

## Decubitus Ulcer and Post-Operative Incision Clinical Management: The Best Practices of Wound Care

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### Abstract

**Objective:** The intention of this systematic review is to describe and explore the existing research evidence about the best practices for wound care management.

**Methods:** A review was conducted to determine the current literature on the chosen topic. PubMed, CINAHL, EBSCO, Science Direct, and Directory of Open Access Journals (DOAJ) online databases or systematic engine search were utilized to obtain the research articles relevant to this systematic review. The data consisted of 16 research articles about clinical decision-making skills using inclusion and exclusion criteria. The researcher used content and thematic analysis as a qualitative approach in reviewing the articles. Data analysis was implemented from January 1, 2019 to March 25, 2019.

**Results:** This systematic review revealed three major themes emerged in this study. Such major theme includes decubitus ulcer, post-operative incision, wound healing, and best practices in wound care. Accordingly, this systematic review is focused on developing wound care practice among staff nurses. Based on the result of the systematic review, one must elicit. One must possess thorough knowledge about decubitus ulcer, post-operation incision and wound healing in order to provide the best practices in wound care management to patients.

**Conclusion:** In general, the need to assist undergraduate nursing students in anticipating and exercising pre-requisite skills, clinical decision making, and professional nursing judgment is needed in their clinical placement setting.

**Keywords:** Nursing; wound healing; Wound care; Wound management; Best practices

### Introduction

#### Background of the study

Chronic ulcers affect 6 million people in the United States with increasing numbers anticipated in our growing elderly populations. Studies have shown that skin infections related to decubitus ulcers have attributed to high rates of morbidity and mortality [1]. These wounds cause significant morbidity and mortality and lead to significant medical costs [2]. Chronic wounds are a common problem among patients with high requirements for treating for physicians, home carers. Frequent recurrence, long lasting therapy duration, high material costs and negative impact on quality of life represent some of the challenges a wound care is confronted with [3]. Lastly, longer hospital stays, formation of bad scar brought by wound dehiscence, as well as escalating cost ratio are among the consequences of wound problems. Wound care is an essential function of a nurse and is commonly known as a nursing management rather than medical practice [4]. However, national and international concerns have been expressed over the years over the adequacy of preparation of graduate nurses for the clinical skill of wound care [5]. In addition, studies have shown that graduate nurses demonstrate inadequate competence and deficient knowledge in wound care management [6]. Knowledge and understanding about wound assessment, wound pathophysiology, wound complication, wound dressing techniques and categories, and wound management is an obvious requirement among nurses. This wound care education will provide guidance for nurses confronting different clinical situations and wound types [7]. Intensive lectures and trainings are crucial to get to know the best practices of wound care and how it is correctly applied and practiced in the course of patient care. Wound care is one of the basic nursing procedures a clinical nurse must apply. Although, it's a fundamental procedure, innovative techniques and technologies exist. Throughout the field of healthcare, there is a vast study to improve and

develop techniques and principles of wound management. It constantly evolves through the ever-dynamic clinical scenarios related to wound and wound care affected by a bulk of factors. The study is intended to summarize relevant and updated studies and analyze them into consolidated procedures, techniques, or principles to come with the best practices of wound management. With The patients as the primary clientele in the realm of health care, their welfare, recovery, and health are always taken into consideration. This prompted the researcher to develop a research paper entitled "Decubitus ulcer and post-operative incision clinical management: The best practices of wound care" that will examine and explore the current status of research evidence about the use of best practices in wound care management among nursing staffs in the clinical area.

### Methods

#### Search methods

A review of the literature was undertaken using a systematic approach. This review was conceded subsequently by a wide-ranging literature exploration exhausting electronic databases such as EBSCO, Citation Index to Nursing and Allied Health Literature (CINAHL), PubMed, and Science Direct. Online databases or engine search were utilized to obtain the research articles relevant to this systematic review

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and also to enable high search sensitivity. Search key terms were identified and searched.

### Search outcomes

Sixteen research articles were retrieved that were published from the years 2010 to 2019. All obtained research articles are about clinical decision-making skills among nursing students. Thus, 31 eligible studies were identified. Inclusion criteria of the study include the following:

- a) All selected articles must be published in English language.
- b) All articles must be published in peer-reviewed journals.
- c) All articles must be published from at least 9 years from now (2010-2019); The researcher decided to include a nine-year period of journal publication to be sufficient enough to make a comprehensive and updated literature search.
- d) All articles must include effect or impact of wound healing and wound care practices
- e) All articles must contain at least one of the following keywords: staff nurses, wound care, wound management and best practices and lastly.
- f). All experimental designs (RCT, quasi studies) were also included. Thus, all studies were incorporated in this review if they conformed the inclusion criteria.

On the other hand, Exclusion criteria are criteria which may not allow any articles to be included in the study. The exclusion criteria include the following:

- a) All case studies and case reports were omitted due to excessive conceivable biases; b) all articles must either be descriptive design, correlational study, observational study, exploratory study, phenomenological qualitative study or mixed method and
- c) All articles with secondary data and not report primary data like meta-analysis, meta-synthesis, and integrative literature review.

### Data extraction

Key information, title review, research design, sample participants, research focus, and study outcomes were extracted from the preferred articles. Data were extracted by two reviewers to perform a quality assessment and to evaluate the quality of studies. The primary researcher self-sufficiently fulfilled abstraction form while the second researcher double-checked the first reviewer's entry for verification, accuracy, clarity and completion purposes. Data extraction took place at two participating institutions (Dr. Fakeeh International Colleges for Applied Medical Sciences- Jeddah, Saudi Arabia and Al Ghad International Colleges for Applied Medical Sciences- Najran, Saudi Arabia). Data analysis were performed from January 1, 2019 to March 25, 2019.

### Data synthesis

The researcher used content analysis and thematic analysis as qualitative approaches in reviewing the articles. Content analysis is a research method for studying social phenomena using the available documents, artifact, and literature to examine pattern in a systematic manner/way. On the other hand, thematic analysis was performed to integrate the information presented in this review. Generally, presenting through Cochrane Handbook statement for systematic reviews of Intervention will be adopted for this study. All relevant data

obtained will be processed into Rev Man 5.3, a software application for statistical analysis.

### Flow chart of literature search (PRISMA)

The researcher has utilized PRISMA as an evidence-based minimum set of items for reporting in systematic reviews. PRISMA is used as a basis for reporting and critical appraisal of published systematic reviews of other types of research. It aims to help authors improve the reporting of systematic reviews.

- A total of 74,398 research articles were identified through electronic database search (71072 articles were from PubMed, 1577 from CINAHL, 1706 articles were from Direct Open Access Journal and 43 were from Science Direct).
- Afterward, 1580 duplicate studies were excluded.
- Next, 1174 research articles were identified for title review (541 articles removed).
- On the other hand, 633 research articles were identified for abstract review. (547 research articles were excluded).
- 86 articles were included in the in-depth review using full manuscript assessment (research design, sample participants, research focus, and study outcomes) using inclusion and exclusion criteria (40 articles remained excepted).
- Lastly, a total of 16 research articles were included for systematic review (Figure 1).

### Results and Discussion

This review revealed four general themes emerged in this study.

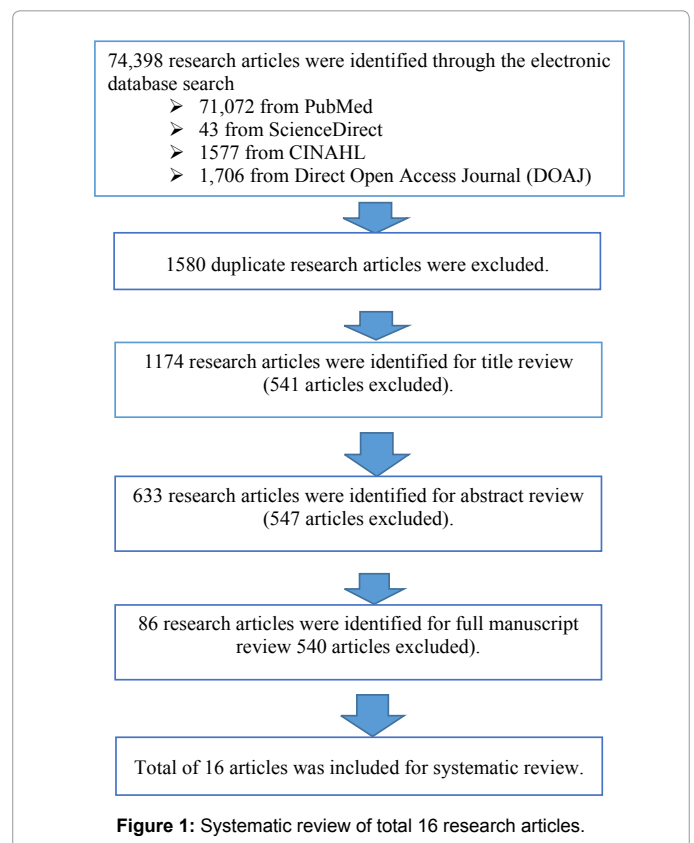


Figure 1: Systematic review of total 16 research articles.

Such major themes include decubitus ulcer, post-operative incision, wound healing, and best practices in wound care.

### Decubitus ulcers

Decubitus ulcers, otherwise known as pressure ulcers are focal damage to underlying skin or soft tissues, commonly occurs on a bony surface, which remains in direct contact with a rigid area, resulting in an injury to the intact skin or open ulcer [8]. Compromised blood flow from direct pressure results to skin breakdown that is usually located over bony prominences. This is one of the main complications presented by elderly individuals who are bedridden at home or in hospital units [9]. Chronic ulcers are classified into decubitus, vascular, inflammatory, and rheumatologic subtypes [2].

Decubitus ulcer is caused by devitalized tissue from a number of contributing factors. Such risk factors in pressure ulcer developments include pressure, friction, mobility, activity, perfusion, age, skin moisture, nutrition, shear, ischemia, and general health status [10]. According to Campbell (2010), the factor with the highest significance in the formation of pressure ulcers is pressure [11]. Its effect depends on intensity, duration, as well as tolerance of the tissues in pressure. Friction is the force that leads to rubbing, sheet pulling causes shears, and these two factors may result to pressure ulcers. Moisture worsens the effect of friction and shear. Shear and friction in the presence of moist environment from diaphoresis and urinary or fecal incontinence macerate the skin. Ischemia is another factor which leads to tissue necrosis and eventually formation of ulcers. Stretched soft tissues and blood vessels occur from prolonged pressure, which may eventually lead to multiple micro thrombi formation especially surrounding within compression points. Ischemia and formation of plaque of dead tissues develops as a result of microthrombi formation. With impaired tissue perfusion, the skin is compromised, and ulcer is evident [12].

The National Pressure Ulcer Advisory Panel (NPUAP) (2014) identified the six stages of pressure ulcers [13]. This is classified according to the degree of tissue loss. These are:

- Stage I (non-blanchable erythema)- where there is no tissue loss involved;
- Stage II (partial thickness loss of dermis tissues)- a superficial ulcer characterized by red pink wound bed, and has no evident sloughs of tissues;
- Stage III (full thickness ulcer)- it displays a break affecting the dermis, exposing fat tissues;
- Stage IV – it extends to deep fascia which damages underlying muscle, tendon and even bones;
- Un stage able: depth unknown – a full thickness tissue loss where the base of the ulcer is superseded by yellowish, tannish, grayish, greenish or brownish sloughs and/or eschars within the wound bed, and;
- Suspected deep tissue injury- a localized area of discolored but intact skin (purple or maroon) or a blood-filled blister from underlying damaged tissue.

### Post-operative incision

Post-operative incision allows sterile tissues to be exposed with the open environment and at risk for contamination [4]. Certain classification of surgical wounds has been adapted widely. It is based on the amount of bacterial presence in the surgical area. There are four

classifications of surgical wounds according to the National Academy of Science's National Research Council. These are:

1) Clean wound – is a non-infected wound in which there is no evident inflammation along the respiratory, alimentary, genital, urinary tracts;

2) Clean/contaminated wound – is a controlled condition without unusual contamination of surgical wound along the respiratory, alimentary, genital, or urinary tracts, as well as uninfected wounds from various procedures affecting the oropharynx, appendix, biliary tract, and vagina;

3) Contaminated wound – is an open and accidental wound from various operations that have major breaks in sterile technique (for instance, open cardiac massage) or frank spills from the digestive tract and tears with acute and non-purulent inflammation; and finally,

4) Dirty or infected – is a previously traumatic wound that has reserves of devitalized tissues as well as those with existing infection or perforated viscera [14].

### Wound healing

Wound healing is a physiological process that is integral for maintaining homeostasis. However, it can be altered with the presence of disease and contributes to various infectious diseases [15]. Repair process is consisting of a cascade of molecular and cellular events that takes place after the onset of tissue impairment so as to restore the damaged tissue [16]. It is a complicated process composed of multifaceted process, a sequential yet overlapping phases. This includes hemostasis, inflammation phase, proliferation phase, and remodeling phase [17]. In hemostasis, it begins immediately after wounding, during which clotting pathways are activated to form a fibrin clot. When bleeding stops, inflammatory cells come into the area of injury and the inflammatory phase comes in. The second phase is characterized by infiltrations of white blood cells primarily the neutrophils, many macrophages, and lymphocytes. Cytokines as well as growth factors are released into the wounded area contributing to fibroblast migration and proliferation. During the proliferative phase, fibroblasts lay down new extracellular matrix and collagen and differentiate into Myofibroblasts, which are responsible for the contraction that produces wound closure. Once activated, Myofibroblasts can also be differentiated into adipocytes by BMP4 stimulation. Finally, remodeling phase is characterized by reorganization of the wound until the repair is completed [18].

According to the loss of skin and tissue, there are three types of wound healing that are distinguished. The first is called healing by primary intention. It is also known as primary wound closure where the tissue surfaces were approximated. This type is applied when a very little tissue loss occurs. The risk of infection is minimal because the wound is small and has clean defect. A typical example of this type is surgical incision. The second type is called healing by secondary intention. This is commonly applied to extensive wounds with large amount of tissue loss as well as when the edges of the wound are difficult to come together. This is also known as secondary wound closure. More time and energy are required that those wounds intended for primary intention. Moreover, this type creates more scars. This is how pressure ulcers heal. The third is healing by tertiary intention, or otherwise known as delayed primary closure. This happens when a wound is primarily left open after removal of all dead tissues. Wound edges may be approximated surgically following a period of open observation, in conditions in which the wound is clean and has an observable good tissue viability and perfusion. Traumatic injuries from animal bites

or tears from foreign bodies are examples of wounds healed in this manner [19,20].

Several factors affect wound healing. For instance, chronic diabetes diminishes sensation and blood perfusion thereby impairing wound healing. Adverse effect of poor control of diabetes causes reduced cardiac output, impaired peripheral perfusion, and altered function of the polymorph nuclear leukocytes. Infection potentiates collagen lysis. Factors like bacterial contamination, presence of foreign bodies, poor wound environment, as well as immune-compromised aggravates presence of infection [21]. Thus, wound dressings loaded with antimicrobial agents emerged as viable options to reduce wound bacterial colonization in order to improve the healing process [1]. On the other hand, certain medications like antimetabolites and steroids obstruct proliferation of substances that promote wound healing such as fibroblasts and synthesis of collagen. Deficiencies in nutrients proteins and calories as well as different vitamins like vitamin A, ascorbic acid, and zinc obstructs mechanisms of wound healing. Dead tissues from local or systemic injury or radiation alters healing. Even a minor foot wound may have long-term and poorly healing ulcer if the blood supply is impeded. Localized oxygen deficits from inadequate tissue oxygenation and excessive tension along wound edges impairs wound healing. Local vasoconstriction from sympathetic hyper stimulation results to poor tissue oxygenation as an effect from hypothermia, hyperalgesia, or hypervolemia especially those involving distal areas of the extremities. Multiple wounds compete for essential substances necessary for wound healing processes and thus impairs healing [21]. Thus, choosing the right and proper wound treatment is the essential step in the wound healing process [22].

### Best practices in wound care

The clinical competence of the health provider, the availability of resources and vast clinical evidences associate the application of the best practices and the clinical outcomes [23]. Wound care practices depend on the nurse's advanced knowledge and current understanding about wound assessment, pathophysiology and wound care management [7,22,24]. Likewise, nurse's competence on wound healing process and wound care management is needed [6]. It is the duty of a nurse to assess systematically and holistically to patients with wound and determine any possibility of having complications even at early stage [4]. Working in the realm of healthcare entails responsibility upon the provider to choose relevant therapeutic management and apply to circumstances that will achieve optimal outcomes. Many overseas government health agencies and academic institutions conducted studies through randomized controlled trials related to wound care and rank evidence depending on its perceived value in the clinical areas. For instance, the College Voor Zorgverzekeringen (CVZ) in the Netherlands categorized available advanced wound dressing but reported to have insufficient evidence to support clinical use [4]. Several studies have been conducted related to best practices of wound care in the medical profession. Furthermore, the need to develop an innovative intervention and educational resource in the clinical practice setting is needed for wound care education [5].

### Conclusion and Recommendation

In general, the systematic review focused on developing wound care practice among staff nurses. Based on the result of the systematic review, one must elicit. One must possess thorough knowledge about decubitus ulcer, post-operation incision and wound healing in order to provide the best practices in wound care management to patients. This paper also reviewed randomized controlled trials about the impact

or effect of wound healing. Also, future research is needed to gather information and research evidence approximately the importance of proper wound care to patients. Furthermore, the researcher advised future researcher to conduct similar study that will include other electronic database like OVID, Scopus, Research Gate, Medline, Pro Quest Dissertations and Theses Global, and Up to Date to provide more detailed and comprehensive literature search.

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