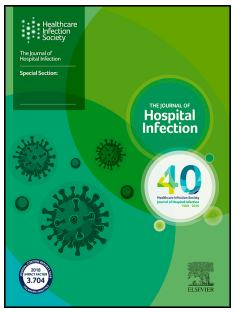
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Aseptic technique in clinical nursing settings: a scoping review

Hannah Kent[1]*, Sonja Dawson[1], Joanne Lewis[12], Brett Mitchell[134]

[1] Avondale University

[2] School of Nursing and Midwifery, University of Technology Sydney

[3] Central Coast Local Health District

[4] Nursing and Midwifery, Monash University

*Corresponding author:

Hannah Kent

Email: hannah.kent@avondale.edu.au

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Abstract

Introduction: Aseptic technique forms a component of Standard Precautions and is a foundational concept in nursing practice. The application of that standard appears to vary between context and nurse. The variation of principles and application between facilities and individuals may reflect the current disparity in evidence-based literature. The purpose of this scoping review is to map the current literature and to seek clarification of key concepts and definitions of asepsis and aseptic technique in relation to clinical nursing.

Method: A systematic search was conducted in alignment with JBI guidelines and PRISMA-ScR for scoping reviews. Electronic databases MEDLINE and CINAHL were searched using a combination of Medical Subject Headings (MeSH) and free-text terms. Studies published between 1st January 2004 and 31st December 2024 were included. Studies were screened in Covidence. One reviewer screened the titles and abstracts, with a second checking a random sample. Two reviewers conducted full text reviews. Data extraction was undertaken using a pre-specified database.

Findings: 2812 studies were initially identified, with 31 articles included in the review following the screening and full-text review. Half of the included papers originated from three countries, the UK (6), USA (5), and Australia (4). Many papers do not define asepsis or aseptic technique, and there are notable variations in the terminology used to apply aseptic technique.

Conclusion: This scoping review highlights the variation in the definitions, principles, and application of aseptic technique in clinical nursing settings across evidence-based literature. It will inform a larger planned program of research.

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Introduction

Healthcare-associated infections (HAIs) remain a significant international concern, with 1 in 10 patients acquiring a HAI in large acute hospitals.[1]. Across the European Union (EU) and European Economic Area (EEA), an estimated 4.3 million patients acquire a HAI, while in Australia, approximately 165,000 cases are reported annually [1, 2]. These infections, including catheter-associated urinary tract infections (CAUTIs), surgical site infections (SSIs), and central line-associated bloodstream infections (CLABSIs), contribute to prolonged hospital stays, increased healthcare costs, and higher morbidity and mortality rates [3, 4]. Given the growing global health challenge of antimicrobial resistance (AMR), infection prevention is essential in reducing the need for antimicrobial use [5, 6]. Strengthening infection prevention strategies through improved clinical protocols, staff education, and adherence to best practice guidelines, is essential for reducing HAIs and mitigating AMR [5, 7, 8]

Aseptic technique is a fundamental component of infection prevention and is employed to prevent CAUTIs, SSIs and CLABSIs [5, 9]. However, its definition and application in clinical nursing practice, particularly outside controlled environments like operating theatres, remains inconsistent. Variations in terminology have created confusion in both education and clinical settings [10, 11]. Terms such as sterile, clean, aseptic technique, no-touch and non-touch technique are often used interchangeably in protocols and literature [9, 11, 12].This inconsistency in terminology and practice may reflect the current variation in the limited evidence-based literature [13]. This study aims to explore how aseptic technique is defined and applied in clinical nursing settings. It also seeks to identify similarities and differences in the understanding and application of aseptic technique, with a particular focus on ward-based settings. To guide this scoping review, the following research questions were developed:

1. What are the similarities and differences in understanding and applying asepsis and aseptic technique in nursing?

2. How is aseptic technique defined and applied in ward-based settings?

Methods

A scoping review was undertaken in preference to a systematic review, as this review aimed to map the available literature, identify key concepts and definitions and identify knowledge gaps due to limited empirical evidence [14]. We followed the updated Joanna Briggs Institute (JBI) methodology for scoping reviews [15]. It will be reported in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR).

Protocol Registration

The scoping review protocol has been registered with Open Science and can be accessed at https://osf.io/68acy.

Eligibility criteria

The inclusion criteria were established using the Population, Concept and Context Framework (PCC Framework) [14]. The population consists of nurses, concept includes studies exploring procedural principles, theoretical foundations, or broad definitions of aseptic technique, and the context is limited to clinical settings. Studies published between 1st January 2004 and 31st Dec 2024 were included to encapsulate current literature and contemporary approaches. Only peer-reviewed literature was eligible for inclusion to ensure the reliability of evidence included in the study. The types of studies included for review were cohort, case-control, cross-sectional, observational, randomised controlled trials or case reports. Grey literature was not included as the aim was to explore the current empirical evidence that informs policy, and resource constraints limited the capacity to review grey literature systematically.

Studies were screened based on well-defined exclusion criteria. Commentaries, case studies, editorials, short reports, conference abstracts, literature reviews, clinical guidelines, audits, and quality improvement projects were excluded. Non-English papers without accurate translation were also omitted. Research focusing on aseptic procedures outside of nursing or non-clinical settings was not included. Additionally, studies primarily addressing antiseptic solutions, gloves, hand decontamination, or broader infection control concepts were excluded.

Information sources

The literature search was conducted using the electronic databases MEDLINE and Cumulative Index to Nursing and Allied Health Literature (CINAHL) to identify relevant studies.

Search

A systematic search was conducted in MEDLINE and CINHAL using a combination of Medical Subject Headings (MeSH) terms and free-text words to capture relevant literature. The combination of keywords used were “Asepsis” (MeSH), “Aseptic technique” OR “Aseptic Non-Touch Technique” OR “Non-Touch Technique” OR “No Touch Technique” OR “Sterile Technique” OR “Clean Technique” (free text) AND “Hospital” (MeSH) AND “Nursing” (MeSH) OR “Education professional”. Search limits included peer-reviewed articles and articles published in the last 20 years.

Selection of sources of evidence

All identified literature was imported from MEDLINE and CINHAL into Covidence (www.covidence.org) for title, abstract and full screening. Abstracts and titles of selected sources were screened using the stated inclusion criteria. One reviewer completed the title and abstract screening, with a second reviewer checking a five per cent random sample to ensure consistency. A third reviewer resolved any discrepancies in study selection and application of the eligibility criteria.

The remaining sources that met the inclusion criteria were reviewed in full text and assessed by two reviewers. The reason for the exclusion of a full-text article was documented in Covidence. A third reviewer resolved any discrepancies during the study selection.

Data extraction process

In consultation with the research team and following a pilot test, one team member extracted all the relevant data into a data extraction table developed in MS Excel.

Data items

Extracted data included title, author, year of publication, location of study, setting, aim of study, definition of asepsis, definition of aseptic technique, principles of aseptic technique,

application of aseptic technique and terminology chosen. Where data could not be clearly interpreted, it was not included in those data.

Synthesis of results

The results are presented descriptively through tables and figures. Content analysis was conducted in NVivo of papers that explicitly or implicitly described principles of aseptic technique, following the approach outlined by Elo and Kyngäs [16].

Results

Selection of sources of evidence

Our search identified 2812 studies, with 31 articles included following the screening and full-text review. The selection process and reasons for exclusion are demonstrated in the PRISMA flowchart (*Figure 1*).

Characteristics of sources of evidence

The included studies were conducted across 15 different international settings (*Table I*). The most frequently represented countries included the United Kingdom (n = 6) [11, 17-21], the United States (n = 4)[22-25], and Australia (n = 4)[26-29]. Other countries represented included Turkey (n=3) [30-32], Finland (n = 2)[33, 34], Brazil (n = 2)[35, 36], Canada [37], Belgium [38], Kenya [39], Sweden [40], Indonesia [41], Ireland [42], China [43], Haiti [44], and India [45]. The most commonly reported clinical settings were ward-based settings (n = 6), followed by operating theatres (n = 5), tertiary education settings (n = 3), and emergency departments (n = 2).

Definition and application: results of individual sources of evidence

Definitions of asepsis, aseptic technique and principles of aseptic technique are presented in *Table II*. A definition of *asepsis* was provided in four of the 31 included studies [35, 42, 43, 46], while aseptic technique was clearly defined in 8 studies [11, 28, 33, 34, 42, 45, 47, 48]. The majority of studies either did not define these terms or presented them in an unclear manner. Five papers [17, 31, 34, 49, 50] explicitly outlined the principles underpinning aseptic technique. Fourteen studies [18, 22, 23, 25, 26, 33, 35, 36, 38, 39, 41-44] provided implicit or unclear descriptions through procedural steps from which principles could be inferred, while twelve studies did not address or imply the principles. The most common clinical applications for aseptic technique included wound care (n = 7), indwelling catheter

(IDC) insertion (n = 5), surgery (n = 4), education (n = 4), and central venous catheter (CVC) care (n = 3). The terminology used in the paper to describe the approach to achieving asepsis was also extracted. The framework Aseptic Non-Touch Technique (ANTT®) [51] was the most common terminology used (n = 11), followed by aseptic technique (n = 9) and sterile technique (n = 8). Several papers used multiple terms or other terminology, such as aseptic practice, clean technique, surgical asepsis, or aseptic care.

Synthesis of results

Of the 31 papers in the review, 19 went through content analysis because they had the principles of aseptic technique either explicitly (n = 5) or implicitly (n = 14) described. A total of 31 procedural elements were identified using content analysis, following the approach described by Elo and Kyngäs [16]. These elements were categorised into overarching principles of aseptic technique (*Figure 2*), which included preparation and planning, hand hygiene, personal protective equipment (PPE), environmental control, aseptic behaviour, no touch technique, and aseptic field management.

Discussion

Summary of evidence

The aim of this scoping review was to examine how aseptic technique is defined and applied in clinical nursing settings. We found notable variations in definitions, terminology and principles surrounding aseptic technique across clinical nursing literature, highlighting the lack of standardisation. Only four out of 31 studies defined asepsis [35, 42, 43, 46], while only eight provided a definition of aseptic technique [11, 28, 33, 34, 42, 45, 47, 48]. This is notable, given that even within studies focused on aseptic technique, these key definitions were often omitted or overlooked. Among the papers that did provide definitions, no two offered the same definition. As mentioned by Flores [52] and Aziz [10], ambiguity in these definitions has likely impacted practice standards.

The terminology used in these papers to describe the approach to achieving asepsis was also varied, as depicted in Table II. The most common approach referenced was ANTT®, which was mentioned in approximately one-third of the studies. It was followed by references to aseptic, sterile, and clean techniques. Six studies described more than one approach within

the same paper. Inconsistent terminology has been identified as an issue in research surrounding aseptic technique. This can create challenges for educators and clinicians when developing consistent teaching materials and policies [50]. Gould, Chudleigh [11] and Isaac, Einion [18] both reported challenges to aseptic technique in clinical settings, including a lack of clarification and standardisation in practice. Additionally, they found nurses appeared to be confused about terminology, particularly surrounding the concept of asepsis.

Among the five studies that explicitly outlined principles of aseptic technique, each of these papers identified different principles. No two papers described the same set, reflecting a lack of consensus and clarity of the fundamentals of aseptic technique. Fourteen studies mentioned some procedural methods, while the remaining did not address principles or methods at all. When content analysis was conducted on the studies that explicitly or implicitly (n=19/31) described the principles, Clare and Rowley [47] and Gerolemou, Fidellaga [23] shared the same set of principles, as did Hegarty, Howson [42] and Ferdianingsih, Efendi [41] also shared the same principles. However, these were the only papers in this review that shared the same sets of principles (*Figure 2*). Pursell et al. (2023) also identified notable differences across 16 international guidelines for aseptic technique, with minimal explanation of how or why specific methods were chosen. This may suggest that even when aseptic technique is the primary focus, the method, rationale and evidence are often missing or assumed, leaving it open to interpretation and potentially contributing to variability in practice.

Despite calls to focus on the principles underpinning aseptic technique [11, 53], these principles remain poorly articulated. Educators in clinical and tertiary settings may inadvertently encourage staff and students to 'rote' learn skills that require an aseptic technique, instead of applying the principles of aseptic technique to the procedure [49]. Moreover, this issue is compounded by the lack of consensus on what constitutes the principles of aseptic technique, particularly in ward-based environments [11, 13]. A national cross-sectional survey of 49 university institutions across the United Kingdom revealed great variance in the methods and principles used to teach aseptic technique [50].

The most common clinical application of aseptic technique is in wound care (n=7). Gillespie, Chaboyer [28] mentions that aseptic technique in wound dressing has historically been based on ritualistic practices, rather than being principle-based. Aseptic technique is often

associated with wound care, other procedures requiring asepsis in clinical settings are generally less commonly addressed in education [54, 55].

The literature reveals a gap in terminology, definitions and application of aseptic technique. Gould, Hawker [48] and Gould, Courtenay [19] state that researchers have sometimes added to this confusion by failing to provide clear definitions of terminology and approaches used. It becomes difficult to inform policy, education, and clinical practice without a universally accepted definition or consensus on guiding principles. Although the ANTT® Clinical Practice Framework (Rowley, 2001; Rowley et al., 2010) was designed to standardise a non-touch technique, there is still reported confusion surrounding aseptic technique [11]. Hegarty, Howson [42] mentions a lack of high-quality empirical evidence regarding measured advantages or disadvantages using ANTT, specifically surrounding its ability to reduce mortality and HAIs. This also highlights the need for further robust studies to be conducted on the effectiveness of these approaches.

This scoping review highlights a lack of emphasis and consensus on the core elements of aseptic technique, as well as a limited empirical evidence base informing policies, potentially explaining a variation in policy, education, and ultimately clinical practice.

Limitations

Given the lack of international standardised terms, a limitation of this paper is the judgment calls that need to go into determining whether the paper had defined or outlined principles, and every effort was made to describe it as accurately as possible. Furthermore, the exclusion of grey literature may have resulted in relevant information being missed, which could impact findings. The heterogeneity of setting and participants in the included studies, as well as the heterogeneity in definitions, limits the ability to draw strong conclusions on the application of aseptic clinical nursing practice. A strength of this paper was the use of a scoping review design. This enabled a broad overview of the available empirical evidence, and to identify and map gaps.

Conclusion

Empirical evidence informing aseptic technique policy and practice lacks clear definitions of its core concepts and principles. Where principles are mentioned, they are often presented as procedural, step-by-step methods that vary between studies and are frequently vague in

nature. Some papers fail to define and describe the approach to aseptic technique entirely. This lack of clarity could impact ward-based settings and the development of local guidelines to inform aseptic procedures. Establishing consistent, overarching terminology and principles would better support the development of polices, education and ultimately clinical practice, potentially reducing the risk of HAIs. Further research is required to determine a consensus on the definitions and the overarching principles of aseptic technique.

Conflict of interest

None declared.

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Ethics

Ethics approval was not required for this study as it is a review of existing literature.

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Table I: Overview of included studies

Author	Year	Country	Population	Setting	Aim
Acun	2024	Turkey	The study sample consisted of 107 first-year nursing students randomised into experimental (n = 53) and control (n = 54) groups	Tertiary Education	This study aimed to evaluate the impact of the flipped learning model on nursing students' asepsis knowledge and learning skills.
Adams et. Al	2011	USA	Registered nurses (n = 67) and technicians (n = 22) practising in the scrub role across two operating suites in a large urban tertiary teaching medical centre.	Operating theatres	The purpose of this cross-sectional study was to examine the practices of perioperative scrub personnel with surgical asepsis.
Andersson et al.	2018	Sweden	Twelve (n = 12) health professionals, including nurses and doctors	Operating theatre	This study evaluated the implementation of a theory-driven program to enhance hand hygiene and aseptic techniques in the operating room.
Chemoiwa et al.	2014	Kenya	A sample of 386 injection procedures attributed to the nurses in a Hospital in Kenya	Ward based setting	To analyse nurses' infection prevention practices in injection handling.
Chen et al.,	2024	China	A total of n = 458 nurses were included in this study from one hospital	Ward based setting	This study aimed to assess ANTT proficiency in a cohort of nurses and analyse associated risk factors to promote its application in clinical practice.
Ding et al.	2017	Australia	A convenience sample of n = 60 nurses in a hospital across four surgical units	Operating theatre	This study prospectively examined surgical nurses' postoperative wound care practices and adherence to evidence-based guidelines.
Ferdianingsih et al.	2023	Indonesia	Neonatal nurses (n= 160) from two national hospitals in Jakarta	NICU	This study examines factors affecting nurse compliance with aseptic technique during PIVC insertion.
Fink et al	2012	USA	Acute care hospitals (n =75) responded from 29 US states and Canada.	Acute Care hospitals	The survey collected baseline data for the STOP CAUTI study on CAUTI prevention.
Flynn et al.	2015	Australia	Bone Marrow Transplantation (BMT) patients (n = 150) were assessed	Oncology ward	This study aimed to assess whether switching from ANTT to a sterile technique for CVAD needleless connector changes affected CRBSI rates in BMT patients.

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Gerceker et al	2018	Turkey	Forty-eight (n=48) PHO patients with Hickman or Port catheters were recruited to participate in a prospective, randomised study.	Paediatric Haemato-oncology Unit	To compare manual vs. prefilled syringes using aseptic non-touch technique for flushing.
Gerolemou et al.	2014	USA	Nurses (n = 46) working in a 23-bed medical, surgical, and neurological critical care unit completed assessment and training of sterile technique in the simulation laboratory.	Critical Care	To assess simulation-based training effectiveness for critical care nurses in sterile technique during central vein catheterisation infection rates.
Gillespie et al.	2013	Australia	Acute care nurses (n = 120) completed the survey from a 250-bed metropolitan hospital in Queensland, Australia.	Acute ward-based setting	To describe the self-reported wound care practices of acute care nurses.
Goessaert et al.	2012	Belgium	Nurses (n = 100) and nursing students (n = 71) participated. From four acute hospitals and two nursing schools in Belgium	Education	To compare the advantages of sterile catheterisation vs. no-touch method for hospital caregivers.
Gonzalez & Sole	2014	USA	Nursing students (n = 13) enrolled in an upper division baccalaureate nursing program in a large urban public university	Tertiary education	To identify if one simulated skills check-off for urinary catheterisation is enough for BN students to be competent.
Gould et al.	2018	UK	The questionnaires were completed by registered nurses (n = 180) in acute surgical and medical wards.	Acute/Medical surgical wards	The study aimed to assess nurses' understanding of "aseptic technique," their confidence in performing it, and their opportunities to update their knowledge and maintain competence through reassessment.
Gould et al.	2021	UK	Nurses (n = 941) responded to a National cross-sectional survey	National hospitals	The aim was to survey nurses' satisfaction with opportunities for continuing professional education on aseptic techniques.
Hawker et al.	2023	UK	Fifteen third-year student nurses, eleven mentors, seven nurse educators and fourteen infection prevention nurses were invited to participate (n = 47)	Tertiary Education	Explore how undergraduate nurses learn aseptic techniques in class and clinical settings and the role of educators, mentors, and infection prevention nurses.

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Hawker et al.	2020	UK	Nurse educators (n = 49) one from each university 49/70 across the UK.	Tertiary Education	The aim was to investigate what, when, and how pre-registration nursing students are taught and assessed on aseptic technique in UK undergraduate programs.
Hegarty et al.,	2018	Ireland	Nurses carrying out wound dressing procedures in a clinical setting (n = 11) and in a simulated setting (n = 3).	Ward based setting	This study aimed to develop an observational metric to assess ANTT performance in acute surgical wound dressing.
Isaac et al.	2019	UK	Registered nurses (n = 23) who had received ANTT ® training in the medical surgical paediatric ward.	Ward based setting	This study explored the challenges NHS child health staff faced in adopting ANTT and IV therapy practices.
Karaogˇlan et al.	2022	Turkey	Tertiary paediatric hospital in Turkey, inpatient clinic nurses (n = 225) participated in the study.	Inpatient clinic	This cross-sectional study aimed to determine paediatric nurses' knowledge and experiences of PIVC insertion
Manojlovich et al.	2015	USA	A total of 81 insertion attempts by registered nurses in the ED were observed across 65 patients.	Emergency Department	To assess aseptic insertion breaches, influencing factors, and post-catheterization bacteriuria in the ED.
Medeiros et al.	2012	Brazil	Nursing professionals (n = 14) and final graduation year students (n = 24) performed care on lesions in the same institution's healthcare and surgical centres.	Ward-based setting and clinic	To compare the development of nursing professionals and students about the performance of the wound dressing technique
Moore et al.	2016	Canada	Patients with cervical spinal cord injuries (n=36) requiring intermittent catheterisation by nursing staff were recruited.	Inpatient Rehabilitation	This RCT compares UTI onset in spinal cord injury patients using clean vs. sterile intermittent catheterisation in rehab.
Padula et al.	2011	Brazil	Nursing professionals (n = 41) observed and performed forty-one dressings in a teaching hospital.	Ward based setting	The objective of this study is to verify the use of the technique's steps in the execution of dressings
Priyanka et al.	2019	India	Nurses (n = 60) from civil hospitals Panipat, Jind and Sonipat	Maternity	This study aimed to assess staff nurses' knowledge and practices of aseptic technique during normal vaginal delivery.

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Simon Clare and Stephen Rowley	2018	UK	Registered healthcare professionals (n = 49) across two London hospitals	Ward based setting	This study assesses whether standardising aseptic technique with the ANTT®-CPF improves and sustains staff compliance with infection prevention practices.
Teija-Kaisa Aholaakko	2011	Finland	Registered nurses (n = 31) working in operating theatres at a large university hospital were interviewed.	Operating theatres	The aim is to explore aseptic practice-related stress in surgery. The objectives are to define stress-related factors and the means to reduce the stress.
Teija-Kaisa Aholaakko and Eija Metsälä	2015	Finland	Registered nurses (n = 242) working as scrub nurses in theatres across two university hospitals	Operating theatres	This cross-sectional study aimed to assess intraoperative aseptic practices by circulating nurses.
Timmins et al.	2018	Haiti	Nursing staff (n = 15) members on the general surgery, orthopaedics, and maternity units in three surgical wards of a hospital in Port-au-Prince, Haiti.	Mixed-speciality ward-based settings	To describe the facilitators and barriers for nurses to perform quality wound care
Towell-Barnard, et al.	2020	Australia	The sample consisted of Registered nurses (n = 38) and doctors (n = 9) from a tertiary hospital	Emergency Department	Explore challenges and enablers of standardising aseptic technique in an Australian ED.

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Table II: Definitions, principles and approach to aseptic technique

Author	**Definition of asepsis** *(YES/NO/UNCLEAR)*	**Definition of aseptic technique** *(YES/NO/UNCLEAR)*	**Outlined the principles of AT** *(YES/NO/UNCLEAR or UNCLEAR/IMPLICIT)*	**Application focus**	**Approach terminology**
Acun, 2024	Unclear	No	No	Education	Asepsis principles

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Adams et al., 2011	Yes	No	No	Surgery	Surgical asepsis
Aholaakko & Metsälä, 2015	No	Yes	Yes	Surgery	Aseptic practice
Aholaakko, 2011	No	Yes	Unclear/Implicit	Surgery	Aseptic practice
Andersson et al., 2018	No	No	No	Surgery	Aseptic technique
Chemoiwa et al., 2014	No	No	Unclear/Implicit	IV therapy	Aseptic technique
Chen et al., 2024	Yes	No	Unclear/Implicit	Invasive procedures	ANTT®
Clare & Rowley, 2018	Unclear	Yes	Yes	Invasive procedures	ANTT®
Ding et al., 2017	Unclear	Unclear	Unclear/Implicit	Wound Care	ANTT®
Ferdianingsih et al., 2023	No	No	Unclear/Implicit	PIVC	ANTT®
Fink et al., 2012	No	No	Unclear/Implicit	IDC insertion	Sterile technique
Flynn., 2015	No	Unclear	No	CVC accessing	ANTT® & Sterile technique
Gerceker et al., 2018	No	No	Yes	CVC maintenance	ANTT®
Gerolemou, et al.2014	No	No	Unclear/Implicit	CVC insertion	Sterile technique
Gillespie et al., 2013	No	Yes	No	Wound Care	Aseptic technique & Wound field concept
Goessaert et al., 2012	No	No	Unclear/Implicit	IDC insertion	Sterile, non-sterile, No-touch technique
Gonzalez & Sole., 2014	No	No	Unclear/Implicit	IDC insertion	Sterile technique
Gould et al., 2018	Unclear	Yes	No	Education	Aseptic technique
Gould et al., 2021	No	Yes	No	Education	Aseptic technique
Hawker et al., 2020	Unclear	Unclear	Yes	Education	Aseptic technique
Hawker et al., 2023	Unclear	Unclear	Yes	Invasive procedures	Aseptic technique & ANTT®
Hegarty et al., 2019	Yes	Yes	Unclear/Implicit	Wound Care	ANTT®
Isaac et al., 2019	No	Unclear	Unclear/Implicit	IV therapy	ANTT®
Karaogˇlan, et al. 2022	No	No	No	PIVC insertion	ANTT®
Manojlovich et al., 2015	No	No	No	IDC insertion	Aseptic technique

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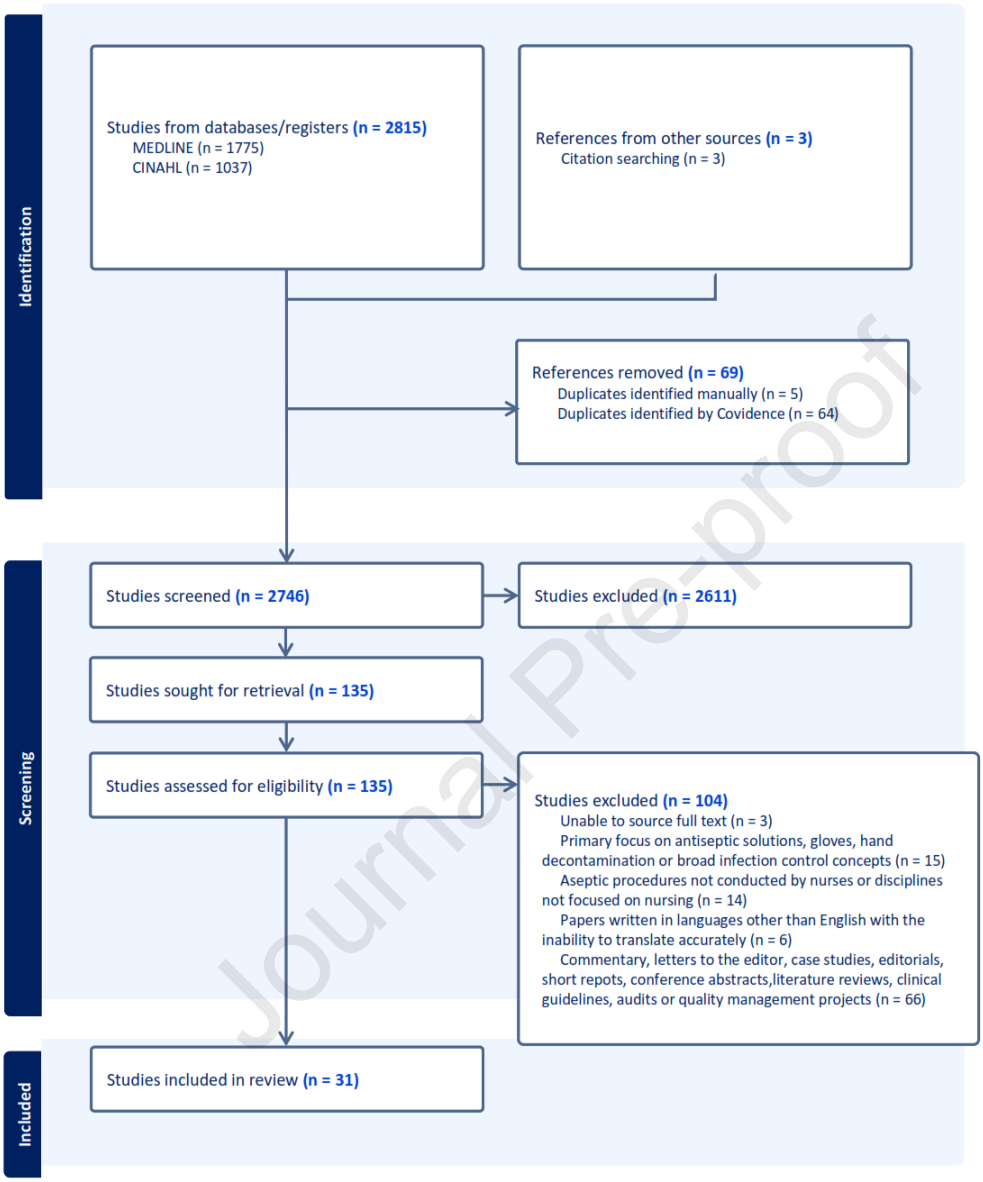
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Medeiros et al.2013	Yes	Unclear	Unclear/Implicit	Wound Care	Sterile technique
Moore, et al.,2006	No	No	No	IDC insertion	Sterile & Clean technique
Padula et al., 2011	No	Unclear	Unclear/Implicit	Wound Care	Sterile & Clean technique
Priyanka., 2019	No	Yes	No	Labour delivery	Aseptic technique
Timmins., 2018	Unclear	No	Unclear/Implicit	Wound Care	Aseptic care
Towell-Barnard, et al.,2020	Unclear	No	No	Wound Care	ANTT ®

Note: Yes = Clear definition/Explicitly outlined. **No** = No definition. **Unclear =** Does not explicitly define AT, but descriptions of AT imply a definition. **Unclear / Implicit =** Implied principles or partially describes principles. **Asepsis:** the absence of harm-forming microorganisms [56, 57]. **Aseptic technique:** infection prevention practices in clinical procedures focused on minimising contamination to protect patients and staff from infection [10]. **Principle:** a fundamental rule or guideline that underpins a concept or practice. In the context of **aseptic technique**, a **principle** would be an overarching standard that ensures the technique is performed correctly to prevent infection.

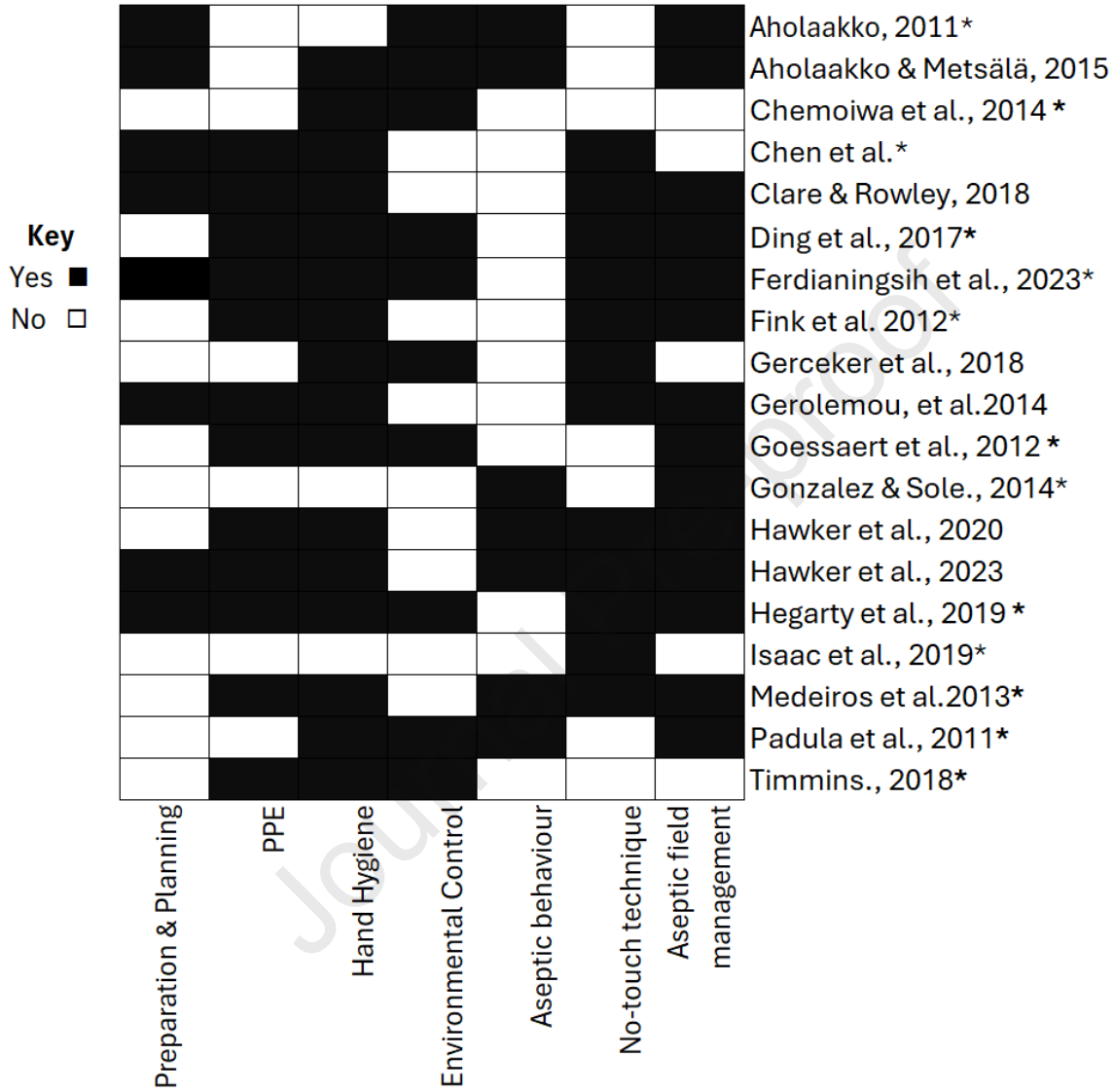
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Figure 1- PRISMA Flow diagram



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Figure 2: Overview of Principles



Note: *******The paper described the procedural method of the skill, with some principles of aseptic technique inferred through the outlined steps. The procedural steps have been categorised into broad principles to highlight key aspects of aseptic technique in the paper. Aseptic behaviour involves human behaviours, decision-making, and conduct involved in maintaining asepsis, often requiring situational awareness. Aseptic field management focuses more on the technical, field setup, and materials management