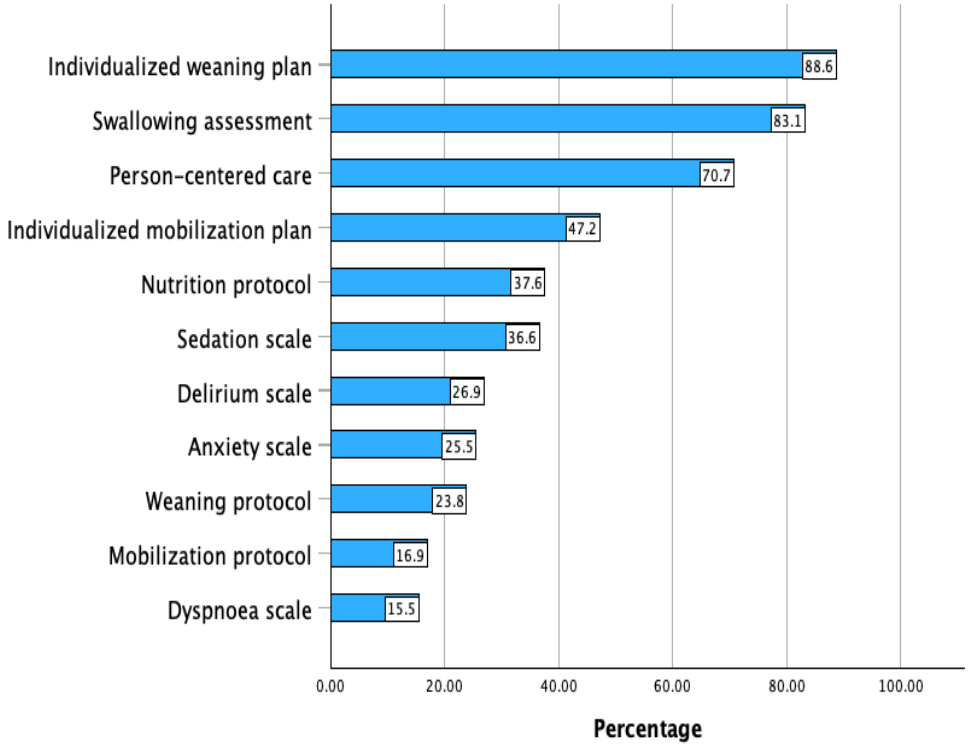


Figure 4.1: Level of adopting some care practices policies for PMV patients among respondents in Palestinian adult ICUs (N = 290).

Overall, the level of implementation of care practices policies specific to PMV patients was more common in non - governmentalPalestinian ICUs, see Figure 2. The comparative analysis among governmental and non - governmentalICU nurses revealed that nutrition protocols and swallowing assessments were more common among respondents within non – governmental ICUs (p-value < 0.001 and p-value = 0.029, respectively).

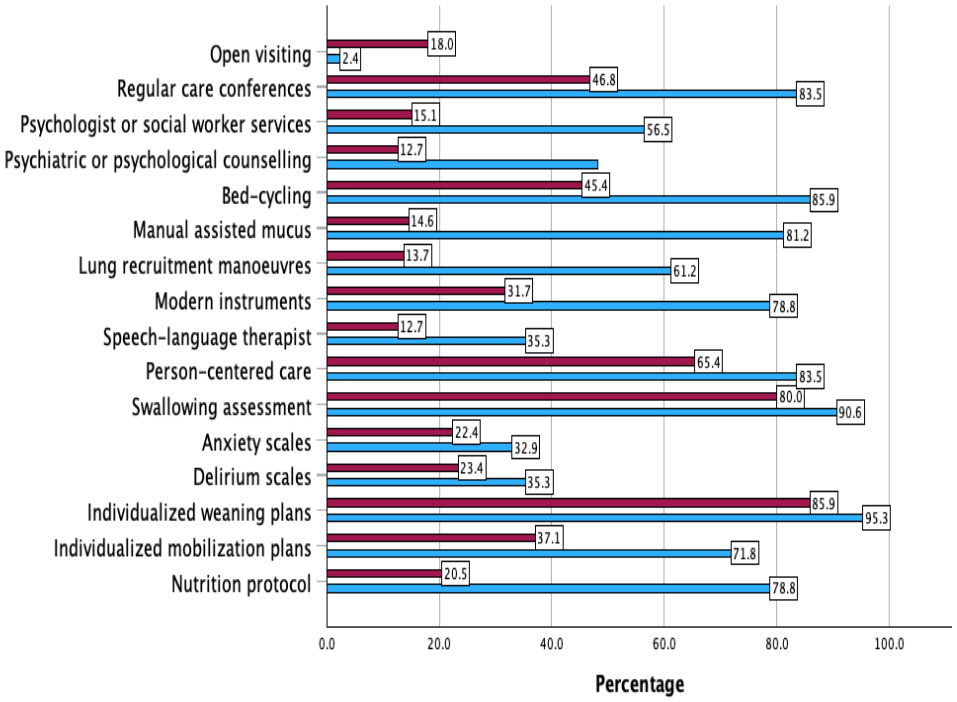


Figure 4.2: Significant differences between governmental and non – governmental Palestinian ICU nurses regarding their perspective on care practices and guidelines for PMV patients, red bars (governmental ICUs), and blue bars (Non - governmental ICUs).

Chapter Five: Discussion

5.1 Introduction

In this study, a cross-sectional survey was conducted to explore the existing care practices, protocols, and guidelines used for patients undergoing PMV in Palestinian adult ICUs in the region of West Bank. To the best of our knowledge, this was the first study in Palestine that explored care practices and protocols specific to PMV patients.

5.2 General Characteristics of Respondents

The study included 290 nurses; with a mean age of 33.5 ± 5.8 years, predominantly male (63.1%), and mostly holding a bachelor's degree (83.1%). The majority were staff nurses (89.0%) with an average ICU experience of 7.4 ± 3.7 years. This demographic profile suggests a relatively young and experienced workforce, which is crucial for the demanding environment of ICUs. **Smith and Brown (2021)** found similar trends in their national survey, highlighting the importance of a young and experienced workforce in critical care settings.

5.3 Unit and Patient Characteristics

Most respondents worked in general ICUs (69.3%) with a 1:2 nurse-to-patient ratio (53.8%). The majority of ICUs had 5 to 10 beds (55.5%) and were equipped with 5 to 10 ventilators (71.4%). The mean number of ICU beds was 8.3 ± 3.7, and the mean number of ventilators was 7.0 ± 2.5. These figures indicate a moderate capacity for handling critically ill patients, which aligns with the reported nurse-to-patient ratios. **Johnson and Lee (2022)** discuss the impact of ICU capacity and nurse-to-patient ratios on patient outcomes, supporting the importance of maintaining moderate capacity and appropriate staffing levels.

5.4 Weaning Practices

Only 23.8% of respondents reported following weaning protocols, with gradual lowering of SIMV frequency being the most common method (72.4%). Intelligent-Adaptive Support Ventilation (ASV) was the most frequently utilized automatic mode for weaning (61.0%). The choice of weaning method was predominantly determined by

physicians (93.8%). This highlights a significant reliance on physician-led decisions, with limited nurse autonomy in weaning practices. **Garcia and Thompson (2020)** examined the use of weaning protocols in ICUs and the role of physician-led decisions, which is consistent with these findings. Additionally, **Miller and Davis (2023)** explored the efficacy of Intelligent-Adaptive Support Ventilation (ASV) in weaning patients from mechanical ventilation, supporting its frequent use as reported by 61.0% of respondents in the study.

5.5 Mobilization

Mobilization practices were suboptimal, with only 16.9% of respondents following mobilization protocols. Less than half (47.2%) established individualized mobilization plans, and only 13.8% indicated that walking during MV was routine practice. Early mobilization was prioritized by only 22.1% of respondents, suggesting a need for greater emphasis on mobilization to improve patient outcomes. **Wilson and Green (2021)** identified barriers and facilitators to early mobilization in ICUs, highlighting the need for improved practices to enhance patient outcomes. Furthermore, **Roberts and Clark (2022)** discussed the benefits of individualized mobilization plans and the importance of routine mobilization practices, which aligns with the study's observation that less than half of the respondents established individualized mobilization plans and only a small percentage indicated that walking during mechanical ventilation was routine practice.

5.6 Communication

Traditional communication tools such as paper and pen (61.0%) and alphabet/word or picture plates (51.4%) were the most common. Only 19.3% of ICUs had access to a speech-language therapist, indicating a gap in specialized communication support for PMV patients. **Jones and Smith (2021)** found similar trends in their study, highlighting the reliance on traditional communication tools and the limited access to specialized support.

5.7 Nutrition

Only 37.6% of respondents followed a nutrition protocol, with most ICUs managing nutrition by physicians (88.3%). Swallowing assessments were performed in most units (83.1%), primarily using clinical examination of oral reflexes (73.4%). This underscores the need for standardized nutrition protocols and greater involvement of dietitians in patient care. **Brown and Taylor (2022)** and **Green and White (2020)** both emphasize the importance of standardized nutrition protocols and the role of dietitians in improving patient outcomes.

5.8 Symptom Management

Symptom management practices varied, with 35.8% of respondents reporting that the monthly percentage of VAP exceeded 20%. Only 40.7% believed the VAP percentage was acceptable. Scales to assess anxiety, dyspnea, and delirium were underutilized, with only 25.5%, 15.5%, and 26.9% of respondents using them, respectively. This indicates a need for better symptom management protocols and training. **Wilson and Clark (2021)** and **Miller and Davis (2023)** both highlight the variability in symptom management practices and the underutilization of assessment scales.

5.9 Psychosocial Support

Psychosocial support strategies were uncommon, with only 23.1% of respondents reporting access to psychiatric or psychological services for PMV patients. Similarly, only 27.2% reported that family members had access to a psychologist or social worker. Regular family meetings were held in 57.6% of ICUs, highlighting a need for improved psychosocial support. **Roberts and Green (2022)** and **Johnson and Lee (2021)** both emphasize the limited availability of psychosocial support services and the importance of regular family meetings.

5.10 Care Practices According to Healthcare Sectors

The study found that care practices specific to PMV patients were more common in non - governmental ICUs. Nutrition protocols, swallowing assessments, individualized mobilization, weaning plans, and the use of modern instruments were more prevalent in non - governmental ICUs. Conversely, open visiting policies were more common in

governmental ICUs. This suggests disparities in care practices between different healthcare sectors. **Taylor and Brown (2023)** discuss similar disparities in their study, highlighting the differences in care practices between non - governmental and governmental ICUs.

5.11 Early Mobilization as a Priority

Early mobilization was significantly associated with lower ICU experience, higher monthly admissions, and receiving in-service ICU training. This indicates that training and experience play crucial roles in prioritizing early mobilization. **Jones and Smith (2021)** and **Brown and Taylor (2022)** both emphasize the importance of continuous training and education in promoting early mobilization practices among ICU staff.

5.12 Implementation of Weaning Strategies

The implementation of weaning strategies was significantly higher among respondents with a master's degree and in ICUs with fewer beds. This suggests that higher education and smaller ICU settings may facilitate better weaning practices. **Garcia and Thompson (2020)** and **Miller and Davis (2023)** both highlight the role of advanced education in improving weaning outcomes.

5.13 Adopting Person-Centered Care Routines

Person-centered care routines were significantly associated with patient and family engagement in developing and revising weaning plans. ICUs that offered psychosocial support practices were more likely to adopt person-centered care routines, emphasizing the importance of holistic care approaches. **Roberts and Green (2022)** found similar associations, highlighting the importance of psychosocial support in adopting person-centered care routines.

Conclusion, Recommendation, and Limitations of the Study.

Conclusion

Overall, the level of implementation of care practices policies specific to PMV patients was more common in non - governmental Palestinian ICUs, see Figure 2. The comparative analysis among governmental and non – governmental ICU nurses revealed that nutrition protocols and swallowing assessments were more common among respondents within non – governmental ICUs (p-value < 0.001 and p-value = 0.029, respectively). The development of individualized mobilization and weaning plans was more common in non – governmental ICUs (p-value was < 0.001 and 0.021, respectively). Delirium scales were more widely used among respondents within non – governmental ICUs (p-value = 0.035). The use of modern instruments and bed cycling were more common in non – governmental ICUs (p-values < 0.001). Similarly, airway clearance maneuvers such as lung recruitment and manually assisted mucus were more widely used among respondents within non – governmental ICUs (p-values < 0.001). Routines based on person-centered care were more common in non – governmental ICUs (p-value = 0.002). Generally, strategies that supported patient and family well-being such as access to psychiatrists or psychologists to support patients' mental health issues, access to a psychologist or a social worker to address family issues, held regular care conferences including family participation were more common in non – governmental ICUs (p-values < 0.001). Yet, open visiting policy was more common in governmental ICUs (p-value < 0.001).

Recommendation of this Study

1-Educate and Train ICU Employees, Put in place ongoing professional development initiatives that emphasize person-centered care methodologies, customized care planning, and the use of delirium evaluation scales.

2- To advance best practices, encourage cooperation and information exchange between government and non – governmental intensive care units.

3- Encourage family-centered and person-centered care.

4-Increase the use of person-centered care practices in government intensive care units, such as holding frequent family-inclusive care conferences.

5- Utilize government intensive care units' open visitation policy by combining it with more comprehensive family engagement techniques found in non – governmental ICUs. Include Services for Mental Health Support

6- Give PMV patients' mental health treatment priority by incorporating social workers, psychologists, and psychiatrists into government intensive care units.

7- Provide ICU staff with training on how to identify and treat patients and their families' mental health issues.

Recommendation of Future Research

1- Examine the obstacles to establishing care techniques in government intensive care units.

2- Assess the influence of standardized care practices on patient outcomes in both environments.

3- Assess the financial viability of using multidisciplinary teams and cutting-edge technologies in government intensive care units.

Limitations of Study

There are several limitations to this study. First, despite repeated requests, several hospitals declined to participate in the study, specifically in the Non – governmental healthcare sector. Second, this survey was limited to ICU nurses; hence, we are unable to compare the responses with those of the other ICU staff, for instance, physicians, physiotherapists, and respiratory therapists, who may have a different perspective and play an important role in the implementation of care practices and guidelines. Third, the lack of similar studies in this regard in both the local Palestinian and adjacent Arab countries restricted comparison and discussion.

strength of study

The study has some strengths. First, to the best of our knowledge, it was the first study that attempts to identify care practices and protocols specific to patients requiring PMV among ICU nurses in Palestine, and possibly Arab countries. It also tried to incorporate most of the relevant components of ventilator care. Second, our survey respondents covered a broad range of age groups, geographical locations (north, middle, and south) of West Bank, ICU experience, and types of ICUs, including both

governmental and non - governmental hospitals of various sizes. Consequently, our data reflect the broad spectrum of care practices and protocols across regions and estimate the level of current care practices and protocols. Finally, our findings suggested which care practices and protocols were the least adopted, hence determining targets that require better infrastructural support for implementation.

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Appendices

Appendix 1: IRB Approval

Arab American University
Institutional Review Board - Ramallah

الجامعـــة العربيـــة الأمريكيـــة
مجلس اخلاقيات البحث العلمي – رام الله

IRB Approval Letter

Study Title: "Patient Characteristics, Prevalence, and Care Problems Associated with Prolonged Mechanical Ventilation (PMV) in Palestinian Critical Care Units"

Submitted by: Dareen Khalid Abu Dayyah

Date received: 8th January 2024

Date reviewed: 4th February 2024

Date approved: 18th February 2024

Your Study titled **"Patient Characteristics, Prevalence, and Care Problems Associated with Prolonged Mechanical Ventilation (PMV) in Palestinian Critical Care Units"** with the code number **"R-2024/A/32/N"** was reviewed by the Arab American University Institutional Review Board - Ramallah and it was approved on the 15th of February 2024.

Sajed Ghawadra, PhD
IRB-R Chairman
Arab American University of Palestine

الجامعة العربية الأمريكية - فلسطين
مجلس اخلاقيات البحث العلمي - رام الله
IRB-R
ARAB AMERICAN UNIVERSITY-PALESTINE
INSTITUTIONAL REVIEW BOARD - RAMALLAH

General Conditions:

1. Valid for 6 months from the date of approval.
2. It is important to inform the IRB-R with any modification of the approved study protocol.
3. The Bord appreciates a copy of the research when accomplished.

رام الله – فلسطين
Tel: 02-294-1999 **E-Email:** IRB-R@aaup.edu **Website:** www.aaup.edu

Appendix 2: AAUP-IRB Participant Information

معلومات للمشارك / ه في الدراسة

AAUP-IRB Code No.: …….

AAUP-IRB Date: …….

عزيزي الممرض / الممرضة

شكرا" لاهتمامكم ورغبتكم بالمشاركة في هذا البحث العلمي.

تهدف هذه الدراسة الموسومة ب **" طول المدة الزمنية لوجود المريض على جهاز التنفس الصناعي في وحدة العناية المركزة في فلسطين وعلاقتها بخصائص المريض ونسبة الانتشار وكذلك التحديات في الرعاية التمريضية "** إلى فهم العلاقة بين الفترة الزمنية لوجود المرضى في العناية المكثفة وهم موصولون في جهاز التنفس الصناعي والمضاعفات الناتجة عن طول الفترة وكذلك التحديات التي تواجه التمريض في رعاية هؤلاء المرضى.

ستعامل البيانات جميعها بسرية تامه ، ولا يحق لاي شخص الاطلاع على هذه البيانات باستثناء الباحثين. وستحفظ البيانات في اماكن خاصة لا يصل اليها الا الباحثون .

لا يتطلب الاشتراك في البحث ذكر اسمك او ما يدل عليه. ومهما كانت اجابتك او رأيك فان هذه الاجابات والآراء لن تؤثر بأي شكل كان عليك، ولك الحق بالاشتراك في الدراسة او رفضه حيث أن المشاركة في البحث طوعية وبمحض اختيارك.

لقد حصلت هذه الدراسة على موافقة المؤسسة التي تنتمي إليها بحيث يسمح للباحث بجمع البيانات من المشاركين في الدراسة.

يستغرق ملئ الاستبيانات حوالي "15 دقيقة " من الوقت كحد أعلى .

يحق لك كمشارك في الدراسة الاستفسار من الباحث عن أي أمر يتعلق بالدراسة وكذلك يحق لك الحصول على نتائج البحث عند الانتهاء منه .

توقيع المشارك: _____

الباحث الرئيس :- دارين أبو دية

كلية التمريض / الجامعة العربية الأمريكية-فلسطين

بريد الكتروني:

هاتف رقم :

Appendix 3: Researcher Mission Facilitation Form.

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

دولة فلسطين
وزارة الصحة
وحدة التعليم الصحي
والبحث العلمي

Ref.: .....
Date:.....

الرقم: عحا/١٠٢٥/٢٠٢٤
التاريخ: ١٩/١٠/٢٠٢٤

عطوفة الوكيل المساعد لشؤون المستشفيات والطوارئ المحترم،،،

عطوفة الوكيل المساعد لمجمع فلسطين الطبي المحترم،،،

تحية واحترام،،

الموضـــوع: تسهيل مهمة بحث

يرجى تسهيل مهمة الطالبة: **دارين خالد احمد ابو ديه** برنامج تمريض العناية المكثفة – الجامعة العربية الامريكية، في عمل بحث بعنوان:

" طول المدة الزمنية لوجود المريض على جهاز التنفس الصناعي في وحدة العناية المكثفة في فلسطين وعلاقتها بخصائص المريض والتحديات في الرعاية "

تحت اشراف د. **عماد فشافشة** حيث سيتم جمع معلومات من خلال توزيع استبانة وذلك في :

- **جميع المستشفيات الحكومية**
- **مجمع فلسطين الطبي**

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 الاحترام،،

د. عبد الله القواسمي
رئيس وحدة التعليم الصحي والبحث العلمي

نسخة: عميد كلية الدراسات العليا المحترم/ الجامعة العربية الامريكية

Telfax.:09-2333901 scientificresearch.dep@gmail.com تلفاكس: 09-2333901

2024/5/11

إلى من يهمه الامر

تسهيل مهمة بحثية

تحية طيبة وبعد،

تُهديكم كلية الدراسات العليا في الجامعة العربية الأمريكية أطيب التحيات، وبالإشارة الى الموضوع أعلاه، تشهد كلية الدراسات العليا في الجامعة العليا أن الطالبة **دارين خالد احمد ابوديه** والتي تحمل الرقم الجامعي 202113013 هي طالبة ماجستير في برنامج تمريض العناية المكثفة وتعمل على رسالة الماجستير الخاصة بها بعنوان:

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وتفضلوا بقبول فائق الاحترام

عميد كلية الدراسات العليا

د. نوار قطب

كلية الدراسات العليا
FACULTY OF GRADUATE STUDIES

Jenin Tel: +970-4-2418888 Ext.:1471,1472 Fax: +970-4-2510810 P.O. Box:240
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E-mail: FGS@aaup.edu ; PGS@aaup.edu Website: www.aaup.edu

Approval date: 2024-06-04
Ref: CRC_2024_0308

Subject: Approval to conduct a research project at An-Najah National University Hospital

Dear Ms. Dareen Abu Dayyha,

I am writing this letter to grant you permission to conduct your research project titled "Patient characteristics and care problems associated with prolonged mechanical ventilation (PMV) in Palestinian critical care units: ICU Nurses Perspective". I hope your study will provide new insights and contribute the advancement of knowledge and evidence. Furthermore, I would like to emphasize the importance of adhering to the ethical guidelines set forth by the hospital throughout the research process.

On behalf of An-Najah National University Hospital, I extend my best wishes and support for your research endeavors.

Sincerely,

Sa'ed H. Zyoud, Ph.D.
Clinical Toxicology
Director of Clinical Research Center

CC:
Chief Medical Officer
Chief Nursing Officer

Note: this approval letter is not valid unless signed and stamped by the CRC and the Chief Medical Officer of An-Najah National University Hospital

2024/5/11

إلى من يهمه الامر

تسهيل مهمة بحثية

تحية طيبة وبعد،

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Appendix 4: Survey

Patient characteristics and care problems associated with prolonged mechanical ventilation (PMV) in Palestinian critical care units: ICU Nurses Perspective

Dear ICU Nurse,

I kindly invite you to participate in my research study on patient characteristics and care problems associated with prolonged mechanical ventilation (PMV) in Palestinian critical care units. Your participation is valuable to me as it will provide me with insights on how to improve patient care in hospitals in the future.

If you agree to participate, you will be asked to complete the questionnaire. Your participation is completely voluntary and you have the right to withdraw at any time without any consequences.

Rest assured that all the information you provide will be treated with confidentiality. The data collected will be used for research purposes only and any published results will be anonymous and will not contain any identifying information.

Thank you in advance for your cooperation and your valuable contribution to this important research.

Best Regards,

Instructions:

- Please answer the questionnaire completely. Your responses are completely confidential and will not be shared with anyone else.
- If you do not understand any question, please do not hesitate to contact the researcher for clarification.
- Please do not share your answers with anyone else.

Researcher: Dareen Abu-Dayyah (E-mail address: dareenabudayah@gmail.com)

Supervisor: Dr. Imad Fashafsheh

Participant number	
Date	

Part 1: Sociodemographic characteristics		
Age: ----------		**Gender:** ○ **M** ○ **F**
Position: ○ Head Nurse ○Staff Nurse ○Practical		**Years of ICU experience:**
Level of education: ○ MSN ○ BSN ○ Diploma		
In-service ICU training: ○ None ○ Critical ○ Cardiac ○ Ventilation ○ Other ----------		
Part two: unit and patient characteristics		
1.	Hospital: ○Beit Jala ○ Jericho ○Queen Alia ○Rafidia ○Al Mezan ○Bethlehem Arab Society for Rehabilitation	
2.	ICU specialty: ○ General ○ Trauma ○ Neuro ○ Burn ○ Cardiac ○Other ----------	
3.	How many intensive care beds available in your unit? ----------	
4.	How many ventilators available in your unit? ----------	
5.	What regulations for visiting times do you have in your ICU?	**A**. 24 hours per day **B**. Regulated times for visiting
6.	Type of patients admitted in your unit ? **Multiple responsible are possible** ○Cardiac ○Respiratory ○Nuero ○ Renal ○Burn ○Trauma ○ other ----------	
7.	How many patients admitted in your unit last month? ----------	
8.	How many patients were on MV for more than a week last month? ----------	
8.	Do you have special rules in your department related to nurses and **patient care (e.g., nurse patient ratio)?**	**A. Yes** **B. No**
9.	For patients using a ventilator, the usual nurse-to-patient ratio is:	**A.** 1:1 **B.** 1:2 **C.** 1:3 **D.** 1:4
10.	The need for physiotherapists or respiratory therapists in your department.	**A.** Once a day **B.** More than once a day **C.** No need
11.	Do you have any modern instruments used to help nurses in caring of patients connected to MV, e.g., special beds for burned patients?	**A.** Yes **B.** No
12.	Does PMV patient needs high set up parameters on mechanical ventilator?	**A.** Always **B.** Usually **C.** Occasionally **D.** Rarely **E.** Never

14.	Do you have care routines in your unit that are developed based on the concept of *"**person-centered care**"*?	**A.** Yes **B.** No
15.	Who participates in routinely care planning for patients on MV? (***Multiple responses are possible***)	**A.** Patient **B.** Physician **C.** Respiratory Therapist **D.** Nurse **E.** Physiotherapist **F.** Family members **G.** Other ----------
16.	What are the primary diagnosis for patients on prolonged mechanical ventilation (PMV) ? ***(Multiple responses are possible***)	A. Acute Respiratory Distress Syndrome (ARDS) B. Pneumonia C. Chronic Obstructive Pulmonary Disease (COPD) D. Neuromuscular Disorders E. Traumatic Injuries F. Sepsis and Septic Shock G. Cardiovascular Disorders: H. Post-operative Complications I. Overdose or Poisoning J. Other ----------
17.	What are the comorbidities (are additional medical conditions or diseases that coexist with a primary disease) ? ***(Multiple responses are possible***)	A. Cardiovascular Diseases B. Respiratory Diseases C. Endocrine Disorders D. Renal Diseases E. Neurological Disorders F. Gastrointestinal Disorders G. Cancer H. Psychiatric Disorders I. Immunological Disorders J. Infectious Diseases K. Other ----------
18.	What kind of medication used to relax the PMV patients? **(Multiple responses are possible)**?	A. None B. Sedatives C. Muscles relaxant D. Other ----------

19.	Do you follow protocols for sedation for patients on MV in your unit?	A. yes B. NO
20.	Which sedation scale do you use to assess sedation level for patients on MV in your unit?	A. None B. SAS (The Riker Sedation-Agitation Scale) C. RASS (The Richmond Agitation-Sedation Scale) D. Ramsay scale E. Other ----------
Part three: Weaning from ventilator		
1.	The most common weaning techniques for PMV patients (both tube/tracheostomy patients): **(Multiple responses are possible)**	**A.** Gradual lowering of SIMV frequency **B.** Gradual reduction of pressure support (TU) **C.** Volume support (VU) **D.** Gradually increased time with CPAP **E.** Gradually increased time with a wet nose and oxygen via tracheostomy **F.** Gradually increased time with active humidification and high flow system over the tracheostomy **G.** Other ---------- _____
2.	Which automatic modes are most frequently utilized in weaning training trials? (***Multiple responses are possible***)	**A.** Proportional Assist Ventilation Plus (PAV) **B.** Intelligent- Adaptive Support Ventilation (ASV) **C.** Neutrally Adjusted Ventilatory Assist (NAVA) **D.** Smart mode **E.** Other ----------
3.	The choice of weaning method for PMV patients depends on: (***Multiple responses are possible***)	A. Physician B. Nurse C. Respiratory therapist D. Physiotherapist E. Other ----------
4.	Is there a weaning protocol in your unit to guide weaning?	**A.** Yes **B.** No
5.	Which weaning strategies do you routinely use for PMV patients? ***(Multiple responses are possible***)	**A.** None **B.** Clinical assessment (eg., stable hemodynamics, adequate oxygenation, awake and cooperative ...) **C.** Physiological parameters (e.g., tidal

		volume, vital capacity, ...) **D.** Spontaneous breathing trial (SBT) **E.** Nutritional status **F.** Other ----------
6.	Do you establish and document an individual plan for weaning for patients in PMV in your ICU?	**A.** Yes **B.** No
	If yes on pervious question, who establishes the individual plan? (***Multiple responses are possible***)	**A.** Physician **B.** Nurse C. Respiratory therapist D. Physiotherapist E. Other ----------
	If yes on pervious question, how often the individual plan is being evaluated and revised?	**A.** Every shift **B.** Daily **C.** Several times a week **D.** Occasionally
7.	Does the patient participate in any way when an individual plan for weaning is being establish or revised?	**A.** Yes **B.** No
8.	Do family members take part in establishment or revision of individualized weaning plans?	**A.** Yes **B.** No
9.	Do you routinely use lung recruitment manoeuvres in your unit?	**A.** Yes **B.** No
10.	Do you routinely use manual assisted mucus mobilization (vibrator) in your unit?	**A.** Yes **B.** No
11.	Do you routinely use cough machine (nebulizer) in your unit?	**A.** Yes **B.** No
Part Four: Mobilization		
1.	How early are patients assessed for mobilization?	**A.** On admission **B.** 2-4 days of admission **C.** 5-7 days of admission **D.** 8-14 days of admission **E.** 15-21 days of admission **F.** No assessment
2.	Do you have a mobilization protocol for PMV patients in your unit?	**A.** Yes **B.** No
3.	Do you establish and document an individualized mobilization plan for PMV patients?	**A.** Yes **B.** No
4.	Are patients mobilized to walking under ongoing MV in your unit?	**A.** Yes **B.** Sometimes **C.** No

5.	Do you use in bed-cycling to mobilize patients on MV in your unit?	**A.** Yes **B.** Sometimes **C.** No
6.	Would you say that early mobilization of patients with mechanical ventilation is being prioritized in your ICU?	**A.** Yes **B.** No
Part Five: Communication		
1.	Which communication tools are used in your department for PMV patients ? (***Multiple responses are possible***)	**A.** Alphabet/word or picture plate **B.** Paper and pencil **C.** Writing pad/ whiteboard **D.** Computer/tablet **E.** Cuffless tracheostomy tubes **F.** Fenestrated tracheostomy tubes **G.** Speaking valve over the tracheal cannula **H.** Other ----------
2.	Do you have access to a speech therapist to consult regarding communications?	**A.** Yes **B.** No
Part Six: Nutrition		
1.	Is there a nutrition protocol in your ICU?	**A.** Yes **B.** No
2.	Mainly who assesses the nutritional status and choice of nutrition for PMV patients? (***Multiple responses are possible)***	**A.** Physician **B.** Nurse **C.** Dietitian **D.** Other ----------
3.	Is swallowing function routinely assessed for PMV patients in your ICU?	**A.** Yes **B.** No
4.	**If yes on previously question** How is swallowing function assessed in your ICU?	**A.** Clinical examination of oral reflex **B.** Clinical examination of laryngeal reflex **C.** Swallow test with colored liquid **D.** Swallow test with passed diet **E.** Fibrotic examination of swallowing function **F.** Other ----------
Part Seven: Ventilator Associated Pneumonia (VAP), Delirium, anxiety and dyspnea		
1.	In your experience, what is the monthly proportion (%) of VAP in your ICU?	**A.** Less than 10 % **B.** 10 – 19% **C.** 20 -29% **D.** 30 % or more
2.	In your opinion, is the percentage of VAP in your unit acceptable?	**A.** Yes **B.** No

3.	What are the most causes of VAP for patient in your unit? (***Multiple responses are possible***)	**A.** Type of patients **B.** Nurse patient ratio **C.** Occupation rate in the department **D.** Shortage of the staff **E.** No respiratory therapist **F.** Medical errors **G.** Nurses experience **H.** Lack of protocols for prevention **I.** Period of mechanical ventilation **J.** Other ----------
4.	Which scale do you use to assess anxiety for PMV patients in your unit?	**A.** None **B.** Faces Anxiety Scale **C.** State-Trait Anxiety Inventory (STAI) **D.** Visual Analog Scale for Anxiety (VAS-A) **E.** Modified COMFORT Scale **F.** Hamilton Anxiety Rating Scale (HAM-A) **G.** Other ----------
5.	Which scale do you use to assess dyspnoea/shortness of breath for PMV patients in your unit?	**A.** None **B.** Numeric Rating Scale for Dyspnea (NRS-D) **C.** Visual Analog Scale for Dyspnea (VAS-D) **D.** Modified Borg Dyspnea Scale (MBS-D) **E.** Other ----------
6.	Which scale do you use to assess delirium for PMV patients in your unit?	**A.** None **B.** The Confusion Assessment method for the ICU (CAM-ICU) **C.** Intensive Care Delirium Screening Checklist (ICDSC) **D.** Nursing Delirium Screening Scale (Nu-DESC) **E.** Other ----------
7.	In your experience, how many patients have delirium in your ICU?	**A.** less than 10 % **B.** 10%-19% **C.** 20 - 29% **D.** 30% or more
Part eight: Psychosocial Support		

1.	Do you have access to psychiatric or psychological counselling for patients on PMV?	**A.** Yes **B.** No
2.	Do you offer any psychologist or social worker services for family members to patients on PMV?	**A.** Yes **B.** No
3.	Do you hold regular meetings/case conference for family members to patients on PMV?	**A.** Yes **B.** No

خصائص المرضى ومشاكل الرعاية المرتبطة بالتهوية الميكانيكية المطولة (PMV) في وحدات العناية المركزة في فلسطين.

دارين خالد أحمد ابو دية

د. عماد فشافشة

د. أحمد عايدي

د. جمال قدومي

ملخص

الخلفية: العدد الكبير وتكرار المرضى المصابين بـ PMV من شأنه أن يثير قضايا الرعاية، مما سيرفع معدل الوفيات. أدت المعايير والبروتوكولات غير الكافية لعلاج مرضى PMV إلى ارتفاع معدل المضاعفات والعقبات والإقامة في المستشفى. الأهداف: تناقش هذه الدراسة المرضى البالغين في فلسطين الذين يستخدمون التهوية الميكانيكية المطولة (PMV) في وحدات العناية المركزة التي تحتاج إلى MV من 7 إلى 21 يومًا أو أكثر. أيضًا، لتحديد خصائص مرضى وحدة العناية المركزة، بالإضافة إلى استهلاك أيام سرير وحدة العناية المركزة من قبل هؤلاء القبول، فإن الهدف الآخر هو التحقيق في مشاكل الرعاية المرتبطة بالتهوية الميكانيكية المطولة (PMV) في وحدة العناية المركزة الفلسطينية

المنهجية: استخدم الباحث التصميم الكمي الوصفي المقطعي، العينة: تم تضمين جميع ممرضات العناية المركزة في الدراسة لأن عينة البحث تتكون من عينات ملائمة من 15 مستشفى وكانت هادفةً. يتم تحديد عدد المشاركين في الدراسة من خلال معدل الاستجابة، والذي يبلغ بالنسبة للمستشفيات الحكومية والخاصة 75.1 بالمائة (ن = 290). وقت جمع البيانات: من 30 مايو إلى 20 يوليو. الأداة: استخدم الباحث استبيانًا تم تطويره بناءً على دراسة أجريت باللغة السويدية مع 59 سؤالاً موزعة على ثمانية مجالات: (1) المعلومات الاجتماعية والديموغرافية المتعلقة بالعمل للمستجيبين (6 أسئلة) (2) خصائص الوحدة والمريض (20 سؤالاً) ؛ (3) فطام جهاز التنفس الصناعي (11 سؤالاً) ؛ (4) التعبئة (6 أسئلة) ؛ (5) التواصل (سؤالان) ؛ (6) التغذية (4 أسئلة) ؛ (7) الالتهاب الرئوي / الهذيان / القلق / ضيق التنفس المرتبط بجهاز التنفس الصناعي (7 أسئلة) ؛ و(8) الدعم النفسي والاجتماعي (3 أسئلة). النتائج: كان معظم المشاركين (69.3%) يعملون في وحدات العناية المركزة العامة ويستخدمون نسبة 1:2 من الممرضات إلى المرضى (53.8%). تلقى أكثر من نصفهم (59.0%) تدريبًا في وحدة العناية المركزة أثناء

الخدمة. كان مرضى القلب (85.0%) يليهم مرضى الجهاز التنفسي (80.8%) أكثر شيوعًا في وحدات العناية المركزة للبالغين الفلسطينيين. كانت متلازمة الضائقة التنفسية الحادة ((ARDS 91.0%)) تليها اضطرابات القلب والأوعية الدموية (61.7%) هي التشخيص الأولي الأكثر شيوعًا لـ PMV. تبنى معظم المستجيبين نهج الفطام الفردي (88.6%) وتقييم البلع (83.1%) وروتين الرعاية المتمركز حول الشخص (70.7%). اتبع عدد قليل من المستجيبين بروتوكولات التغذية (37.6%) والفطام (23.8%) والتعبئة (16.9%). الاستنتاجات: بشكل عام، كان مستوى تنفيذ سياسات ممارسات الرعاية الخاصة بمرضى PMV أكثر شيوعًا في وحدات العناية المركزة الخاصة الفلسطينية.

الكلمات المفتاحية: وحدات العناية المركزة، خصائص المريض، مشاكل الرعاية، ممارسات الرعاية.