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Article

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Absorbent Dressings: Controlling Exudate And Supporting The Healing Of Infectious Wounds

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Abstract

Infectious wounds are often accompanied by excessive exudate, which can increase the risk of infection spread, cause tissue maceration, and delay the healing process if not properly managed. This literature review aims to analyze the effectiveness of absorbent dressings in controlling exudate, reducing signs of infection, and supporting the healing of infectious wounds. Article searches were conducted through PubMed, ScienceDirect, and Google Scholar, with study selection based on the PICOS approach and the PRISMA flow diagram. A total of 10 relevant articles were analyzed, including randomized controlled trials, systematic reviews, and meta-analyses. The findings indicate that absorbent dressings such as hydrofiber, alginate, and superabsorbent dressings are effective in controlling excessive exudate and preventing tissue maceration. Absorbent dressings containing antimicrobial agents, particularly silver, were also reported to reduce signs of infection and bacterial burden. Overall, absorbent dressings are an effective option in the management of infectious wounds to support an optimal wound healing process.

INTRODUCTION

Infectious wounds are a common clinical problem frequently encountered in healthcare practice and remain a significant challenge in modern wound management. This condition is characterized by colonization or invasion of microorganisms that can impair the healing process, increase exudate production, cause unpleasant odor and pain, and raise the risk of systemic complications if not managed appropriately [1]. Infectious wounds are commonly found in patients with chronic conditions such as diabetes mellitus, venous ulcers, postoperative wounds, and burns, which are often associated with excessive exudate and prolonged healing processes [2,3].

Exudate is part of the inflammatory response and plays a role in wound healing; however, excessive exudate production can lead to maceration of the surrounding tissue, expansion of tissue damage, and an increased risk of secondary infection [4]. Therefore, exudate management is a crucial component of infectious wound care.

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Modern wound care approaches emphasize the importance of maintaining moisture balance (moist wound healing) through the use of dressings that are capable of effectively absorbing and retaining exudate [5].

Absorbent dressings have been developed to meet these needs by providing high exudate absorption while maintaining a moist wound environment. Several types of absorbent dressings commonly used in clinical practice include hydrofiber, alginate, foam, and superabsorbent dressings [6,7]. In infectious wounds or wounds at risk of infection, absorbent dressings are often combined with antimicrobial agents, such as silver, to help control bacterial growth and biofilm formation within the wound [8,9].

A number of studies have demonstrated that silver-containing absorbent dressings, such as silver hydrofiber and silver alginate, are effective in reducing signs of infection, decreasing bacterial burden, and supporting the wound healing process, particularly in chronic wounds and wounds with high exudate levels. In addition, the use of absorbent dressings has been reported to reduce the frequency of dressing changes, improve patient comfort, and potentially reduce pain during wound care [10,11].

Nevertheless, scientific evidence regarding the effectiveness of various types of absorbent dressings for infectious wounds remains heterogeneous in terms of study design, wound type, and assessed outcomes. Some studies focus primarily on exudate control, while others emphasize antimicrobial effects, wound healing, or the prevention of surgical site infections [12,13]. This variability highlights the need for a comprehensive synthesis of evidence to provide clearer insights into the role of absorbent dressings in the management of infectious wounds.

Based on this background, a systematic literature review is warranted to examine the use of absorbent dressings in infectious wounds. This article aims to analyze the effectiveness of absorbent dressings in controlling exudate, reducing signs of infection, and supporting the healing process of infectious wounds based on findings from relevant scientific studies.

METHOD

This study employed a narrative literature review design to identify, evaluate, and synthesize scientific evidence related to the use of absorbent dressings in infectious wounds. As this study did not involve human or animal participants, elements related to participant characteristics, sampling procedures, and sample size determination were not applicable.

Eligibility and Exclusion Criteria

The eligibility criteria included peer-reviewed articles published between 2011 and 2025 that examined the use of absorbent dressings in infectious wounds or wounds at risk of infection. Eligible studies were available in full-text format in English or Indonesian and included randomized controlled trials, systematic reviews, meta-analyses, and relevant clinical studies. Articles that were not relevant to the topic, opinion-based publications, or studies without full-text access were excluded.

Literature Search Strategy

A systematic literature search was conducted across multiple electronic databases, including PubMed, Scopus, CINAHL, ScienceDirect, Google Scholar, and Portal Garuda. Reference management was supported using the Publish or Perish software. The search strategy utilized combinations of keywords and Boolean operators (AND, OR), including “infected wound,” “wound infection,” “absorbent dressing,” “hydrofiber,” “alginate,” “foam dressing,” and “superabsorbent dressing.”

Study Selection Process

The study selection followed the PRISMA flow diagram. After duplicate removal, articles were screened based on titles and abstracts, followed by full-text assessment to determine eligibility. A total of 10 articles met the inclusion criteria and were included in the final analysis.

Data Analysis

Data analysis was conducted using a thematic synthesis approach. Key findings from each included study were identified, compared, and grouped based on similarities in focus and outcomes. Major themes were then developed to describe the role of absorbent dressings in exudate control, infection management, and wound healing. The results are presented descriptively and supported by summary tables to facilitate comparison across studies.

PICO Development

Firstly, the population of interest, (P), Iinteirveinsii (1), Comparison (C) and results (0) are determined, the PIiCO which is balanced is as follows

For someone who suffers from an infectious wound, what type of absorbent has been used and what results can be obtained from using the absorbent.

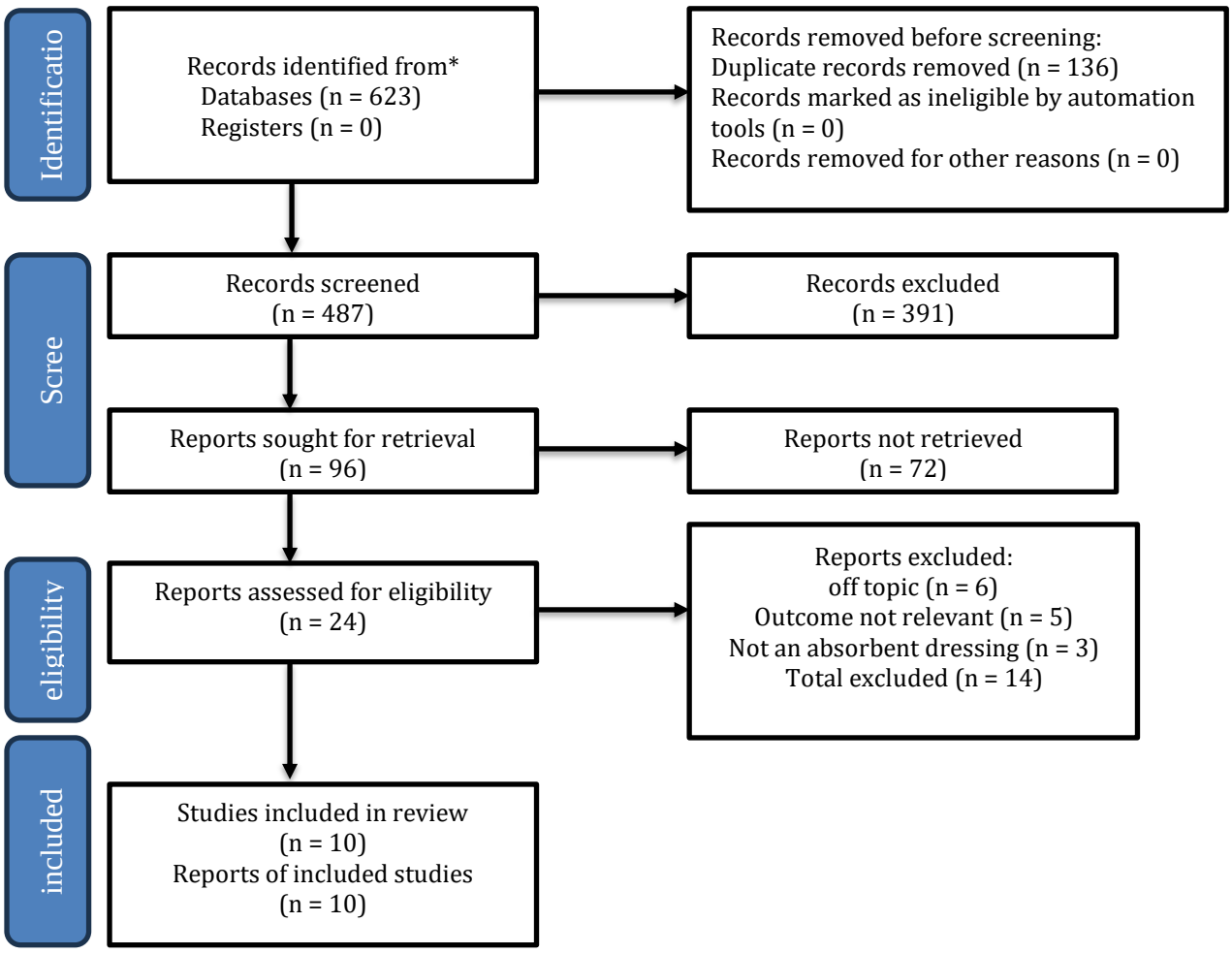

Diagram 1
PRISMA Flow of the Study Selection Process

RESULTS

Tabel 1
Summary of Analyzed Studies and Identified Themes

No	Author (year)	Kind's of wound/ Population	Intervention (Absorbent)	Compared	Design	Outcome	Result
1	Hurlow (2012)	Surgical wounds & open trauma	*Hydrofiber + silver*	*Povidone-iodine gauze*	RCT	Infection control, healing	Demonstrated better clinical performance in open wound management compared with antiseptic gauze.
2	Lopes et al. (2025)	*Venous ulcer + superficial infection*	*Silver hydrofiber dressing*	Control dressing	RCT	Signs of infection, bacterial load, biofilm	After 30 days, a higher proportion of wounds were free of infection signs with a reduced bacterial load.
3	Mitchell et al. (2013)	Infected diabetic foot ulcer	Hydrofiber Ag Extra	Standard care	Clinical evaluation	Microbial and exudate control	Reported to be effective in managing exudate and supporting microbial control in diabetic foot ulcers.
4	Percival et al. (2011)	Wound bacterial isolates (biofilm and non-biofilm)	*Silver alginate dressing*	—	*In vitro*	Antimicrobial activity	Showed broad-spectrum antimicrobial activity; biofilms exhibited greater tolerance than non-biofilm bacteria.
5	Liang & Liu (2024)	Chronic wounds	*Silver-based dressings*	*Non-silver dressings*	*Meta-analysis*	Healing rate, healing time	Increased healing rates and shortened wound healing time.
6	Younes et al. (2025)	Surgical wounds (risk of SSI)	*Silver-based dressings*	*Standard dressing*	*Meta-analysis*	SSI risk	Reduced the risk of surgical site infection, although effects varied across surgical contexts.
7	Macmillan et al. (2024)	Heavily exudative wounds	*Superabsorbent dressings*	Other therapies	Systematic review	Pain, clinical outcomes	Supported effective exudate management; some studies reported reduced pain.
8	Geri et al. (2025)	High-exudate wounds	*Superabsorbent wound dressing*	Other dressings	Review	Exudate control, maceration	Absorbed and retained large volumes of exudate, thereby preventing maceration.
9	Ravnskog et al. (2011)	*Post hip arthroplasty*	*Hydrofiber dressing*	*Alginate dressing*	RCT	Dressing performance	Compared the performance of absorbent dressings for exudate management in surgical wounds
10	Lou et al., (2025)	Burn wounds	*Alginate dressing*	Control dressing	SR/MA	*Healing time, pain*	Alginate dressings accelerated healing, reduced pain, and required less frequent dressing changes.

The narrative synthesis of the 10 included studies identified four main themes describing the role of absorbent dressings in the management of infectious wounds: (1) exudate control and prevention of maceration, (2) reduction of signs of

infection and microbial burden, (3) support of the wound healing process, and (4) impact on patient comfort and efficiency of wound care.

Most studies reported that absorbent dressings, including hydrofiber, alginate, and superabsorbent dressings, were effective in absorbing and retaining excessive exudate in infectious wounds and wounds at high risk of infection. Adequate absorptive capacity was associated with reduced maceration of the periwound tissue, particularly in wounds with moderate to heavy exudate levels [7,11,12]. Superabsorbent dressings were reported to have a higher absorption capacity compared with conventional absorbent dressings, making them suitable for wounds with heavy exudate [11].

The second theme highlighted the role of absorbent dressings containing antimicrobial agents, particularly silver, in infection management. Several studies demonstrated that the use of silver-containing hydrofiber and alginate dressings was associated with a reduction in clinical signs of infection, such as purulent exudate, wound odor, and erythema, as well as a decrease in bacterial load and biofilm presence [15,19]. In vitro studies supported these findings by demonstrating broad-spectrum antimicrobial activity of silver-based alginate dressings against wound-related bacterial isolates, although biofilm-forming bacteria exhibited greater tolerance than planktonic bacteria [17]. Furthermore, meta-analytic evidence indicated that silver-based dressings may reduce the risk of secondary infections, including surgical site infections [13].

Most of the analyzed articles reported that absorbent dressing use was associated with improved wound healing outcomes. Effective exudate control and reduction of local inflammation were linked to enhanced granulation tissue formation and epithelialization, contributing to increased healing rates and shorter healing times, particularly in chronic wounds and burn injuries [10,18].

The final theme addressed patient comfort and wound care efficiency. Several studies reported that absorbent dressings reduced the frequency of dressing changes, decreased pain during wound care, and improved overall patient comfort. Reduced dressing change frequency was also associated with improved efficiency of wound care delivery and potential reductions in healthcare costs [7,10,11]. A summary of the included studies and the identified themes is presented in Table 1.

DISSCUSSION

This literature review demonstrates that absorbent dressings play a crucial role in the management of infectious wounds, particularly in controlling exudate, reducing microbial burden, and creating a wound environment conducive to healing. These findings are consistent with contemporary wound care principles emphasizing moisture balance as a key factor in preventing maceration and promoting tissue repair [20].

Various types of absorbent dressings, including alginate, hydrofiber, foam, and superabsorbent dressings, have been shown to possess high absorptive capacity while maintaining controlled wound moisture. Alginate and hydrofiber dressings, in particular, form a gel upon contact with wound exudate, which facilitates exudate retention and microbial containment within the dressing and supports granulation tissue formation and epithelialization [18,21].

Optimal exudate management through absorbent dressing use has also been associated with reduced local inflammation, decreased pain, and protection of periwound tissue from further damage. Additionally, fewer dressing changes may minimize mechanical trauma to the wound

bed and reduce the risk of secondary contamination [22,23]. From a nursing perspective, these benefits translate into improved patient comfort, enhanced adherence to wound care regimens, and increased efficiency in clinical practice, particularly in the management of chronic and recurrent infectious wounds [24].

Nevertheless, this review highlights that the effectiveness of absorbent dressings varies depending on wound characteristics, including wound type, infection severity, exudate volume, and patient comorbidities. Therefore, the selection of absorbent dressings should be individualized and based on comprehensive wound assessment. Moreover, absorbent dressings should be integrated with other essential wound care interventions, such as debridement, infection control, and management of underlying conditions, to achieve optimal healing outcomes [25,26].

Overall, this literature review provides a synthesis of current evidence regarding the role of absorbent dressings in infectious wound management and underscores the importance of evidence-based and patient-centered wound care. Further high-quality experimental studies are needed to directly compare different types of absorbent dressings and to inform the development of more specific clinical guidelines for the management of infectious wounds.

This literature review has several limitations that should be considered. First, the included studies were limited to articles published in reputable journals and indexed in specific electronic databases; therefore, relevant studies may not have been identified, particularly those from local journals or non-indexed publications. Second, the number of articles analyzed was relatively limited, ranging from 8 to 10 studies, which may affect the breadth and generalizability of the findings.

In addition, there was considerable variation in study designs, wound types, types of absorbent dressings, and outcome measures across the reviewed studies, which limited the ability to conduct direct comparisons and more in-depth synthesis. Most studies also focused on short-term clinical outcomes, resulting in limited evidence regarding the long-term effectiveness of absorbent dressings for infectious wounds. Therefore, the findings of this review should be interpreted with caution.

CONCLUSIONS

This literature review demonstrates that absorbent dressings play a crucial role in the management of infectious wounds, particularly in controlling exudate, reducing the risk of periwound maceration, and creating a wound environment that supports the healing process. Various types of absorbent dressings, including alginate, hydrofiber, foam, and superabsorbent dressings, offer distinct clinical advantages and can be effective when selected according to wound characteristics and patient needs. The findings highlight that successful management of infectious wounds depends not only on the type of dressing used but also on accurate wound assessment, evidence-based dressing selection, and the active role of nurses in delivering holistic and patient-centered wound care. This review contributes to health science development by reinforcing the importance of tailored absorbent dressing use as an integral component of modern infectious wound management.

Further research is recommended to address existing gaps in the evidence, particularly through well-designed experimental studies with larger sample sizes to compare the effectiveness of different types of absorbent dressings. Future studies should also explore long-term clinical outcomes and standardized outcome measures to strengthen clinical recommendations and support the

advancement of evidence-based nursing practice in infectious wound care.

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