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THE BEST PRACTICES OF WOUND CARE AND HEALING AMONG PATIENTS WITH DECUBITUS ULCER AND POST-OPERATIVE INCISION: A SYSTEMATIC REVIEW

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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, ScienceDirect, and DOAJ online databases or systematic engine search were utilized to obtain the research articles relevant to this systematic review. The data consisted of 28 research articles about the best practices for wound care management 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 four major themes emerged in this study. Such major theme includes decubitus ulcer, post-operative incision, wound healing, and best practices in wound care. Based on the result of the systematic review, advanced knowledge and competence about wound assessment, pathophysiology, wound healing process, and wound care management is needed. Furthermore, study findings revealed that Povidone Iodine, sterile-prepared Manuka Honey and Silver Nitrate show promising benefits for wound management. **Conclusion:** The study concluded that adequate knowledge about decubitus ulcer, post-operation incision and wound healing is important in order to provide the best

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practices in wound care management. **Recommendation:** The researcher recommended to conduct an experimental research with a scientific approach using the best practices in wound care elicited from this study to prove its effectiveness and power in hastening the wound healing process.

INTRODUCTION

Background of the Study

Studies have shown that skin infections related to decubitus ulcers have attributed to high rates of morbidity and mortality (Simoes, 2018). These wounds cause significant morbidity and mortality and lead to significant medical costs (Powers, 2016). 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 carer is confronted with (Erfurt-Berge, 2015). 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 (Surme, 2018).

Wound care is an essential function of a nurse and is commonly known as a nursing management rather than medical practice (Surme, 2018). 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 (Redmond, 2018). In addition, studies have shown that graduate nurses demonstrate inadequate competence and deficient knowledge in wound care management. (Kielo, 2018). 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 (Vowden & Vowden, 2014). 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 & 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 conducted 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 and also to enable high search sensitivity. Search key terms were identified and searched.

Search Outcomes

Twenty-eight (28) 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, 28 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 extricated from the preferred articles. Data were extracted by three reviewers to perform a quality assessment and to evaluate the quality of studies. The primary researcher self-sufficiently fulfilled abstraction form while the two others double-checked the first reviewer's entry for verification, accuracy, clarity and completion purposes. Data extraction took place at two participating institutions (Fakeeh College for Medical Sciences, Saudi Arabia and Hail University, Saudi Arabia). The data analysis was performed from January 1, 2019 to March 25, 2019.

Data Synthesis

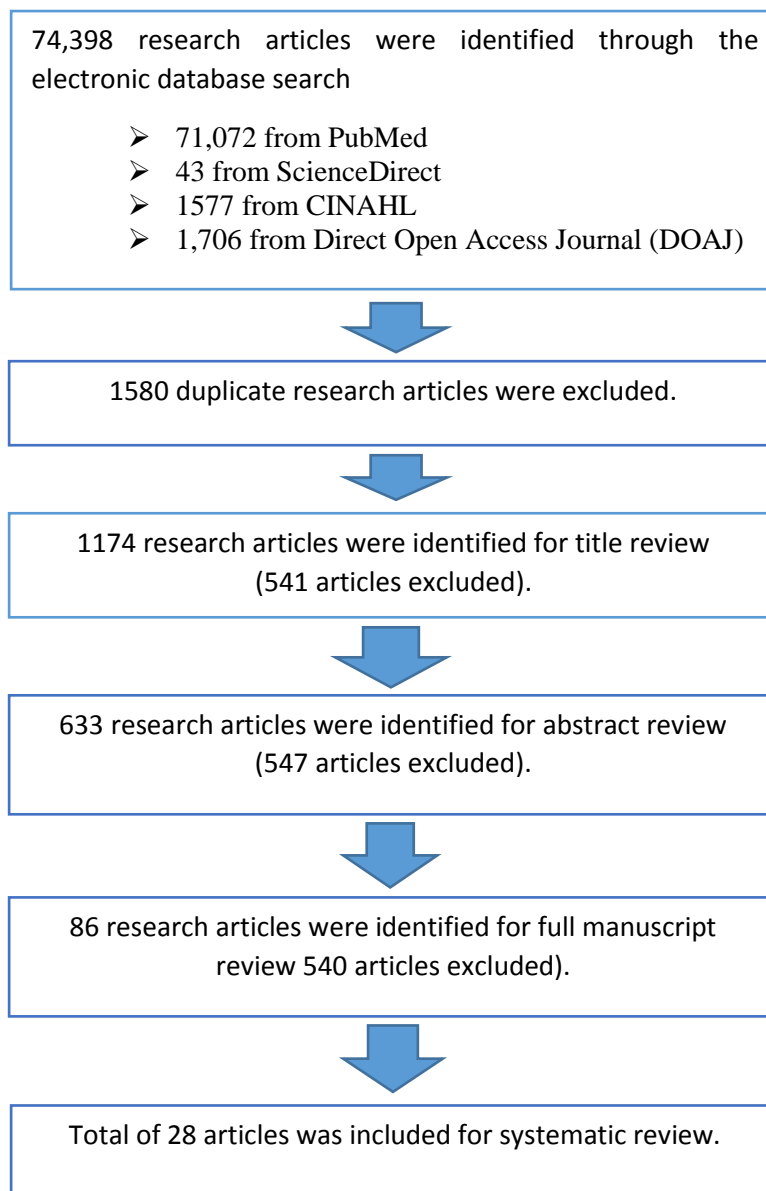
The researcher used content analysis and thematic analysis as qualitative approaches in reviewing the articles. Content analysis is a research method for studying social phenomena using the available documents, artifact, and literature to examine pattern in a systematic manner/way. On the other hand, 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.

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. 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 ScienceDirect).
- b. Afterward, 1580 duplicate studies were excluded.
- c. Next, 1174 research articles were identified for title review (541 articles removed).
- d. On the other hand, 633 research articles were identified for abstract review. (547 research articles were excluded).
- e. 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).
- f. Lastly, a total of 28 research articles were included for systematic review.



RESULTS

This review revealed four (4) general themes emerged in this study. Such major themes include decubitus ulcer, post-operative incision, wound healing, and best practices in wound care. The first theme emerged is decubitus ulcer. In here, the following sub-themes were identified which includes definition, contributing factors, and stages of decubitus ulcers. The second theme is the post-operative incision which includes classification of surgical wounds. Next is wound healing which includes the following phases, namely, hemostasis, inflammation phase, proliferation phase, and remodeling phase. The fourth and last theme emerged is the best practices in wound care, it reveals in most of the study findings from the chosen articles that Povidone Iodine, sterile-prepared Manuka Honey and

Silver Nitrate show promising benefits for wound management.

Decubitus Ulcers

Decubitus ulcers, otherwise known as pressure ulcers, are focal damage to underlying skin or soft tissues which remains in direct contact with a rigid area, resulting in an injury to the intact skin or open ulcer (NPUAP, 2016). The compromised blood flow caused by direct pressure over bony prominences usually results to skin breakdown. This is one of the most common complications experienced by elderly individuals who are bedridden at home, institutional facilities or in hospital units (Tonole & da Silva Brandao, 2018). Chronic ulcer is further classified into decubitus, vascular, inflammatory, and rheumatologic subtypes (Powers, 2016).

Decubitus ulcer is caused by devitalized tissue from a number of contributing factors. Such risk factors involved in pressure ulcer developments include pressure, friction, mobility, activity, perfusion, age, skin moisture, nutrition, shear, ischemia, and general health status (Coleman, 2013). According to Campbell (2010), the factor with the highest significance in the formation of pressure ulcers is pressure. The effect of pressure depends on the intensity, duration, and tolerance of the tissues. Friction is another contributing factor defined as the force that leads to rubbing, sheet pulling, and shears. Skin 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 causing skin breakdown. Ischemia is another factor that leads to tissue necrosis and eventually ulcer formation. Stretched soft tissues occur from compressed and prolonged pressure, which may eventually lead to multiple microthrombi formation. Ischemia and formation of dead tissues plaques develop as a result of microthrombi formation. With impaired tissue perfusion, the skin becomes compromised and ulcer develops (Parish, 2007).

The National Pressure Ulcer Advisory Panel (NPUAP) (2014) identified the six stages of pressure ulcers based from the degree of tissue loss. These are: a) Stage I (non-blanchable erythema)- where there is no tissue loss involved; b) Stage II (partial thickness loss of dermis tissues)- a superficial ulcer which is characterized by red pink wound bed, and has no evident of tissue sloughing; c) Stage III (full thickness ulcer)- displays a break which affects the dermis and exposing fat tissues; d) Stage IV – it extends to the deep fascia which damages underlying muscle, tendon and even bones; e) Unstageable 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 black eschars within the wound bed; and lastly f) 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 bacterial contamination (Surme, Kartin, & Curuk, 2016). Certain classification of surgical wounds has been based on the amount of bacterial presence in the surgical area (Ryan & Ekango, 2018). The National Academy of Science's National Research Council identified the four (4) classification of surgical wounds. These are: 1) Clean wound– is a non-infected wounds and has no evidence

of 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 and also classified 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, frank spills from the digestive tract, and tears with acute and non-purulent inflammation; and finally, 4) Dirty or infected wound– is a previously traumatic wound that has reserves of devitalized tissues and shows evidence of existing infection or perforation in the visceral organs (Devaney & Rowell, 2004).

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 (Shaw & Martin, 2009). 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 (Gonzalez et. al., 2016). It is a complicated process composed of multifaceted, sequential and overlapping phases. The phases of wound healing include hemostasis, inflammation phase, proliferation phase, and remodeling phase (Wang, Huang, et. al., 2018). The hemostasis phase begins immediately after wounding, during this phase, clotting pathways are activated to form a fibrin clot. When the 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 (WBCs) primarily the neutrophils, 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, the remodeling phase is characterized by reorganization of the wound until the repair has completed (Loza, 2018).

The three types of wound healing have been identified based from the loss of skin and tissue. The first type of wound healing is called healing by primary intention. It is also known as primary wound closure where the tissue surfaces were approximated and only a

few tissue losses occur. 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 or secondary wound closure. This is commonly applied to extensive wounds characterized by large amount of tissue loss. In this type, wound edges are difficult to come together and requires more time and energy. Moreover, a scar is formed that begins healing process in pressure ulcers. The third type of wound healing is healing by tertiary intention, or otherwise known as delayed primary closure. This happens when a wound is primarily left open after the removal of all dead tissues. In this type, wound is clean and has an observable good tissue viability and perfusion. For instance, this includes traumatic injuries from animal bites or tears from foreign bodies (Mayers, 2008; Salcido, 2017).

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 polymorphonuclear 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 (Daley & Bhat, 2018). Thus, wound dressings loaded with antimicrobial agents emerged as viable options to reduce wound bacterial colonization in order to improve the healing process (Simoes et al, 2018). 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 hyperstimulation results to poor tissue oxygenation as an effect from hypothermia, hyperalgesia, or hypovolemia especially those involving distal areas of the extremities. Multiple wounds compete for essential substances necessary for wound healing processes and thus impairs healing. (Daley & Bhat, 2018). Thus, choosing the right and proper wound treatment is the essential step in the wound healing process (Skorkowska-Telichowska; 2011).

Best Practices in Wound Care

The best wound care practices are highly dependent on the nurse's advanced knowledge and current understanding about wound assessment, pathophysiology and wound care management (Vowden & Vowden, 2014; Skorkowska-Telichowska; 2011; Guzman, 2017). Likewise, nurse's competence on the wound healing process and wound care management is needed (Kielo, 2018). It is the primary duty of the nurse to assess systematically the patients with wound. Likewise, the need to determine any possibility of having wound-related complications at an early stage must be taken into consideration (Surme, 2016). It is the responsibility among healthcare provider to provide an evidence-based care and relevant therapeutic management for wound care necessary to achieve favorable clinical outcomes.

Many overseas government health agencies and academic institutions conducted randomized controlled trial studies related to wound care in the clinical practice settings. Several studies have been conducted related to best practices of wound care in the applied medical science profession (Redmond, 2018). Specifically, Open wounds are best cleansed with lukewarm drinkable water and requires simple dressings whereas close wounds need no cleansing and no dressing (Ubbink, 2015). Currently, antiseptic agents are not recommended for routine use in wound care because it has selective antibacterial mechanism of action which damage all cells on contact (Warriner & Burrell, 2005). On the contrary, Povidone iodine shows promising benefits in wound healing. It has broad antimicrobial spectrum and anti-inflammatory properties which provides high effective treatment for acute and chronic wounds (Bigliardi, 2017). Likewise, silver wound dressing is used to promote fast wound healing. Silver is a broad-spectrum anti-microbial agent that controls and kills yeast, mold, bacteria, and pathogens. Studies showed that it has low cellular toxicity, potent anti-inflammatory property creating a microbe-free, moist wound healing environment (Warriner & Burrell, 2005). In addition, other organic preparations like Manuka Honey has been used in wound management because it contains glucose oxidase and hydrogen peroxide which is proven to have antibiotics, antiseptic, antibacterial properties. But caution and patient safety must be the primary concern because honey is not a sterile product and maybe naturally contaminated with several organisms, pathogens, and microflora. Thus, clinicians must only use honey preparation that have been sterilized and available in sterilized dressing for wound management (Gethin, 2008). Furthermore, the need to develop an

innovative intervention and educational resource in the clinical practice setting is needed for wound care education (Redmond, 2018).

CONCLUSION

In general, the systematic review focused on identifying the best practices in wound care. Based on the result of the systematic review, one must elicit and possess adequate 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. Specifically, it revealed that Povidone Iodine, sterile-prepared Manuka Honey and Silver Nitrate show promising benefits for wound management. Alongside, advanced knowledge and competence about wound assessment, pathophysiology, wound healing process, and wound care management is important. In-depth research is needed to gather more information and research evidence of proper and accurate wound care management to patients. Furthermore, the researcher recommended to conduct an experimental research with a scientific approach using the best practices in wound care elicited from this study to prove its effectiveness and power in hastening the wound healing process.

Conflict of interest

The author has declared no conflict of interest in the study.

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