

Challenges faced by nurses in complying with the principles of Aseptic Non-touch Technique during wound-care practice: A Literature Review

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ABSTRACT

Background: Surgical and wound site infections (SWSIs) are the second most frequent Healthcare-associated Infections. One way of preventing SWSIs is by adhering to the principles of asepsis. However, many nurses still struggle to successfully apply the principles of Aseptic non-touch technique (ANTT) during wound-care management.

Aim: To identify the barriers and enablers that influence nurses' adherence to the principles of ANTT during wound-care management.

Method: A literature search was carried out using a systematic approach. Key terms were ascertained and used in combinations to search four electronic databases for primary studies specific to the topic. Common challenges encountered by registered nurses when applying ANTT in wound-care procedures were identified using a thematic analysis process.

Findings: A total of seven research studies fulfilled the requirement for inclusion and three themes emerged including: material and resources, nurse education and nurses' behaviour were amongst the most dominant factors influencing adherence to the principles of ANTT.

Conclusion: The evidence suggests that nurses' compliance with aseptic practice is directly influenced by environmental and psychological factors. Ensuring compliance to ANTT may require an integrated approach involving local, national and worldwide organisations, and in collaboration with higher education institutions teaching nursing.

Key words: Nurses □ Aseptic Non-touch Technique □ Wound-care management □ Compliance □ Challenges

Surgical and wound site infections (SWSIs) are the second most frequent healthcare-associated infections (HAIs) (ECDC, 2012). The global impact of SWSIs on both individuals and the economy is alarming and represents a major epidemiological burden in developing and high-income countries (Allegranzi *et al.*, 2016). Based on data reviewed from 84 studies, and according to a study published by Leaper *et al.*, (2004), the financial cost of SWSIs in Europe was estimated to range between €1.47- €19.1 billion, while the average patient stay in hospital is set to increase by 6.5 days, costing 3 times as much to treat an infected patient. Data collected by the National Health Service (NHS) hospitals in England from April 2010 to March 2012, estimated the length of hospital stay attributed to SWSIs to increase by 7 to 13 days, with a total of 4,694 bed-days lost over this period (Jenks *et al.*, 2014). Meanwhile, in 2017/2018, SWSI risks were higher than the annual SWSI incidence 10 years ago (Public Health England, 2018).

The World Health Organisation (WHO) estimates that HAIs can be reduced by at least 30% with effective infection prevention and control measures (WHO, 2019a). However, its prevention involves a complex process of integrating a range of measures (Allegranzi *et al.*, 2016). According to the Department of Health, (DH, 2001), one of the fundamental processes of preventing HAIs when performing wound care, is adhering to the principles of asepsis. Asepsis is the process of utilising sterile procedures to eliminate micro-organisms from an area (Lowbury *et al.*, 2013). Aseptic Non-Touch Technique (ANTT) involves using a sterile procedure to prevent contamination of wounds and other susceptible sites (NHS UK, 2018). The Health and Social Care Act has made it a requirement for all health-care providers to have ANTT as a standardised aseptic technique (AT), in which education and audit can be demonstrated across the board (DH, 2008).

According to literature, nurses have found it challenging to attain asepsis, with very few successfully adhering to the principles of ANTT during wound-care procedures (Ding *et al.*,

2017). Whereas, others that adhere to the principles do not often understand the rationale for this practice (Bree-Williams & Waterman, 1996; Gould *et al.*, 2018). A theory-practice gap was notably identified in the area of microbiology and infection control education amongst undergraduate nurses; and the transferability of this knowledge in practice (Cox *et al.*, 2014). Overall, there is a gap in nurses' understanding of ANTT and its application in practice (Bree-Williams & Waterman, 1996; Ding *et al.*, 2017); and although a recent study highlighted varying reasons why nurses adhere to this standardised technique (Teija-Kaisa & Eija, 2016), there has been little breakthrough made with regards to exploring nurses' awareness of the rationale base, their responsiveness to the principles of ANTT or their perception of applying these principles in practice.

Aim

The purpose of this review is to identify the challenges that nurses face in applying the principles of Aseptic Non-Touch Technique (ANTT) during wound-care practice.

Method

Study Design

A literature review was carried out to identify and summarise common challenges encountered by registered nurses when applying ANTT during wound-care procedures.

Inclusion and Exclusion Criteria

Primary research papers published in English between January 1993 to Dec 2018. Articles focusing on registered nurses and their experiences on the application of ANTT during wound management were included in this study. Articles published before 1993, including reports on registered nurses were excluded, since the aseptic technique became standardised internationally

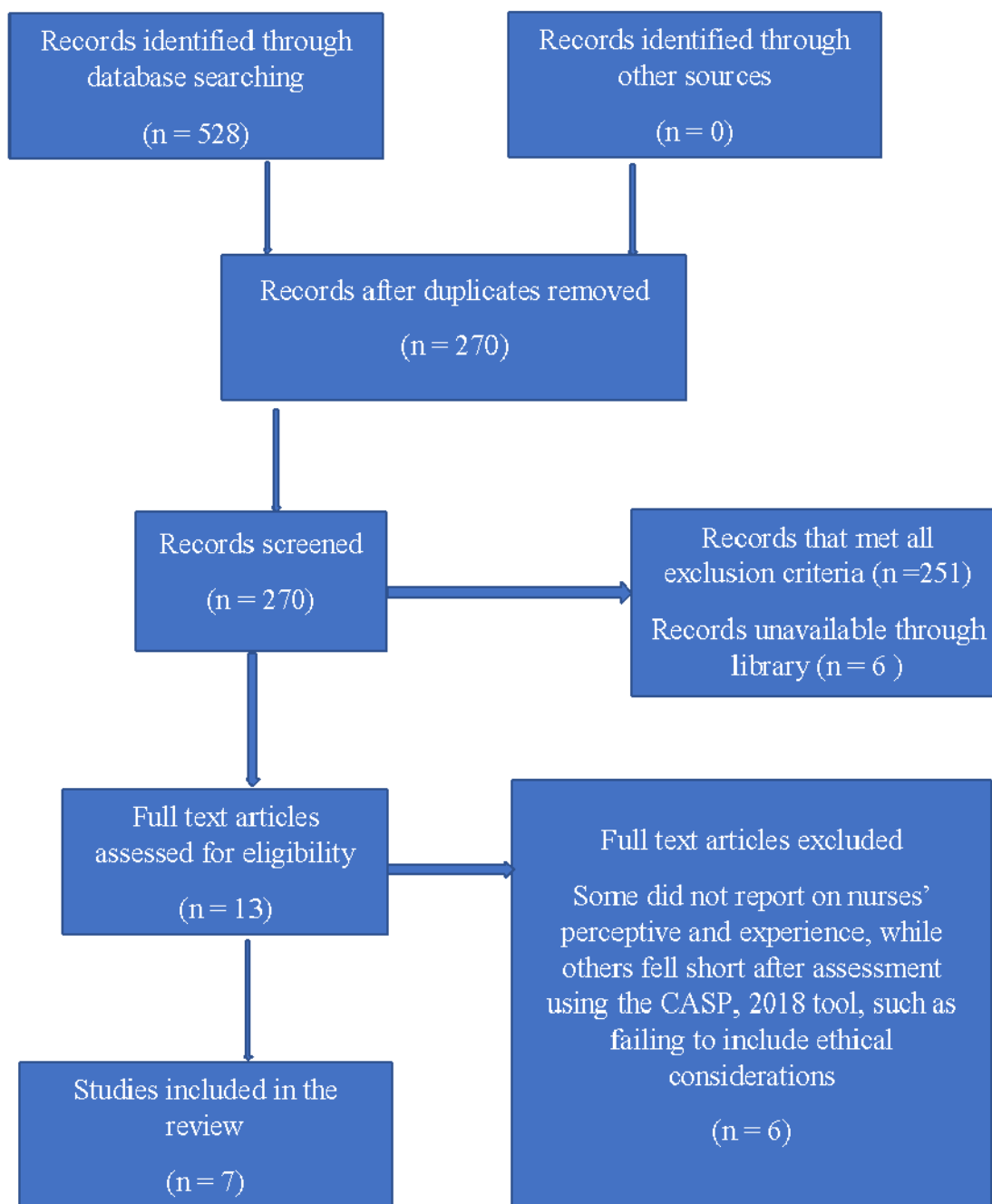
in 1993.. Papers written in English were included and literature reviews were excluded from this study.

Search Strategy

Four databases including CINAHL, BND, PubMed and PsycINFO were searched using key words as highlighted below. Boolean operators were utilised in the search process, using connectors 'AND' and 'OR' to combine keywords and their synonyms. Articles were obtained using the keywords: "Registered nurse" OR nurse OR "staff nurse" OR "graduate nurse" OR "qualified nurse" AND "Aseptic non touch technique" OR "Aseptic technique" OR "Non touch technique" OR "Sterile technique" OR Asepsis OR "infection prevention and control" OR Aseptic AND "Wound care" OR "Wound healing" OR "Wound management" OR "Wound treatment" OR "Wound assessment" OR "Wound dressing" OR Wound AND Challenges OR Barriers OR Limitations OR Understanding OR Experience OR Awareness OR Perception OR insight OR knowledge OR "Clinical Competence" OR "Professional Compliance" OR adherence.

528 records were identified as potential articles following the use of keywords on all four databases. Once duplicates were eliminated, 270 articles were left. A total of 251 papers were excluded for not meeting the inclusion criteria after review of titles and abstracts. Overall, 13 articles met the the inclusion n criteria. Of the 13 articles only 7 papers were appropriate and therefore were included in the review (See flow-chart of literature search in Figure 1).

Figure 1: Flow-chart of literature search



Critical Appraisal

In order to ascertain the trustworthiness and value of the chosen papers, the criteria from the Critical Appraisal Skills Programme (CASP, 2018) tool for qualitative was used. The critical appraisal tool for the quantitative paper used Coughlan et al 2007 and for the cross –sectional study the CASP 2018 tool was employed. All articles used in this review were deemed to be of high quality and the researchers had no ethical concerns.

Data Extraction

The process of data extraction helps the researcher to obtain the relevant information from the papers reviewed, in preparation for data analysis (Aveyard et al., 2018). Braun & Clarke, (2006) thematic analysis process of identifying and analysing patterns of meaning in a data set was used to develop themes in the study. Each paper was examined to develop codes. They were then grouped into potential sub-themes according to their homogeneity and attributes. Further examination of all sub-themes led to the development of 3 main themes as shown in Table 1a.

TABLE 1a	
THEMES AND CODES	
THEME	Sub-themes
Material and resources	Equipment and environmental related stress Time to perform task Inter-disciplinary collaboration
Nurse Education	Initial Training Reinforcement of Knowledge and skills

	Awareness of rationale
Nurses' behaviour	Work experience and sensitivity Ethical/Moral sensitivity

Results

Three overarching themes emerged following interrogation of the data. These include:

- Material and Resources
- Nurse education
- Nurses' behaviour

Material and Resources

The review identified that an unfamiliar environment or inadequate equipment was a significant stress factor experienced amongst nurses during procedures involving ANTT (Aholaakko, 2011), with some nurses admitting that they felt stressed when they've had little or no training on how to use a new equipment. Some nurses commented on how the procedure packs keep evolving over the years, thereby making it more challenging for those who had their AT education years ago to keep up (Unsworth & Collins, 2010). There was also a consensus that time restriction may be a contributing factor limiting nurses from adhering to the principles of ANTT (Ding *et al.*, 2017). This could be aggravated when nurses are encumbered with a high workload, since they may need to rush through tasks, particularly in cases where nurse-to-patient workload ratios are low (Timmins *et al.*, 2018). Findings from this study further revealed a hierarchical dynamic and lack of inter-disciplinary collaboration or shared agreement amongst professionals, leading to negative skill discretion in ANTT performance amongst nurses, as a result of healthcare workers shifting responsibilities (Timmins *et al.*, 2018; Aholaakko, (2011). It was highlighted in a study

by Unsworth & Collins, (2010) that nurses in the community have become accustomed to working alone, subsequently raising concern about the practice of ANTT becoming ritualistic.

Nurse Education

There was a general acknowledgement across the literature regarding how nurses' education may impact on their ability to maintain aseptic practice (Unsworth & Collins, 2010; Timmins *et al.*, 2018; Gould *et al.*, 2018). One of the participants expressed that the principles of asepsis taught in their initial training were embedded in them (Unsworth & Collins, 2010). However, the study by Timmins *et al.*, (2018) revealed significant differences between ANTT training across schools, due to a lack of standard curricula within nursing programmes, and it was highlighted that competency in ANTT is no longer routinely assessed within the nurse education process in UK universities (Gould *et al.*, (2018). Bree-Williams & Waterman, (1996) revealed that nurses encountered difficulties while trying to adapt to changes in ANTT such as adopting the "clean hand, dirty hand" approach, causing the procedure to become more complicated and leading to a lack of uniformity across nursing practice. The study by Unsworth & Collins, (2010) further reported on how ANTT had gone through several changes over the years, including the introduction of pre-sterile packs which did not include forceps and had only one-sized sterile gloves available, making it difficult to ensure asepsis. Some of the nurses admitted to having no refresher training over a long period of time and were often left oblivious to developments that occurred in the hospital (Gould *et al.*, 2018). Furthermore, Bree-Williams & Waterman, (1996) found that not all nurses understood the reasoning for applying ANTT, and their practices were not often based on reference to literature. Although, some nurses were able to identify important principles relating to reducing bacteria contamination and transfer; with one of the participants stating the importance of having a sterile environment (Unsworth & Collins, 2010); a study by

Gould *et al.*, (2018) revealed that nurses' knowledge of the concept of sterility and cleanliness is obscure, which may further contribute to the difference in the way these techniques are practiced.

Nurses' behaviour

Studies reported breaks in aseptic practice due to human behaviour, lack of compliance with recommendations or adherence to infection control (Aholaakko, 2011; Teija-kaisa & Eija, 2016). An evident stress factor was the differences in the work experience of team members. A senior nurse participant acknowledged variation in nurses' aseptic practice based on the experience of co-workers, admitting that with experience comes competence in ANTT practice. However, junior nurses admitted to feeling uncertainty during procedures involving aseptic practice, with the sense that every step was flawed and the belief that they had to imitate the actions of more experienced nurses (Aholaakko, 2011). Participants in this study also revealed cases of experienced nurses feeling the pressure to work more, making them stressed and anxious in the moment leading up to the performance of their tasks. A study by Teija-kaisa & Eija, (2016) suggested that the morals of individual practitioners and shared morals of members within a team are challenged by internal and external issues. There was a statistically significant difference ($P=0.002$) in ethical-sensitive reasoning, with nurses appearing to be more ethically sensitive than physicians, while some nurses stated their reasons for adhering to AT as knowing it is the right thing to do and patient having the right to good care (Teija-kaisa & Eija, 2016). There were reports of nurses feeling guilty when they made mistakes in their aseptic procedures, subsequently blaming themselves for surgical site infections. This was indicative when a nurse became worried about harming a patient's thin skin during a preoperative procedure, leading to feelings of frustration. It was evident that nurses felt a deep-rooted accountability to their patient; seeing them as their moral responsibility (Aholaakko, 2011).

Discussion

Three of the studies that informed this review were conducted in England, two of these were carried out in Finland, one in Australia and the other in Haiti. However, they all revealed exogenous variables that influenced nurses' application of the ANTT principles during wound-care procedures, which may affect the accomplishment of Infection Prevention and Control (IPC) priorities (Allegranzi B *et al.*, 2016). Some of the variability observed in nurses' ANTT practice stems from the element of education and training (Takahashi, 2002), while the review further revealed that nurses' behaviour directly affects compliance to IPC practice (Aholaaikko, 2011; Teija-kaisa & Eija, 2016).

The overarching theme of nurse education presents a significant factor influencing ANTT practice. The initial training that nurses receive might help sustain what was taught, as nurses revealed that the concept of asepsis is instilled in them (Unsworth & Collins, 2010). However, the quality and extent of training received might have an impact on how this technique is practiced (Burnett, 1998). Timmins *et al.*, (2018) reported incongruencies between what was learnt at school and clinical procedures observed in practice, attributing these to differences in nurses' initial training and a lack of standard curricula across universities. The WHO (2016) recommended that IPC education and training should involve a complete health-care strategy, and ought to be embedded within clinical practice and training, rather than be delivered in an isolated manner, as this integrated approach will help build nurses' knowledge on IPC and its associated principles, which is essential in reducing cases of SWSIs (Beers & Bowden, 2005; Walker *et al.*, 2007).

It is no surprise that nurses may simply not understand the rationale for infection-control practices and are therefore, unable to link theory to practice (Cox *et al.*, 2014). If nurses do not understand why it is necessary to maintain asepsis, this could impact on their resolve to apply its

principles in practice (Gould *et al.*, 2018), inevitably increasing the chance of patients acquiring infections from clinical procedures. Although ANTT has been set as the standard technique to be used in the UK (DH, 2008), its application remains a challenge for nurses who must determine what accounts for acceptable practice (Ford & Koehler, 2001). The National Institute for Health and Care Excellence (NICE) have developed clinical guidelines for Healthcare-associated infections: prevention and control in primary and community care. These guidelines were updated in 2012, nonetheless, they do not include guiding principles of ANTT or its application on wound management procedures. Rather, it inferred that practitioners ought to be trained on the standard principles of IPC. Furthermore, WHO (2016) has made it mandatory for healthcare providers to monitor performance by carrying out regular training and education based on IPC principles and best practice, while competency in aseptic practice is required to be monitored regularly by local trust's IPC policies and guidelines under the legislation of the Health and Social Care Act (2012). However, although applying a structured training process in practice may be helpful in reducing episodes of SWSIs and subsequently control the rate of HAIs, health-care organisations continually strive to reinforce ANTT training in a way that learning is facilitated (Ford & Koehler, 2001).

A major sub-theme highlighted within the theme "Nurses' behaviour" suggests that nurses' decision-making skills when applying the principles of ANTT may be positively or negatively affected, depending on whether the system is in a state of wellness or experiencing some stress (Neuman & Fawcett 2011). Some of the internal factors perceived by nurses in this study, to have some degree of control over their mental process include stress associated with work experience or work sensitivity, stress induced by the absence of inter-disciplinary collaboration; and equipment or environmental-related stress (Aholakko, 2011; Teija-kaisa & Eija, 2016). While some nurses may relate being in the profession for several years to improved competency

and confidence in their role, others might feel anxious as a result of the pressure to ‘know’ more or perform to a higher standard (Burnett, 1998), which may ensue from the struggle to keep up with changes in ANTT procedure without adequate refresher training (Bree-Williams & Waterman, (1996); Unsworth & Collins, (2010); Gould *et al.*, (2018). Nonetheless, the revalidation process introduced by the Nursing and Midwifery Council in 2016 is intended help ensure that all registered nurses and midwives in England promote and maintain good practice, as well as build overall confidence in areas where there is a recognised need (NMC, 2019). This may also help to mitigate the idea of ANTT practice becoming ritualistic, as found amongst nurses working alone in the community (Unsworth & Collins, (2010). However, since it is the responsibility of the registered nurse to recognise these limitations and address them accordingly, there is a possibility that the ANTT competency may be overlooked in the process.

Further arising from the theme “Material and resources” and “Nurses’ education”, some community nurses are uncertain about how to work with standard packs used in ANTT procedures, since they are subject to frequent change. However, the NICE’s guideline on developing and updating local formularies recommends that systems ought to be in place to ensure health-care organisations develop and update local formularies effectively and in accordance with statutory requirements (NICE, 2018). So, although an aseptic environment is critical in practicing ANTT; and community nurses strive to replicate the procedure as practiced in the acute setting; ensuring effective hand decontamination, conforming to the appropriate wound care pack according to local formulary guidelines and performing standardised ANTT procedures underpinned by its key principles, may help nurses become more confident, since they will be assured that they are practicing as aseptically as possible whilst working in a non-sterile or unfamiliar environment (Hart, 2007; Rowley & Clare, 2011).

According to the WHO, measures put in place to prevent HAIs may be ineffective without staff accountability and behavioural change (WHO, 2019). In this review, nurses' moral sensitivity seems to reflect as the central value guiding practice and the actions that nurses take in adhering to the principles of ANTT, will largely depend on their values and beliefs (Aholaakko, 2011; Teija-kaisa & Eija, 2016). As such, when nurses feel morally motivated, this may be reflected in their effort to ensure that their patients are protected from harm (NMC, 2018). The implication is that nurses will be practicing within the codes of conduct and behaviour set out by the NMC, signifying the values that translates to good practice. This concept of valued-based practice resonates that all clinical decisions should be informed by both values and evidence (Radden, 2007; Fulford *et al.*, 2006). Albeit, in modern health, the universal attention on values is diminishing and leaning more towards an evidence-based approach (Fulford *et al.*, 2002).

Table 1b: DATA EXTRACTION FORM

Author and date, Country	Subject	Aim of Study	Methods	Main Findings
Gould <i>et al.</i> , (2018) England	Survey to explore understanding of the principles of aseptic technique: Qualitative content analysis with descriptive analysis of confidence and training	To determine nurses' understanding of the term 'aseptic technique, their confidence in undertaking it, and what opportunities they have to update their knowledge and undergo periodic assessment to maintain competency	Survey with purpose-designed, self-reported questionnaire	Response rate was 72% <ul style="list-style-type: none"> ● 65% of nurses described aseptic technique in terms of the procedure used to undertake it ● 46% understood the principles of asepsis. ● 72% reported that they had not received training for at least 5 years ● 92% were confident of their ability to apply aseptic technique ● 90% reported that they had not been reassessed since their initial training.
Timmins <i>et al.</i> , (2018) Haiti	Nursing wound care practices in Haiti: facilitators and barriers to quality care	To describe the facilitators and barriers for nurses to perform quality wound care in three surgical wards of a hospital in Port-	Qualitative descriptive, with observation and interviews	Four themes related to barriers and facilitators to perform quality wound care were identified: <ul style="list-style-type: none"> (i) materials and resources; (ii) nurse-to-patient ratios, workload and support; (iii) roles and responsibilities of nurses; (iv) knowledge and training of nurses.

		au-Prince, Haiti.		
Ding <i>et al.</i> , (2017) Australia	Nurses' practice in preventing postoperative wound infections: an observational study	To prospectively describe surgical nurses' postoperative wound care practices and the extent to which observed surgical wound practices aligned with evidence-based guideline recommendations.	Cross-sectional, prospective, observational study	(n = 60) observed episodes of wound care <ul style="list-style-type: none"> • post-procedure hand hygiene (n=49, 81.7%) was less evident • pre-procedure hand hygiene practice (n=57, 95%) was more evident • Over one-third of nurses observed did not correctly use clean gloves (n=16, 38.1%) • One in five did not properly use sterile gloves (n=4, 22%) • More than half of surgical nurses (n=37, 61.7%) did not educate patients on post-discharge wound management. • Fewer than a quarter (n=14, 23.3%) of wound care events were recorded on both wound assessment charts and patients' progress notes. • Inter-rater reliability testing indicated good agreement (intra-class correlation coefficient 0.859; 95% CI: 0.771–0.923; p<0.0005).
Teija-Kaisa & Eija, (2016) Finland	Reasoning for adherence to aseptic practices in the operating room	To explore reasoning of the self-reported adherence to surgical AP-recommendations	Self-administered questionnaire	Principal Component Analysis (PCA) explored the most meaningful reduction of 14 items explaining the reasoning for AP-adherence <ul style="list-style-type: none"> • The four factors, 1) Situation-sensitivity; 2) Reference sensitivity; 3) Ethical-sensitivity and 4) Infection-

				<p>sensitivity explained more than 64% of the total variance in reasoning the AP-adherence</p> <ul style="list-style-type: none"> • 32% of respondents were Situation-sensitive (n = 47), 32% Reference-sensitive (n = 47), 19% Infection-sensitive (n = 27) and 17% Ethical-sensitive (n = 24) by their reasoning for AP-adherence. • Nurses (mean 3.90, SD .23), were more Ethical-sensitive than physicians (mean 3.66, SD .58). The difference was statistically significant (t = -3.19, p = 0.002).
Aholaakko, (2011) Finland	Reducing surgical nurses' aseptic practice-related stress	To explore aseptic practice-related stress in surgery. The objectives are to define stress-related factors and the means to reduce the stress.	Interviews and video-taped stimulation interviews	<ul style="list-style-type: none"> • The analysis revealed aseptic practice-related stress which constructed a sixteen-level category. • The membership categorisation identified connections between qualitatively attributed personnel and seven stress factors: working experience; time; equipment; person; patient; working morals and power. • Final analysis revealed nurses reducing aseptic practice-related stress by safe, peaceful, competent and relative means

<p>Unsworth & Collins, (2010)</p> <p>England</p>	<p>Performing an aseptic technique in a community setting: fact or fiction?</p>	<p>To examine how experienced practitioners have adapted the aseptic technique within a community setting and to what extent the changed procedure still adhered to the principles of asepsis</p>	<p>Non-participant observation and individual semi-structured interviews</p>	<ul style="list-style-type: none"> ● Almost all staff understood the principles of asepsis and had adapted the standard procedure for use in a patient's home. ● Common challenges included wound cleaning using a single nurse procedure, the contents of the pack and the home environment. ● The research also identified misconceptions about clean versus aseptic procedures and a lack of training for staff
<p>Bree-William & Waterman, (1996)</p> <p>England</p>	<p>An examination of nurses' practices when performing aseptic technique for wound dressings</p>	<p>To establish if nurses' actions when carrying out aseptic technique using the glove technique are simple and based on up-to-date knowledge and do not incur unnecessary wastage</p>	<p>Observation and formal interviews</p>	<ul style="list-style-type: none"> ● Not all nurses in the study applied the aseptic technique ● The rationale for the practice of aseptic technique was not always research-based ● There were variations in practice which lacked scientific evidence ● Not all nurses understood the principles underlying the changes surrounding aseptic practice

Limitations of the review

A major limitation of this study was that only 2 studies were drawn from the UK and this limits the transferability of the findings however such findings should not be relegated to insignificance. This study used only articles written in English and had other languages been included, the findings may have been different, Additionally, the study used thematic analysis and this is also prone to interpretation—and therefore this is also a limitation of the study..

Conclusion

Ultimately, practicing within the stipulated principle of ANTT remains the nurses' responsibility . However, promoting IPC compliance and adherence to ANTT requires a more integrated approach involving local and national organisations, including higher education institutions that teach nursing. It might be helpful if trusts are mandated to incorporate a more structured approach to their training process and one which ought to be addressed under the new standards for education, to allow for routine, practical and contextual learning. This might cause nurses to feel less overwhelmed with the frequency and schedule of training (Bree-Williams & Waterman, 1996). It may also be beneficial to roll out training whenever changes are made to the standard packs used in ANTT procedures, including measures such as introducing content labels on the pre-packs. Furthermore, a review of the NICE, (2012) guideline is recommended, to accommodate standard principles of ANTT and include guiding procedures for wound-care management. This will support adherence to the principles of ANTT during wound-care procedures, since NICE is recognised as the professional source of protocols and guidelines for nurses, which is based on high quality evidence (The Information Standard Guide, 2013).

Although policies and procedures guide the performance of aseptic practice, nurses' educational experience leaves them feeling unsure about the implementation of this technique (Hallett,

2000). Therefore, if nurses are to understand the rationale of the principles and practices around infection control, it is not enough for universities to teach the practical aspect alone. This review proposes that higher institutions teaching nursing, design their curriculum in a way that it equips future nurses with in-depth knowledge of infection control and the microbiological principles that inform these practices. This review was informed by seven research studies conducted across different countries and, although several themes were uncovered from the literature, time limitation did not allow for all factors to be addressed. Therefore, further research is needed in the UK to highlight challenges faced in a UK context, when applying the principles of ANTT. This will ascertain whether the issues identified in this study are country-specific and will allow for effective mitigation strategies to be targeted at a national level.

KEY POINTS

- Nurse Education is a main factor influencing ANTT practice and the quality and extent of training received may have an impact on how this technique is practiced
- Training should include in-depth knowledge of infection control to help nurses understand the rationale for the principles of ANTT
- Conforming to the appropriate wound care pack according to local formulary guidelines and following the standardised ANTT procedures underpinned by its key principles may help nurses become more confident
- The accountability that nurses feel for their patients propels their compliance to aseptic practice. This signifies the values that translates to good practice and suggests that nurses are practicing within the codes of conduct set out by the NMC (2019).

CPD reflective questions

- What can nurses do to become more aware of their values and beliefs in order to ensure adherence to the principles of ANTT?
- How can trusts engage distinctive nurses to act as champions towards driving a change in professional culture, while aiming to improve aseptic behaviour?
- How can nurses utilise the revalidation process in developing their ANTT skills?

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