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Nursing Role for Intra-abdominal Pressure (IAP) Monitoring in Critical Care of Adult Patients: Scoping Review

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ABSTRACT

Background: Monitoring Intra-abdominal Pressure (IAP) was crucial for managing critically ill patients since high IAP could result in serious consequences such as Intra-abdominal Hypertension (IAH) and Abdominal Compartment Syndrome (ACS). Despite its importance, critical care nurses have significant gaps in their knowledge and practices surrounding IAP monitoring.

Aim: This scoping review aimed to evaluate the state of IAP monitoring in critical care settings, focusing on the role of critical care nurses and identifying the challenges they faced in recognizing and managing IAH and ACS.

Methods: A systematic search of the literature was undertaken using databases such as PubMed and Google Scholar, adhering to the PRISMA criteria to guarantee a robust review process. Studies were chosen based on their relevance to critical care nurses' roles in IAP monitoring in critically ill adult patients, as well as their publication date (2020-2024) and study design.

Results: The analysis found a lack of defined techniques and training for assessing IAP. While trans-vesical measurement was widely employed, there was significant diversity in measuring methodology and the prevalence of IAH and ACS between investigations. Many critical care nurses expressed feelings of inadequacy in their knowledge of IAP monitoring, citing constraints such as a lack of resources and clinical support.

Conclusion and recommendations: The findings highlighted the urgent need for improved critical care nurse training programs to improve their awareness of IAP monitoring procedures. Standardized protocols were proposed to ensure consistency in practice across critical care settings. Investing in technology that allows more accurate and less invasive IAP monitoring was also recommended. Finally, ongoing study into the effectiveness of IAP evaluation approaches was regarded critical for improving patient outcomes.

Keywords: Intra-abdominal pressure; Critical care nursing; Intra-abdominal hypertension; Abdominal compartment syndrome; Patient outcomes; Nursing education; Monitoring techniques

INTRODUCTION

Critical care Patients are at high risk for significant health issues that can lead to death. Critically sick patients require more rigorous nursing care and monitoring [1]. Critical care patients have consequences such as Intra-abdominal Pressure (IAP) and abdominal compartment syndrome, which requires quick diagnosis and treatment, high IAP levels can impact organ perfusion and function [2].

Intra-abdominal Pressure (IAP) is defined as a steady-state pressure within the abdominal cavity. It is determined by the elasticity of the abdominal wall and the properties of the abdominal contents [3]. Intra-abdominal Hypertension (IAH) and Abdominal Compartment Syndrome (ACS) are not new issues for critical care patients, as early as the nineteenth century, IAH was detected and ACS was described, although these were not called until more recent times [2]. The prevalence of Intra-abdominal Hypertension (IAH) in the

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Intensive Care Unit (ICU) is high at over 50%. Studies have found that 20%-30% of critically sick patients present to the ICU with IAH, which increases to 30%-55% during their ICU stay [4].

Intra-abdominal pressure monitoring is commonly used in clinical practice because it is a safe, accurate, cost-effective, and quick way to diagnose Intra-abdominal hypertension [5]. Both levels of increased Intra-abdominal tension have been shown to produce considerable morbidity and mortality in critically ill patients, this involves acute renal failure, pulmonary impairment, and decreased blood supply to the gastrointestinal organs [6]. IAP is described as pressure within the abdominal cavity that is proportional to the respiratory phase and abdominal wall resistance [7]. However, it has not been tested for safety and reliability in the ICU. As a result, alternative procedures that are less invasive have been developed. IAP can be determined by measuring bladder pressure (with a Foley catheter), stomach pressure (with a nasogastric or gastrostomy tube), rectal pressure (with a balloon catheter), and inferior vena cava pressure [7]. Transurethral measurement stood out among these measurements due to its simplicity, reproducibility, consistency, and low cost. The bladder is a passive reservoir, which appropriately reflects IAP [7].

Clinical assessment of IAP based on palpation of the abdomen is inaccurate, and clinically significant IAH can be present in the absence of abdominal distension [8]. In critical care, IAP measurements through the bladder or stomach are the most practicable, and intravenous IAP measurement is considered the gold standard [9].

Improved IAP assessment allows for more effective monitoring and management of patients with IAH or ACS. Accurate IAP measurement is crucial for managing patients with IAH and ACS, IAP can be measured directly intra peritoneally or indirectly through a hollow viscus (e.g. bladder, stomach, rectum, or uterus) [10]. Clinical examination of IAP is inconsistent, with a sensitivity ranging from 40% to 60%. IAP is thus most usually estimated using urinary bladder pressure, which is measured *via* a manometer attached end-to-side to a urinary catheter, allowing for intermittent bladder pressure monitoring while momentarily impeding urine flow [11].

Some systems support the use of a pressure sensor by introducing a needle into the system to detect pressure, whilst others employ a column of fluid to measure pressure mechanically [11]. IAP measurement using intravenous pressure is easy, consistent, reproducible, and minimally invasive because the majority of relevant patients require urinary catheterization for other purposes [11]. IAH increases morbidity and mortality rates among severely ill individuals, the limited space and close contact with bordering cavities impair the function of Intra-abdominal organs, as well as causing physiological changes and malfunction of organs outside the abdominal cavity [1].

Common physiological measures such as blood pressure, electrocardiography, heart rate, and hemoglobin saturation are routinely monitored for all critical care patients [12]. Although IAP measurement is not a novel idea, its importance and therapeutic implications in the ICU have just recently become increasingly apparent, however, measurements of IAP have rarely been employed as a standard monitoring element, instead, IAP is often measured only when a specific risk factor or the existence of IAH has been discovered [12]. Intermittent IAP measurements through the bladder in symptomatic patients or those with a strong clinical suspicion of developing IAH every 4 hours-6 hours are universally acknowledged as standard treatment [12].

Critically Ill Patients rely heavily on critical care nurses to monitor Intra-abdominal pressure [13]. Although critical care nurses are responsible for measuring and reporting IAP, there is limited information on their awareness of IAH and ACS [14]. Despite best practice guidelines, recommendations are often not implemented [14]. Advanced nursing practice empowers nurses to manage Intra-abdominal hypertension with greater clinical discretion, responsibility, and autonomy [15].

Critical care nurses may experience difficulties in adopting IAP monitoring due to a lack of resources, such as equipment and qualified personnel, which may impede their capacity to monitor it efficiently [13]. Additionally, cultural differences may influence how patients and families react to IAP monitoring and care, despite these limitations, critical care nurses can assist minimize negative outcomes associated with IAH and ACS by recognizing early signs of IAH, delivering interventions, and educating patients and families on the need of IAP monitoring [13]. All hospitals recognize the importance of nurses' roles as members of the health-care team. Continuous in-service education is essential for improving nursing care in the ICU, nurse education must align with their knowledge and skills [16]. Research indicates a lack of awareness among nurses on recognizing high-risk patients and clinical indicators of IAH/ACS [12].

The purpose of this scoping review is to provide an overview of current Intra-abdominal pressure in nursing management among critically ill adult patients and the role of critical care nurses in measuring Intra-abdominal pressure in critical care settings. The review will consider current methods for measuring Intra-abdominal pressure. The results of this analysis will provide a comprehensive overview of the current state of Intra-abdominal pressure monitoring and serve as a guideline for critical care nurses.

Rationale of the Review

The role of critical care nurses in Intra-abdominal pressure monitoring among critically ill patients is vital to patient care, as critically ill adult patients are at high risk for serious health complications that can lead to mortality [1]. Despite the importance of Intra-abdominal Pressure (IAP) monitoring, critical care nurses have little understanding and practice with Intra-abdominal Hypertension (IAH) and Abdominal Compartment Syndrome (ACS) [7,17]. The use of a urinary catheter or nasogastric tube to measure IAP is not universally used, and cultural variations may impact patient and family responses to monitoring and care [7].

The goal of this scoping study is to assess critical care nurses' existing knowledge and practices regarding IAH and ACS, as well as the problems they face when implementing IAP monitoring among critically ill adult patients. This review will look at the current methods for measuring IAP, critical care nurses' understanding of IAH and ACS, and cultural and resource-related challenges to IAP monitoring implementation [9]. According to IAH and ACS can result in considerable morbidity and mortality, emphasizing the significance of appropriate IAP monitoring [2]. Furthermore, critical care nurses may have difficulty implementing IAP monitoring due to a lack of resources, such as equipment and qualified personnel [13]. This scoping research is important due to the dearth of information on the knowledge and practices of critical care nurses about IAP, despite the need of IAP monitoring in critically ill adult patients.

LITERATURE REVIEW

Definition of Intra-abdominal Pressure

The pressure in the abdominal cavity is referred to as Intra-abdominal Pressure (IAP) [18]. Intra-abdominal Pressure (IAP) refers to the constant pressure in the abdominal cavity created by the interaction of the abdominal wall and internal organs [12].

In critically ill adults, the Intra-abdominal Pressure (IAP) is typically 5 mmHg-7 mmHg [19]. In critically ill patients in the Intensive Care Unit (ICU), a persistent increase in IAP caused by acute respiratory failure, gastrointestinal dysfunction, abdominal and pelvic hemorrhage, effusion, intensive fluid resuscitation, and/or septic shock can lead to (IAH) or (ACS) [19].

Diseases Related to Measure IAP

Intra-abdominal Hypertension (IAH) is defined as an elevated IAP exceeding 12 mmHg [7]. This syndrome can be a life-threatening consequence in a variety of therapeutic situations, including critically sick patients, trauma victims, and those undergoing abdominal surgery. IAH can cause organ dysfunction, hypo perfusion, and even organ failure if not managed [7]. IAP measurement is important for diagnosing and managing IAH. There are several methods for measuring IAP, including both invasive and non-invasive procedures [20]. The measurement device used is determined by the clinical context and patient condition [21]. According to Crumley (2020), the study concluded that, Intra-abdominal hypertension is common in critically ill patients of all ages and is associated with negative outcomes such as abdominal compartment syndrome [20]. Because there are no obvious clinical symptoms, the illness is frequently overlooked, highlighting the need for instruments that can reliably test IAP. Commercially accessible devices assess IAP indirectly, usually through the bladder or stomach. More study is needed to demonstrate the benefits of routine screening, define risk factors for IAH/ACS development, and assess the impact of IAP reducing interventions in order to improve patient outcomes.

The development of accurate and reliable IAP measurement instruments is critical for IAH diagnosis and management. Recent work has focused on validating and improving these devices [22]. A comprehensive evaluation of diagnostic sensors for IAP monitoring found numerous devices with promising findings, but additional study is needed to determine their accuracy and reliability [22]. Recent studies have investigated the importance of static and dynamic Intra-abdominal pressure monitoring in the diagnosis and therapy of acute pancreatitis [23].

IAH has been linked to a diverse array of conditions, such as renal kidney disease. The renal resistive index, which quantifies blood flow in the kidneys, is positively correlated with Intra-abdominal pressure [24]. This demonstrates that IAH may be a contributing factor to renal dysfunction and failure. Intra-abdominal pressure may also increase during pregnancy, particularly when the abdomen is acute. According to Augustin (2023) is a common pregnancy issue that can result in major maternal and fetal consequences if not managed. Monitoring IAP is critical in these cases to avoid complications and guarantee the best possible outcomes [25].

IAP is an important characteristic in critically ill adult patients because it can result in life-threatening consequences including Abdominal Compartment Syndrome (ACS) and Intra-abdominal Hypertension (IAH) [26]. IAP measures in neuro critical patients have been found to be critical for monitoring illness development and predicting prognosis [18]. For example, Xu et al. (2021) discovered that greater IAP was associated with a higher risk of ACS and mortality in neuro critical patients [18].

The intestinal fatty acid binding protein has been found as a possible predictor of IAP-related problems in ICU patients [27]. Furthermore, a study discovered that IAP was a strong predictor of outcome in patients with acute pancreatitis, and its measurement might be utilized as a prognostic marker [28]. Thus, monitoring IAP in critically ill adult patients is vital for preventing and managing these life-threatening consequences [28].

Zou et al. (2021) examined IAP readings in critically ill patients with intra vesical normal saline at 15°C, 25°C, and 35°C temperatures [19]. The study discovered that utilizing normal saline at 35°C resulted in considerably greater IAP values compared to 15°C and 25°C. This suggests that the temperature of normal saline may alter IAP measurements, which is an important factor to consider when monitoring IAP in critically ill patients. This study emphasizes the need of standardizing the temperature of normal saline used for IAP measurements in order to obtain accurate and reliable results. More study is needed to determine the best temperature for IAP measurements and develop a standardized technique for their usage in clinical practice.

Causes and Risk Factors of Intra-abdominal Pressure (IAP) Measurement in Critical Adult Patients

The assessment of Intra-abdominal Pressure (IAP) is an important metric in critically ill adult patients, particularly those with Intra-abdominal Hypertension (IAH) and Abdominal Compartment Syndrome (ACS) [26].

Sepsis, for example, can cause increased capillary permeability, edema, and high IAP, Similarly, trauma can cause bleeding and edema, which increases IAP, burns, pregnancy, obesity, chronic kidney disease, and prolonged mechanical ventilation [18,26,27,28].

Risk factors for IAH and ACS are also present. Older age increases the risk of IAH and ACS due to decreasing lung compliance and cardiac performance [28]. Males are also more susceptible due to differences in abdominal anatomy and physiology [28]. Patients who have had abdominal surgery before are more likely to develop adhesions and scar tissue [26].

The classification of IAP-related disorders is critical for successful management. Intra-abdominal hypertension is divided into 3 categories based on IAP level: Grade I (IAP 12 mmHg-15 mmHg), Grade II (IAP 16 mmHg–20 mmHg), and Grade III (IAP at admission, first and second IAP measurements after admission were ≥ 12 mmHg), Grade IV (IAP>25 mmHg (Grade IV (IAP>25 mmHg), Abdominal compartment syndrome is divided into 2 stages: Stage I (mild ACS, defined by raised IAP and decreased urine output) and Stage II (severe ACS, defined by elevated IAP, decreased urine output, and organ failure (**Table 1**) [26].

Table 1: Summary for risk factors for IAP in adults

Risk factors
Distended abdomen
Peritoneal dialysis
Laparoscopy with excessive insufflation pressures
Diagnosis of the following
Acute pancreatitis
Hemoperitoneum/pneumoperitoneum or intraperitoneal fluid collections
Intra-abdominal infection/abscess
Intra-abdominal or retroperitoneal tumors
Liver dysfunction/cirrhosis with ascites

Sign and Symptoms of IAP

IAP can cause a range of signs and symptoms, which can be subtle and may not always, be immediately apparent [27]. One of the initial indications of IAP is abdominal distension, which can show as a palpable abdominal mass or swelling [8]. This can be accompanied by nausea, vomiting, and stomach pain [29]. As IAP increases, patients may have respiratory compromise, including decreased lung volumes and increasing peak airway pressures. Cardiovascular instability, such as reduced blood pressure and tachycardia, may also develop as the body responds to the increased Intra-abdominal pressure [18].

Other indications of IAP include decreased urine production and oliguria, which can be symptomatic of impaired renal perfusion due to increased Intra-abdominal pressure [27]. Additionally, individuals with IAP may display changes in mental status, such as disorientation, agitation, and altered consciousness, which can be linked to reduced cerebral perfusion [8]. In severe cases of IAP, patients may develop abdominal compartment syndrome, characterized by significant organ dysfunction and failure. Early identification and therapy of IAP are critical to prevent complications and enhance patient outcomes, monitoring methods for IAP measurement have been developed to aid in early detection and management of IAP [29].

Pathophysiology of IAP in Critical Adult Patients

According to De Laet et al. (2020), IAP is a complex pathophysiological process involving the interaction of several variables, including increased fluid and gas accumulation within the abdominal cavity, altered abdominal wall compliance, and impaired respiratory and cardiovascular performance. One of the most common causes of IAP is increased fluid collection in the abdominal cavity, which can be caused by a variety of events such as hemorrhage, ascites, or edema [8,30].

This extra fluid might compress the abdominal organs, reducing blood flow and oxygenation. In addition, trauma, surgery, or inflammation can cause the abdominal wall to become less compliant, contributing to the development of IAP [19]. Increased IAP can have a major impact on respiratory function, such as lower lung volumes, higher peak airway pressures, and poorer gas exchange [30]. This can cause respiratory failure and an increased risk of death. Cardiovascular dysfunction is also common in IAP patients, as evidenced by reduced cardiac output, hypotension, and tachycardia [31]. This can worsen respiratory impairment and raise the likelihood of organ malfunction. IAP-related pathophysiological alterations can have an impact on different organ systems. For example, elevated IAP can impair renal function, reduce urine production, and raise the risk of acute kidney damage [30]. IAP can also cause gastrointestinal dysfunction, such as delayed gastric emptying and reduced gut motility [8].

Complications of (IAP) in Critical Adult Patients

According to Strang et al. (2021, IAP related problems can result in considerable morbidity and mortality in critically sick patients [27]. Respiratory compromise is a complication of IAP that can emerge as decreased lung volumes, increased peak airway pressures, and impaired gas exchange [30]. In addition, IAP can produce cardiovascular instability, which includes reduced cardiac output, hypotension, and tachycardia [30]. Another IAP consequence is abdominal compartment syndrome, which occurs when Intra-abdominal pressure exceeds 20 mmHg [30]. This syndrome can cause serious organ malfunction and failure, including respiratory, cardiovascular, and renal impairment. Abdominal compartment syndrome is a life-threatening illness that requires rapid treatment. In addition, IAP can produce gastrointestinal issues such as delayed gastric emptying and reduced gut motility [32]. This might cause nausea, vomiting, and abdominal pain, which can worsen the patient's condition. Furthermore, IAP can have a major impact on the neurological system, causing mental status changes such as disorientation, agitation, and altered consciousness [33]. Physiological effects of IAP on Multiple Organ Systems are discussed in **Figure 1** [34].

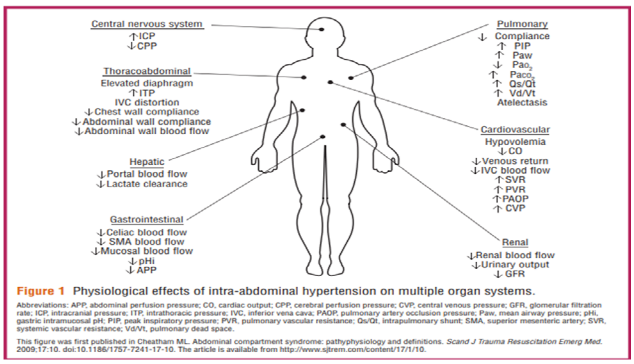


Figure 1: Physiological effects of IAP on multiple organ systems

Contraindication of (IAP) in Critical Adult Patients

Abdominal Compartment Syndrome (ACS) is a substantial contraindication to IAP measurement [35]. ACS can occur when abdomen pressure rises to a level that impairs organ function, and measuring IAP may be inappropriate if the patient's condition puts them at risk for hemodynamic instability [35]. Furthermore, certain patient populations, such as those with severe respiratory compromise or gastrointestinal disorders (e.g. bowel obstruction), may have contraindications that hinder IAP monitoring. The procedure for measuring IAP needs careful consideration of the patient's position, as badly positioned individuals can result in false readings [33].

Furthermore, critically ill patients who have recently had abdominal surgery may be at risk for elevated IAP. After surgeries such as laparotomy or other procedures in which the abdomen is manipulated, the possibility of measuring IAP must be balanced against the danger of future complications [12].

The Important of (IAP) in Critical Adult Patients

IAP is an important factor of Intra-abdominal organ perfusion, and it can lead to serious consequences including Abdominal Compartment Syndrome (ACS). Elevated IAP impairs blood flow to abdominal organs, potentially causing ischemia and organ failure [30]. IAP has been demonstrated in studies to be an accurate predictor of numerous problems in critically ill patients. Strang et al. (2021) found that Intestinal-Fatty Acid-Binding Protein (I-FABP) levels could predict problems associated with IAP elevation in ICU patients [27]. This emphasizes the importance of precise IAP measures as part of the overall clinical assessment. Elevated IAP may suggest the need for immediate action, such as decompressive surgery or fluid management modifications, to avoid further worsening.

IAP is also linked to nutritional status and care of critically ill individuals. Monitoring IAP, as indicated in Guan et al. (2024) guidelines, can inform nutritional therapies, especially when patients exhibit indications of intestinal edema or reduced gastrointestinal function [36]. Elevated IAP may present issues for sufficient nutritional supply, underlining the significance of tailored treatment plans that incorporate IAP data to improve patient recovery.

The relevance of IAP is especially clear in the postoperative situation. Dugar et al. (2024) discovered that IAP measures could predict wound problems in individuals undergoing an emergency laparotomy [37]. Monitoring IAP in these circumstances can help guide clinical decisions by identifying at-risk patients and implementing preventive measures to improve surgical outcomes.

Prevalence and Incidence of (IAP) in Critical Adult Patients in the World

The incidence of IAP in critical adult patients has been investigated in a variety of situations and demographics. According to one study, 9,345 patients were screened, and 95 were evaluated, yielding a mean age of 56.7 years and 79% male. Alcohol was the leading cause of liver cirrhosis (45.3%), followed by alcohol combined with hepatitis C (9.5%). Infection and haemorrhage were both precipitating causes (26% and 21%, respectively). The prevalence of Intra-abdominal Hypertension (IAH) was 82.1%, with Abdominal Compartment Syndrome (ACS) at 23.2% and a mean maximal Intra-abdominal pressure of 16.0 mmHg. Independent risk variables for IAH included alcoholic cirrhosis, the West-Haven score, and the PaO_2/FiO_2 ratio, while infection was associated with ACS. The 28-day death rate was 52.6%, which was strongly related with greater IAP and ACS. The study emphasizes the need of early detection and management of IAH/ACS in critically ill cirrhotic individuals [38]. Another cohort study published in 2020 discovered that the prevalence of IAP was 34.6% among patients admitted to ICUs in a low-income country.

In terms of incidence, the same cohort study in 2020 found a 21.1% daily incidence of IAP among patients admitted to ICUs in a low-income country [39]. These data indicate that IAP is a rather prevalent illness in critically ill patients, particularly those with liver cirrhosis.

Patients with IAP have much higher mortality rates. A cohort research in 2020 discovered that patients with IAP had a higher mortality rate of 54.5% compared to 24.4% among those without IAP [39]. Furthermore, mortality rates rose with increasing IAP severity, reaching 73.7% among patients with severe IAP [39]. These findings emphasize the need of early detection and treatment of IAP in critically sick patients to avoid complications and enhance outcomes.

Prevalence and incidence of (IAP) in Critical Adult Patients at Saudi Arabia

The prevalence and incidence of Intra-abdominal Pressure (IAP) in critically ill adults in Saudi Arabia are poorly reported. However, Qutob et al. (2022) conducted an online cross-sectional survey to investigate clinicians' understanding of abdominal compartment syndrome and IAP in Saudi Arabia [40]. According to the survey, a considerable majority (70.3%) was familiar with Intra-abdominal Hypertension (IAH) and its effects on organ function, with an even greater number (73.7%) understanding the notion of Abdominal Compartment Syndrome (ACS). Despite this understanding, over 43.0% of participants expressed uncertainty about measuring Intra-abdominal Pressure (IAP). The use of inotropes or vasopressors was the most often cited intervention for IAH and ACS, accounting for 13.5% of all interventions discussed.

Management and Nursing Care for Increased and Decreased IAP

Management and nursing care for increased and decreased Intra-abdominal Pressure (IAP) is an essential part of patient care, especially in critical care units [8,34]. Intra-abdominal pressure is the pressure within the abdominal cavity, which typically fluctuates between 0 mmHg and 5 mmHg. Pressures more than 12 mmHg are defined as Intra-abdominal Hypertension (IAH), which can result in consequences such Abdominal Compartment Syndrome (ACS). Effective nursing care requires close monitoring and early interventions to address both raised and lowered IAP, since changes can have a major impact on organ function and overall patient stability [8,34].

Continuous monitoring of IAP is required for both increasing and decreasing pressures. Nursing staff must look for symptoms of IAH, such as abdominal distention, decreased urine output, or changes in ventilatory parameters. Implementing defined protocols and using monitoring devices are critical for early detection of IAP changes [20].

When dealing with increasing IAP, nursing interventions are largely concerned with relieving the pressure and resolving any underlying issues. Optimizing patient placement is a simple yet beneficial step, as elevating the head of the bed can encourage diaphragmatic excursion and lung expansion [8]. Furthermore, careful fluid management is required, including monitoring and possible modifications to fluid intake and output. Diuretics may be administered in cases of fluid overload, depending on the physician's instructions. If there are indicators of oncoming ACS, nurses must be prepared to assist with abdominal decompression operations while also emphasizing the significance of early enteral feeding [29,34].

When IAP is reduced, nursing care focuses on identifying potential problems associated with the condition. Patients may develop visceral organ dysfunction or insufficient perfusion, which can cause hypotension or altered mental status. Close monitoring is therefore required to detect these indications early [8]. To avoid respiratory difficulties caused by low IAP levels in mechanically ventilated patients, ventilatory settings may need to be altered. In cases of hypovolemia, cautious fluid resuscitation can assist restore hemodynamic stability, nevertheless, it must be controlled to avoid excessive Intra-abdominal fluid accumulation. Furthermore, good coordination with the healthcare team is critical for addressing underlying difficulties and providing comprehensive patient management [8].

Critical Care Nursing Role and Document in IAP

Critical care nursing is essential in monitoring and regulating Intra-abdominal Pressure (IAP) in critically ill patients. The measurement of IAP is critical because it has a major impact on hemodynamic stability and organ function. Nursing responsibilities include monitoring IAP levels, identifying symptoms of Intra-abdominal Hypertension (IAH), and providing early interventions. The literature emphasizes the importance of defined methods for measuring and documenting IAP in the critical care environment to enable consistent monitoring and timely decision-making [5,8].

Accurate documentation of IAP is critical for assessing trends over time and implementing effective interventions. Nurses are in charge of documenting baseline readings, reassessing IAP after interventions, and recording any related clinical findings. By collecting these data, the nursing team may better communicate the patient's state to the healthcare team, allowing for collaborative discussions on management plans [8,40,41]. Furthermore, the use of modern measurement techniques has been stressed, and nurses should be conversant with these procedures as they grow [5,12].

IAP treatment also takes into account a variety of factors that can influence abdominal pressure, such as patient posture, sedation, and ventilator assistance. Non-invasive ventilation has been proven in studies to have effects on IAP, which nursing personnel must recognize and document [42]. Similarly, sedation levels can affect IAP measures, needing close monitoring [31].

Critically ill individuals are especially sensitive to IAH complications, such as Abdominal Compartment Syndrome (ACS), which can result in severe morbidity or fatality [41,43]. Nurses, as frontline caregivers, are responsible for identifying symptoms of IAH and ACS early on, such as abdominal distension and decreased urine output. Prompt detection can result in early treatment actions, such as fluid management or surgical consultation, ultimately enhancing patient outcomes [8].

Measuring Intra-abdominal Pressure

Various approaches have been devised to accurately assess IAP. The most commonly used procedures include direct intermittent measures (dialysis or laparoscopy), indirect (catheters implanted through the bladder, stomach, uterine, or rectum), and continuous measurements (catheters positioned in the bladder, stomach, or peritoneal). Flowchart for monitoring Intra-abdominal hypertension is discussed in **Figure 2** [44].

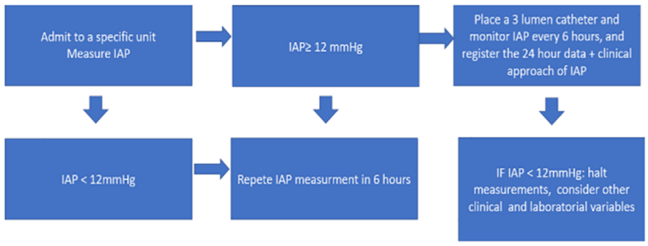


Figure 2: Flowchart for monitoring intra-abdominal hypertension

Methods to measure (IAP)

Intra-abdominal Pressure (IAP) measurement is vital in the management of critically ill patients in the intensive care unit. Several approaches for accurately assessing IAP have been developed, each with unique applications and benefits. This overview focuses on 3 main methods: Manometry, transducers, and the Compass Connection methodology.

Manometer: Manometry is one of the traditional ways for measuring IAP. Typically, a pressure transducer is attached to a catheter inserted into the urine bladder or gastrointestinal system. The instrument monitors the pressure within these hollow organs, which reflects the pressure inside the abdominal cavity. To maintain consistency, the measurement is done in a standardized position, typically supine [8]. Manometry is regarded as a valid way of assessing IAP, nevertheless, accurate readings require proper training and procedure adherence. This approach has been validated in multiple clinical contexts and is still commonly used in intensive care units (**Table 2**) [18].

Table 2: Straightforward approach to measuring Intra-abdominal pressure using a manometer for adult patients in an ICU setting

Step	Action
Patient preparation	Confirm patient identity and review relevant medical history Position the patient supine Explain the procedure to the patient (if alert) to reduce anxiety
Catheter insertion	Use a sterile Foley catheter (12-16 Fr is common) Insert the catheter into the bladder using sterile technique Secure the catheter to prevent accidental dislodgment
Setting up the manometer	Connect the Foley catheter to the manometer using sterile, appropriately sized tubing Fill the tubing and manometer with sterile saline to eliminate air bubbles Position the manometer at the level of the iliac crest (mid-axillary line) for accuracy
Measuring IAP	Close the drain from the Foley catheter to prevent urine from flowing out during measurement Allow the pressure to stabilize for a few seconds Once stabilized, record the IAP from the manometer in mmHg. Normal IAP is usually between 5 mmHg-12 mmHg
Continuous monitoring (if needed)	If necessary, allow continuous monitoring by leaving the system closed while regularly checking the manometer Document IAP readings in the patient's medical records
Follow-up actions	If IAP is elevated (>12 mmHg), consult the healthcare team for appropriate management Monitor the patient's overall clinical condition, adjusting care as needed based on IAP

Transducer: The use of pressure transducers is a more advanced method for measuring IAP. A pressure transducer is frequently coupled to a catheter implanted in the bladder or abdomen to provide continuous IAP monitoring capabilities. This technology is highly accurate and can continually send pressures to the monitoring system, enabling for real-time tracking of IAP changes [5]. Transducers are especially useful in critical care situations, when patients' status might change fast. The continuous aspect of this monitoring system gives vital information that can aid in the timely management of increased IAP (**Figure 3**) (**Table 3**) [18,45].

Table 3: Straightforward approach to measuring Intra-abdominal pressure using a transducer for adult patients in an ICU setting

Step	Action	Notes
Patient preparation	Confirm patient identity and history	Supine position ensures an accurate reference point
	Position the patient in supine position	Helps to reduce anxiety
	Explain the procedure to the patient (if alert)	-
Catheter placement	Use sterile technique for catheter insertion into the bladder	Prevents infection
	Secure the catheter after insertion	Minimizes movement
Setting up the transducer	Connect the sterile tubing from the urinary catheter to the pressure transducer	Ensure a leak-free connection
	Fill the transducer and tubing with sterile saline to eliminate air	Important for accurate pressure measurement
	Position the transducer at the mid-axillary line at the level of the iliac crest	Provides an accurate reference point
	Zero the transducer at the correct level (bladder level)	Necessary for accurate readings
Measuring IAP	Close the drainage system temporarily to prevent pressure escape	Ensure accurate pressure measurement
	Allow pressure to stabilize for a few seconds before reading	Ensure reading reflects true pressure
	Record the IAP displayed on the monitor (normal range: 5 mmHg-12 mmHg)	Readings >12 mmHg may indicate complications
Continuous monitoring	Set the monitor for ongoing pressure measurement if needed	Allows for real-time tracking of IAP
	Document IAP readings at regular intervals	Required for clinical assessment and management
Follow-up actions	If elevated pressures are noted, collaborate with the healthcare team for assessment	Consider fluid management or surgical
	Continue to monitor and adjust care based on the IAP readings and patient condition	Integrated into the overall treatment plan

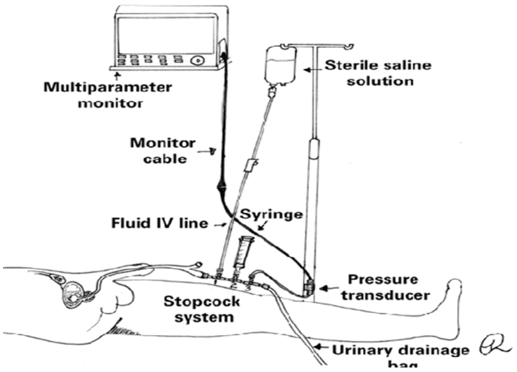


Figure 3: Intra-abdominal pressure measurement using the pressure transducer technique and a three-way stopcock system

Compass Intra-abdominal Pressure monitoring (IAP): Diagnosing and treating life-threatening conditions relies on time-sensitive, dependable data. The popular methods currently being used to get information are cumbersome, time consuming, or inaccurate. Such methods can take control away from the clinician [46] (**Figure 4**).

- Compass disposable pressure transducers provide digital
- Pressure measurements in an instant to help clinicians with
- Quantitative direction for proper treatment courses
- Compass eliminates the set up complexities and inaccuracies of other traditional pressure transduction systems. The easy-touse, single-use, sterile compass is versatile to a wide range of clinical applications requiring pressure monitoring
- Measures in either mmhg or cm H_2O
- Available in luer lock or luer slip connections
- Available with and without a guidewire port
- Single, sterile, disposable packaging, 5 per box
- Precise to American National Standards Institute standards-accurate measurements
- Compact, sterile, disposable
- Not made with natural rubber latex

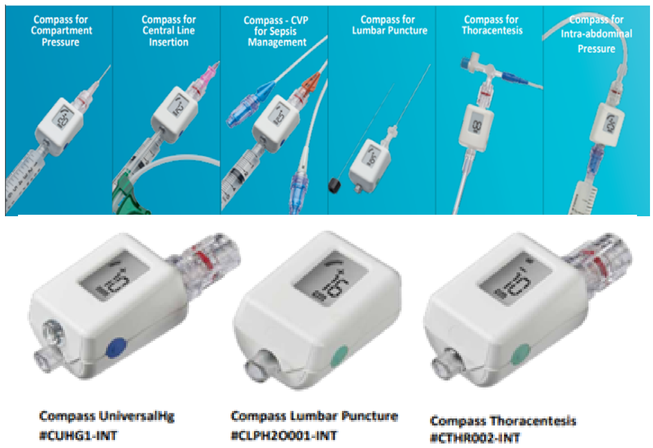
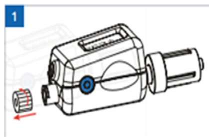
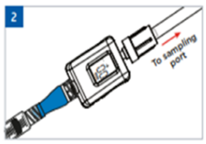
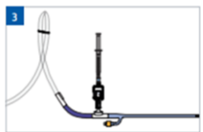
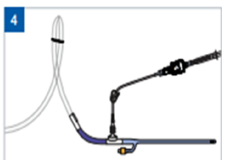


Figure 4: Compass digital pressure monitors compact physiological pressure transducer

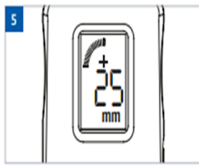
IAP CUHG1-INT

The Compass Intra-abdominal Pressure monitoring (IAP) is as shown in **Table 4**.

Table 4: Compass Intra-abdominal Pressure monitoring (IAP)

Compass Intra-abdominal Pressure monitoring (IAP)	
• Activate and calibrate Compass Universal Hg by depressing the blue power • button for approximately one second until the display reads '00 mm'. Remove the proximal luer cap Removing this cap prior to calibration does not affect the reading	
• Prime Compass and accessories prior to attaching it to the sampling port of the Foley catheter	
• Connect Compass directly to the female luer lock sampling port of the Foley catheter	
• Note: A short (~25cm–51 cm) extension tube can be connected to the sampling port and the male luer lock connection of Compass Universal Hg to facilitate the positioning of the Compass device at the mid-axillary line (level of urinary bladder)	
Pressure Measurement	

- Confirm Compass Universal Hg is positioned at the mid-axillary line (level of the urinary bladder). For patients in an inclined position, place Compass at the iliac crest at the mid-axillary line
- Clamp the tubing that leads to the collection device with a slide clamp, rubber band or haemostat
- Infuse ~20 cc saline for adults or quantity per hospital protocol within 10 seconds. Infusion can be directly into Compass Universal Hg or through a needleless valve positioned at the female luer lock port of Compass Universal Hg
- Allow system to equilibrate (a few seconds) prior to reading the pressure
- Verify Intra-abdominal pressure from the pressure data displayed on Compass Universal Hg Liquid Crystal Display
- Record any infused saline in the patient chart to adjust urine output. When measurement is completed, unclamp the drainage tube
- Disconnect the syringe and cap Compass Universal Hg with a sterile dead-end cap or needleless valve if the needleless valve isn't already present. Repeat process for subsequent measurements



Device Power Off and Recalibration

Press the button three times in a 'PUSH–PUSH–HOLD' sequence (i.e. quickly push the button twice and then hold the third button-push until the device turns off). To recalibrate and zero the device, open the device to atmosphere and depress the power button until the display reads '00 mm'. For complete instructions and warnings, consult the Instructions for use supplied with the device

Conditions for a Reproducible IAP Measurement

The Conditions for a Reproducible IAP Measurement is as shown in **Table 5** [10].

Table 5: Conditions for a Reproducible IAP Measurement

Conditions for a Reproducible IAP Measurement
Expressed in mm Hg (1 mm Hg=1.36 cm H_2O)
Measured at end-expiration
Performed in the supine position
Zeroed at the iliac crest in the mid-axillary line
Priming volume <25 mL of saline (1 mL kg-1 for children up to 20 kg)
Measured 30 sec−60 sec after instillation to allow for bladder

METHODS

A thorough scoping analysis was carried out to look into the current evidence on the function of critical care nurses in Intra-abdominal pressure monitoring among critically ill adult patients. The assessment followed a rigorous methodology, including the PRISMA flow chart, to guarantee transparency and adherence to best evidence-based practices.

The review methodology rigorously followed the suggestions made by Arksey et al. (2005) for defining the scope of review methodology, emphasizing the importance of a systematic and complete approach to data gathering and analysis [47]. This scoping review offers significant insights and evidence-based suggestions for healthcare professionals and policymakers on the most successful tactics for critical care nurses to use in Intra-abdominal pressure monitoring, as well as areas for future research.

Search Strategy

In 2024, a systematic search was carried out using online resources such as PubMed, Google Scholar, and the Cochrane Library to uncover research on critical care nurses' roles in Intra-abdominal pressure monitoring among critically ill adult patients. The search keywords were linked using Boolean operators (AND, OR) to optimize search results and assure topic relevancy. A combination of keywords and phrases was used to locate relevant documents. The search terms included "critical care nurses" or "nurses" or "intensive care nurses" or "ICU nurses," "Intra-abdominal pressure monitoring" or "IAP monitoring or ACS OR IAH".

The search criteria were intended to include studies that looked into critical care nurses' knowledge, practices, and issues with Intra-abdominal pressure monitoring. The terms included "critical care nurses" and "Intra-abdominal pressure monitoring", as well as "critically ill adult patients". Additional criteria were utilized to filter the search results, such as English language limits, study design constraints (quantitative and qualitative studies), and publication date restrictions (2020-2024). The study only included critical care nurses who worked in intensive care units.

Inclusion Criteria

The current scoping review examined papers on the function of critical care nurses in Intra-abdominal pressure monitoring among critically Ill adult patients. Studies that investigated critical care nurses' knowledge, practices, and issues with Intra-abdominal pressure monitoring were considered. In addition, papers on critical care nurses working in Intensive Care Units (ICUs) were included. The evaluation included both quantitative and qualitative studies published in English between 2020 and 2024.

Exclusion Criteria

On the other hand, the current scoping review omitted studies that did not match specific criteria. Studies that did not specifically address critical care nurses or their role in Intra-abdominal pressure monitoring were eliminated. Furthermore, research published before 2020 or after 2024, or those not published in English, were excluded.

Selection Process

In 2024, the review search returned 80 results. After deleting duplicates, 55 studies remained. After examining the titles and abstracts, 20 studies were removed because they did not meet the inclusion criteria. Thus, 10 studies were thoroughly examined to assess eligibility, three studies were excluded since they did not describe the original investigations. As a result, this scoping review includes 7 studies (**Figure 5**) (**Table 6**).

Table 6: Summary of selected studies

Author	IAP Measuring Methods	Results
Xu et al.	• IAP has historically been measured using a variety of ways, with Intra-Bladder Pressure (IBP) being a generally acknowledged indirect measurement approach. • Recent improvements include the introduction of continuous IAP monitoring devices, which improve convenience by providing digital display, long-term data storage, and real-time clinical analysis.	• The typical IAP is usually equal to or less than 12 mm Hg. • IAH is characterized as two consecutive IAP values of more than 12 mmHg within 4 hours-6 hours. • ACS is defined by an IAP greater than 20 mmHg and organ dysfunction/failure, which can result in significant consequences such as gastrointestinal ischemia, acute renal failure, and lung injury, all of which contribute to increased morbidity and death. • The novel IAP monitoring system can identify IAH and analyze clinical status in real time, allowing for better correlation analysis with other physiological indicators such as intracranial pressure to guide treatment and predict prognosis.
Li et al.	• The review states that, while many IAP assessment techniques exist, direct measurement is not suggested as a standard practice due to its high cost and invasiveness. This procedure should only be used in critically ill individuals where normal methods are contraindicated or potentially erroneous. Transvesical measurement is the most extensively used approach, providing a viable choice for both continuous and intermittent IAP assessment.	• The scoping review found 42 of the 9,954 screened papers that matched the inclusion criteria. The research looked at several Intra-abdominal Pressure (IAP) measurement techniques and classified them into three types: Direct measurement, indirect measurement, and less invasive measurement approaches. The majority of research performed agreement evaluations, while some investigated crucial criteria such as the safety, time expenditure, and repeatability of various IAP measuring methodologies.
Zou et al.	• The researchers discovered a significant difference in Intra-abdominal Pressure (IAP) readings between the 15°C and 35°C saline groups ($t=-2.55$, $P=0.027$). In contrast, IAP measurements showed no statistically significant difference between the 25°C and 35°C groups ($t=0.73$, $P=0.48$). A Bland-Altman analysis revealed consistency in IAP readings between the 25°C and 35°C saline groups, supporting data dependability at these temperatures.	• In this study, IAP was determined by injecting 25 mL of sterile saline into the bladder, as per the World Society of Abdominal Compartment Syndrome standards. The main feature of this method is that the saline does not have to be at a certain temperature; nonetheless, the study looked into the effect of several saline temperatures (35°C, 25°C, and 15°C) on measurement accuracy. The data imply that, while it is preferable to use saline at body temperature (35°C) for IAP measurements, saline temperatures over 25°C produce reliable results. In contrast, the study suggests that saline should not be used at temperatures below 15°C since it may cause measurement mistakes.
Pereira et al.	• The study emphasizes the vital importance of monitoring Intra-abdominal Pressure (IAP) in critically ill cirrhotic patients, particularly those at risk of IAH and ACS. Although the specific IAP measurement methods used in this study are not described in the results, the context suggests adherence to established techniques for measuring IAP, most likely involving bladder pressure monitoring in accordance with the World Society of Abdominal Compartment Syndrome's standard practices. Proper IAP assessment is critical for the early detection, prevention, and treatment of IAH and ACS, which may eventually improve outcomes in this high-risk patient population.	• In multi centric retrospective cohort study, a total of 9,345 individuals were screened, with 95 critically sick cirrhotic patients considered. The average age of the participants was 56.7 years, with 79% being male. The cause of liver cirrhosis was primarily alcoholic (45.3%), with some individuals having both alcohol-related disorders and hepatitis C virus (9.5%). Infections (26%) and bleeding (21%) were the triggering events for these patients. At ICU admission, the mean severity scores were MELD 26.2 and SAPS II 48.5. The study found a significant prevalence of Intra-abdominal Hypertension (IAH) and abdominal compartment syndrome (ACS), with 82.1% and 23.2%, respectively. The mean maximum Intra-abdominal Pressure (IAP) was 16.0 mmHg. Regarding IAH grading, 17.9% had no IAH, 26.3% were classed I, 33.7% II, 17.9% III, and 4.2% IV. Independent risk variables for IAH included alcoholic cirrhosis, the West-Haven score, and the PaO_2/FiO_2 ratio, whereas infection was a significant risk factor for ACS. The study also found a troubling 28-day death rate of 52.6%, with higher IAP and ACS indicating worse outcomes. Independent mortality risk factors included the MELD score, white blood cell count, PaO_2/FiO_2 ratio, and lactate concentration during ICU admission.

Smit et al	• While the specific techniques of measuring Intra-abdominal Pressure (IAP) were not specified in the data, the context implies adherence to accepted protocols for IAP monitoring in critically ill patients. IAP is often measured using bladder pressure or other established techniques that meet the World Society of Abdominal Compartment Syndrome criteria. The outcomes of this study highlight the need of appropriate IAP monitoring in high-risk patient populations, as the high prevalence of IAH and ACS is associated with higher morbidity and mortality. Identifying individuals at high risk, such as those with a BMI>30 kg/m², emergency abdominal surgery, or pancreatitis, is crucial for timely monitoring and interventions.	• Between March 2014 and March 2016, a prospective, observational, single-center cohort research included 503 patients, with 307 men (61%), and 196 females (39%). Patients admitted to the intensive care unit were diagnosed with a variety of conditions, including pancreatitis, elective or emergency open abdominal aorta surgery, orthotopic liver transplantation, other major abdominal procedures, and trauma. Of these individuals, 164 (33%) developed Intra-abdominal Hypertension (IAH), while 18 (3.6%) developed Abdominal Compartment Syndrome (ACS). Patients with pancreatitis had the highest rate of ACS (57%), followed by those receiving orthotopic liver transplantation (7%) and abdominal aorta surgery (5%).
Malik et al.	• The Intra-abdominal Pressure (IAP) was measured every 8 hours for 72 hours following the patients' admission to the intensive care unit. While the specific procedure for measuring IAP is not specified, it is generally done *via* bladder pressure monitoring in accordance with recognized recommendations. The study successfully connected the frequency and severity of IAH to patient outcomes by following patients for two weeks after admission to the ICU, underlining the clinical value of routine IAP monitoring in the ICU setting, particularly following laparotomy. The findings indicate that diagnosing and treating abdominal hypertension is vital for efficiently managing patients in the critical care setting.	• Between April and September 2021, a comparative cross-sectional study was done at the Combined Military Hospital in Rawalpindi, Pakistan, on 200 patients who underwent laparotomy and were later admitted to the Intensive Care Unit (ICU). Of the patients assessed, 150 (75%) had positive outcomes, while 50 (25%) had negative outcomes. The average age of the patients was 40.63 years, with a standard variation of ±9.448. Notably, 171 (85.5%) of the patients did not have elevated Intra-abdominal Pressure (IAP), but 29 (14.5%) had Intra-abdominal Hypertension (IAH). Statistical analysis found a significant link between high Body Mass Index (BMI) and poor outcomes in patients with IAH, as well as a correlation between the existence and severity of IAH among study participants, both with p-values less than 0.05.
Gorad, K	• IAP was measured using a Foley catheter implanted in the urine bladder and 50 mL of saline for intra-vesical pressure measurement. This technique for measuring IAP is described as straightforward and less intrusive, allowing for precise monitoring of IAP in patients positioned supine. The study sought to offer a valid clinical tool for screening patients at risk of problems associated with elevated abdominal pressure by establishing normal IAP readings in regular patients and determining the threshold for IAH. The researchers noted that adequate IAP measurement and monitoring might act as an important warning sign for clinicians to implement safety measures and prevent the progression to Abdominal Compartment Syndrome (ACS).	• A total of 250 hospital-admitted patients were evaluated in prospective trial to measure Intra-abdominal Pressure (IAP) utilizing a new creative technique including a Foley catheter. The group comprised 196 male and 54 female patients. The study discovered that patients who underwent laparoscopic abdominal surgeries (e.g., laparoscopic appendectomy and/or laparoscopic cholecystectomy), as well as those with conditions such as obstructed hernia (enterocele), intestinal obstruction, pancreatic ascites, pneumothorax, alcoholic liver disease with ascites, and chronic obstructive pulmonary disease, had higher IAPs than other patients. The average IAP reported in normal patients ranged from 7cm-9 cm of water, while IAP values greater than 9 cm of water were classed as Intra-abdominal Hypertension (IAH).

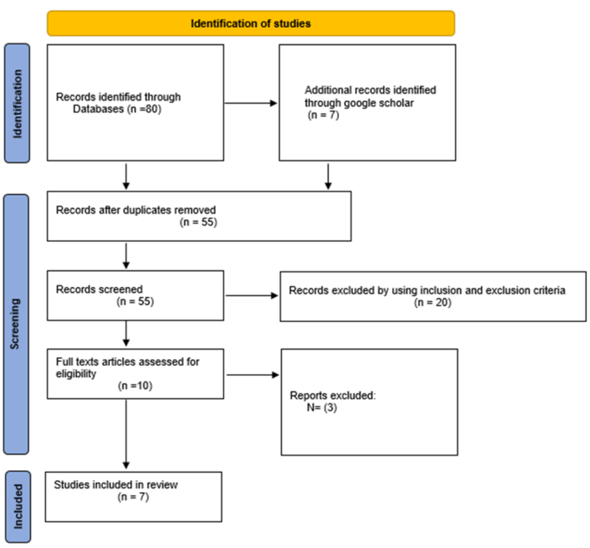


Figure 5: PRISMA 2009 flow diagram

Data Extraction

A review search was carried out, with all titles and abstracts provided, inclusion and exclusion criteria applied, reasons for inclusion and removal explained, and duplicates removed. A PRISMA flowchart was used to depict the four stages of the scoping review approach. **Figure 5** depicts the process for a systematic review. **Table 6** summarizes the features of the seven included studies. The summarized data was then assessed. The author(s), IAP Measuring Methods used in each study, and findings were all extracted and evaluated.

RESULTS

The results are discussed in **Table 6**.

DISCUSSION

Critical care nurses have limited knowledge and skills in Intra-abdominal Pressure (IAP) monitoring, which can result in delays in the detection and management of Intra-abdominal Hypertension (IAH) and Abdominal Compartment Syndrome (ACS) [1,17]. This lack of understanding is not restricted to a single demographic or geographic location, as research in Pakistan [17].

A review of the literature emphasizes the necessity of educating critical care nurses about IAP monitoring in order to enhance patient outcomes [32]. Despite the availability of guidelines and protocols for IAP monitoring, many nurses lack the necessary knowledge and abilities to properly follow them [2]. This lack of information can result in ineffective IAP measuring techniques, which can have catastrophic consequences for critically ill patients.

Intra-abdominal Pressure (IAP) monitoring has received a lot of attention in recent years because of the consequences for critically ill patients. This scoping review indicates a growing consensus on the relevance of IAP assessment, but it also highlights differences in techniques, conclusions, and clinical applications as mentioned in several researches.

Historically, IAP has been measured using a variety of approaches, with Intra-bladder Pressure (IBP) being a popular indirect method [18]. The review focuses on improvements in continuous IAP monitoring devices that improve data collecting and clinical analysis. The usual IAP is ≤ 12 mmHg, but identifying Intra-abdominal Hypertension (IAH) as two consecutive IAP measurements beyond this threshold requires monitoring in patient management. IAH can cause serious complications, including Abdominal Compartment Syndrome (ACS), which is defined by an IAP of more than 20 mmHg as well as organ failure [18,38]. The association found between higher IAP levels and greater morbidity and mortality rates across multiple patient cohorts is especially troubling, emphasizing the importance of routine IAP monitoring in high-risk patients.

When the findings of several researches are compared, differences arise in the prevalence of IAH among different patient categories discovered that medical patients and those undergoing emergency procedures had IAH rates of around 42.5% and 43.75%, respectively, which were much higher than the 12.5% frequency found in elective surgery patients. This finding highlights the importance of focused IAP monitoring measures in critically sick patients, particularly those with established risk factors such alcoholic cirrhosis or emergency abdominal surgery, as noted by [8].

Furthermore, the methods used to measure IAP vary between research, with transvesical measurement being used in many situations because to its safety and repeatability. Zou et al. (2021) studied the impact of saline temperature on measurement accuracy and concluded that, while body temperature saline is preferable, satisfactory results can be obtained at temperatures higher than 25°C [19]. This understanding contributes to the discussion on enhancing technical aspects of IAP measurement to ensure accuracy and consistency in clinical practice.

Cohort studies, such as those carried out by support the significance of routine IAP monitoring following surgical procedures [47,48]. Malik et al. (2023) found a substantial link between the severity of IAH and patient outcomes, emphasizing the importance of detecting and controlling increased IAP as soon as possible. The findings of Gorad and Prabhu support the claim that standardized IAP monitoring methodologies can serve as an important alert system for doctors, giving a proactive strategy to preventing ACS [49].

Despite advances in IAP monitoring, several studies advise against direct measurement due to its high cost and invasive nature [5]. While innovative technologies such as wireless transvaginal approaches show promise, their clinical accuracy remains questionable, necessitating more validation before general usage [5]. This sentiment is shared across the literature, where the need for less invasive technologies is balanced with a recognition of existing standards and practices.

The findings of Pereira et al. (2021), Smit et al. (2022) on the high occurrence of IAH and ACS among cirrhotic patients highlight the critical need for close surveillance in this high-risk group [8,38]. With an alarming 28-day death rate and documented independent mortality risk factors, such as the MELD score, the research clearly shows that proactive IAP assessment can help with early management and perhaps improve patient outcomes.

Finally, this scoping review demonstrates a consensus on the vital necessity for IAP monitoring in distinct patient categories, as well as an understanding of discrepancies in measuring procedures and prevalence rates [50]. While existing procedures are reliable, future research should focus on improving these techniques and solving the information gap about less intrusive options. Comprehensive standards and training for clinical teams are required to fully realize the potential of IAP monitoring as a common practice, improving treatment for critically sick patients.

CONCLUSION

Intra-abdominal Pressure (IAP) monitoring is vital in the care of critically ill patients because it can influence hemodynamic stability and patient outcomes. There is a definite link between raised IAP levels and consequences including Intra-abdominal Hypertension (IAH) and Abdominal Compartment Syndrome (ACS), which can result in increased morbidity and death. However, the data show that critical care nurses frequently lack proper training and familiarity with IAP measuring methodologies, indicating a substantial gap that could jeopardize patient care.

This scoping research has highlighted the necessity of teaching critical care nursing personnel about IAP monitoring techniques. It emphasizes the importance of standardized assessment methodologies and raising awareness of the therapeutic significance of IAP alterations. Variability in methodology and understanding among healthcare workers, combined with a range of risk factors that predispose patients to increased IAP, indicates to a pressing need for greater training and standardized protocols in critical care settings.

RECOMMENDATIONS

- **Enhanced training programs:** Create and implement tailored instructional programs for critical care nurses that include the principles, methodologies, and practical applications of IAP monitoring. These should include hands-on training sessions for the various measuring methods, such as manometry and indirect assessments.
- **Standardized protocols:** Develop uniform procedures and recommendations for measuring and managing IAP across all critical care settings. This should include specific definitions of normal and abnormal IAP levels, monitoring

frequency, and management measures.

- **Interdisciplinary collaboration:** Encourage collaboration among nursing, medical, and allied health workers to ensure a thorough grasp of IAP monitoring across the entire clinical team.
- **Investment in technology:** Encourage the use of novel technology for IAP monitoring that can offer continuous and accurate measurements with little invasiveness, decreasing the strain on healthcare personnel while enhancing patient safety.
- **Regular audits and feedback:** Conduct regular audits of IAP management processes to ensure protocol adherence and identify areas for improvement. Nursing personnel should receive feedback to help them maintain best practices.
- **Research and validation:** Encourage continuous research into the efficacy of various IAP assessment techniques and their impact on patient outcomes, as well as studies examining the long-term implications of IAP management measures.

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None.

CONFLICT OF INTEREST

Authors have no conflict of interest to declare.

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