**Prevention of Post-Operative Blisters with Mepilex Border Dressings in Surgical Patients**

# Abstract

People undergo various surgical procedures for reasons of treating a particular health disorder or diagnosis purposes. These procedures range from C-sections to total knee and hip arthroplasties. After the surgery, the patient will need to receive optimal care that facilitates a faster wound healing process. Various dressings are used to prevent contain the area while ensuring an environment that facilitates the healing. However, some of these dressing methods have been found to lead to the formation of post-operative blisters. These are real threat to patients since they have to stay for a longer time at hospitals and incur more spending to take care of the complications. 13% to 35% of patients who have undergone surgery experience these blisters. This pilot project aimed at initiating a reduction in the occurrence of blisters through the use of Mepilex border dressing. To achieve this, a literature search was conducted to identify some of the advantages of this dressing method. It was found that it requires less changing times hence reducing the prevalence of blistering as well as improving the healing time.

*Keywords*: Post-operative blisters, Mepilex Border Dressing, optimal care

**Chapter One**

## Introduction and Problem Statement

Most of the operative procedures are associated with blisters which increase the length of hospital stay after the surgical operative procedures as reported by Allegranzi et al. (2016). These blisters occur regularly in about 13% to 35% of all patients who undergo surgical procedures and can interfere with the patient's overall quality of life. In fact, most of them have been found to occur only five or six days after the surgical operation, affecting the patients’ abilities to go on with their normal activities of daily living (Eastburn, Ousey & Rippon, 2016). There is a higher risk of developing blisters after operative procedures among the women compared to men and the overall expenses caused by the complications thereof may go up to $36,000 per case. A good example of such blisters are the tape ones which commonly occur in patients who undergo hip surgical procedures at the taped locations of the surgical dressings used to cover the surgical wounds (Steinberg, Chernofsky & Luria, 2015). The rupture of such blisters results in the formation of open wounds which resultantly create a suitable environment for bacterial growth. Furthermore, open wounds following surgical complications can cause prosthetic implant infections in addition to other complications at the superficial level. Leaking of the fluids from such wounds produces changes in the nature of the wound leading to an increase in the length of hospital stay and resultantly increased hospital expenditures. Blisters are among the most painful and unpleasant outcomes of a surgical; procedures as highlighted by Sellæg, Romild, and Kuhry (2012). Such pain and discomfort can be associated with the exposure of the nerve endings which occurs when the epidermis is lost to expose the underlying dermis after the rupture of surgical blisters.

A large percentage of the blisters occur at the surface of the sutures as exemplified by the ones that form in cases of hip surgeries reported by Sellæg, Romild, and Kuhry (2012). The cause of the blisters after surgical operations is dependent on the location of the surgery although the most common causes are attributed to skin friction, skin soreness following the use of disinfection and the method used to remove the surgical drapes. Other cause of blisters may include the status of the skin at the time of conducting the surgical procedure, the formation of edema following the surgery, the type of dressings used to cover the surgical wound, and skin dryness just before the application of the dressing (Eastburn, Ousey & Rippon, 2016).

Research is yet to provide confirmatory information on whether certain aspects of living organisms can act as predisposing factors to blistering after surgical operations. Such possible predisposing factors include the age, gender, an individual’s nutritional status, whether or not the person is obese, and the type of surgery performed. In fact, blistering that occurs following hip surgeries is majorly associated with the type of dressing used to cover the surgical wound (Halawi, 2015). This finding implies that some of the dressings used may be better than others regarding their ability to reduce the potential for developing such blisters or reducing the severity of the blisters formed in this way. Unfortunately, research has established that some patients still develop surgically-related blisters irrespective of the type of dressing used after the surgery, making it difficult to decide on what the problem could be (Eastburn, Ousey & Rippon, 2016). Nevertheless, there is evidence that some patients respond positively to healing when certain dressings are used, and this research insight can be used to drive new research in the field of preventing surgically-associated blisters (Bredow et al., 2015). The objective of this study was to find out the possibility of preventing post-operative blisters using Mepilex border dressings. Determining the potential of improving blister prevention would be a great approach to improving care among admitted patients that end up receiving surgical operations as part of their treatment plan.

## Background of the Problem

People undergo surgical procedures for many reasons some of which are to correct medical conditions while others are for cosmetic purposes. Surgeons also perform a surgery in a bid to locate a medical problem or improve the functioning of the body through the removal of some malignancies, for example. The Centers for Disease Control and Prevention estimates the number of inpatient surgical procedures that were done in 2010 to be approximately 51 million. This is an increase when compared to the 48 million that were performed in 2009 as reported by the National Center for Health Statistics. In addition to the 51 million, the CDC records are further broken down as follows: 719000 total knee replacements, 332000 total hip replacements, 395000 coronary artery bypass graft, and 1.3 cesarean section. These estimates reveal an ever increasing rate of people who could be requiring surgical procedures for various reasons.

One of the leading surgical procedures is the removal of cataracts which is done on approximately 3 million people annually. Being a common occurrence in people as they age, it is likely that one will need a surgical procedure to remove cataracts once they reach the age of 80 years. The eye lens having been made to appear cloudy by the cataracts, their removal through surgery becomes necessary so as to solve the accompanying vision complications. The surgery costs about 2300 to 3000 dollars but has a short hospital stay. This is just an example of the common surgical procedures undergone by Americans, and the implications of improper postoperative management. Others include C-sections, angioplasty and atherectomy, stent procedure, hysterectomy, cholecystectomy, heart bypass surgery, circumcision, joint replacement, and broken bone repair. This variant reveal that while some surgical procedures may be predicted, others may become necessary following an abrupt involvement in accidents. This makes the probability of one requiring a surgical procedure more high.

More than 1 million knee replacements are done on annual basis including approximately 720000knee and 330000 hip replacements. This surgical procedure can also be done on other joints such as the shoulder and the ankle regions. The sensitivity of this procedure is associated with the removal of the affected joint and the subsequent replacement with a properly-functioning artificial one. Joints could be damaged due to an arthritis infection hence necessitating them to part with $16,500 to $33,000 in the surgery. Also, broken bones are helped to heal through a surgical procedure that uses screws, metal plates, and rods. About 670000 of such surgeries are performed every year and costs differ depending on whether it is a wrist or hip bone that has been injured.

Once done correctly, operative procedures help in solving the problem that was being experienced by the patient. However, the manner in which the wound will be taken care of determines whether the quality of life of the patient will be improved or not. The history of post-operative complications lies in the precautions that are considered in taking care of the wound. Common complications that could arise include hemorrhage, shock, embolism, and even wound infection. The healthcare professional is entrusted to improve the quality of life of the patient by offering quality clinical outcomes. This project focused on the proper management of the wound to keep it warm, dry, and clean.

Skin blistering begins occurring when fingerlike projections that hold the epidermis and the dermis together weaken hence causing the separation of the two layers of the skin. The prevention of this blistering takes a multifaceted approach that includes the correct choice of the dressing method. This method should also limit the number of times the dressing has to be removed and another one put in place. This finding gives rationale to my proposed method whereby the Mepilex border dressing can be used for as long as a week without having to be changed. Continuous removal is responsible for the repeated pull on the fingerlike projections aforementioned hence making the patient susceptible to postoperative blistering. As a result, the wound is subjected to deeper infection, delayed healing, increased pain, and could also call for further surgical procedures. The patient’s quality of life is reduced, and they become dissatisfied with the service since they got worse instead of recuperating from the condition that necessitated surgery.

Patients who undergo operative procedures are expected to be put on rehabilitation and attended to by an integrated team of healthcare workers that includes the nurses, the physician, and physiotherapists. This condition remains irrespective of whether the operative wounds are acute or chronic with an assumption that the treatment plan will eventually exhibit a positive impact on the patient under rehabilitation (Sellæg, Romild & Kuhry, 2012). More specifically, the type of wound dressings used have been thought to have a positive or negative effect by aiding in quicker recovery or interfering with the entire healing process or the ability of the patient to move from one place to another or to move their limbs. The formation of an additional condition other than the normal post-operative wound may, however, interfere with the whole process of healing and minimize the patient’s mobility, hindering their timely discharge from the hospital (Eastburn, Ousey & Rippon, 2016). The occurrence of post-operative blisters is one of the post-operative conditions that may negatively interfere with the normal healing process of the patient and lead to longer hospital stays (Allegranzi et al., 2016).

Post-operative blisters are saccular skin vesicles occurring in between the dermis and epidermis and filled with a serous fluid (Allegranzi et al., 2016). They are caused by traumatic shearing forces or friction of the post-operative location in addition to the possibility of a burn or vesicatory agent.  Patients who undergo hospitalized surgeries are prone to developing post-operative blisters which are extremely painful in addition to the possibility of getting infected with microorganisms. As a result, the patient may end up requiring rehabilitation with an eventual delay in being discharged which implies an increase in the hospital expenses. The need for mobilization of the operated locality may also increase the risk of developing a Deep Vein Thrombosis (DVT) during the first 24 hours of mobilization in situations that require it.

The physiotherapists, clinicians and care nurses attending to the wounds play a significant role in the wound healing process. The physiotherapists, for instance, play a critical role in determining the outcomes of the wound healing process especially in cases of orthopedic surgeries (Sellæg, Romild & Kuhry, 2012). Notably, damaged body structures are repaired during the surgical process although the rehabilitation procedure is essential in the restoration of body function following the surgical procedure and effective healing (Eastburn, Ousey & Rippon, 2016). The problems associated with wound healing, therefore, should be proficiently understood by all the caregivers to provide the best interventions to facilitate recovery. Traditional dressing methods like the tape dressings have in the past caused blistering in about 30% of the patients as suggested by Sellaeg et al. (2012) yet the use of the Mepilex Border dressing has the potential of reducing the blistering rate to about 3% as this study is aimed at proving.

## Significance of the Problem

       Most of the surgical wounds are acute hence they heal slowly within the expected duration of time without the patient experiencing secondary complications. However, post-operative complications develop in some instances and prolong the wound healing process. The wounds could be a site of entry of disease-causing microorganisms hence the concept of surgical site infections. Improper management of the wound could lead to the development of such complications which could even lead to the death of the patient. Delayed healing also makes the patient incur more expenditures while at the hospital. This could be due to the need to treat the secondary complication or to improve the healing process.

Blisters that occur after a surgical procedure are responsible for the increased lengths of hospital stay and the resultant increase in the cost of medical care in these settings. For instance, a patient who has acquired a surgical site infection will have to spend approximately 7000 euros more on the healthcare cost. Existing literature has supported this finding, and the researcher has vast experience in handling these complications in the hospital care settings (Allegranzi et al., 2016). From such experience, it has been noted that the standard dressing materials used in post-operative surgical procedures in the orthopedic units increase the tendency to form blisters. For significant reduction of the costs of hospitalization after surgeries, the clinicians and caregivers need to understand the causes of blistering under such circumstances (Eastburn, Ousey & Rippon, 2016). Understanding the causes and reducing the rate of these blistering incidences automatically reduces the rate of microbial infections as well as nosocomial infections and as a result, reduces the length of hospital stay. This study proposes the use of an effective dressing among patients who undergo surgical procedures as a way of reducing blistering and resultant nosocomial infections (Sellæg, Romild & Kuhry, 2012). The studies about post-operative dressings were important in standardizing the positive outcomes after undergoing surgical operations. As such, prioritizing the use of newer and better methods of dressing post-operative wounds would increase the patient safety, reduce patient morbidity and mortality, and cut down the costs of hospitalization.

## Purpose Statement

The objective of this evidence-based practice study is to decrease the number of blisters in post-surgical patients via the implementation of Mepilex border dressing compared with the current practice.

## Burning Clinical Question

Will the use of Mepilex border dressing and proper surgical site handling reduce the occurrence of blistering over a three month period?

## Statement of the Problem in PICOT Format

**P**opulation**:** Surgical patients

**I**ntervention:Mepilex Border dressing

**C**omparison:Use of standard dressing material

**O**utcome: Reduced post-operative blister rates in surgical patients.

**T**ime**:** Three months

# Chapter Two: Critical Appraisal of the Evidence

## Introduction

This study was aimed at synthesizing evidence to decrease the number of blisters in post-surgical patients via the implementation of Mepilex border dressing compared with the current practice.

## Search Strategies and Yield

The search for literature related to the clinical question: “Will the use of Mepilex Border dressing and proper surgical site handling reduce the occurrence of blistering over a three month period?” was conducted from online databases. These databases included the Cumulative Index of Nursing and Allied Health Literature (CINAHL), the Cochrane Library, Medline, PubMed and ProQuest, all with full text. The search criteria were governed by the use of search terms such as blister prevention, blisters or blistering, surgical patients, surgical dressings, Mepilex Border dressings, and surgical site handling. Blister prevention resulted in 1121 sources of evidence from all the databases while blisters or blistering produced 954 articles. Surgical patients on the other had produced a total of 111 sources of evidence while surgical patients produced 797 articles with the search term Mepilex Border dressings producing only 54 articles. Surgical site handling produced 769 sources of evidence, and all these articles (totaling to 3806) were later exposed to the inclusion and exclusion criteria.

## Inclusion and Exclusion Criteria

Only articles published in the English language were included in the final yield of the online academic database search considering that the researcher and the target population can proficiently understand this language. Based on this criterion, 1001 articles were eliminated leaving behind 2805 articles for further scrutiny and eliminative procedures. Another criterion selected to identify relevant materials for appraisal included selecting sources of evidence that were published between 2010 and 2016. This criterion was important in ensuring that the sources of evidence selected for appraisal were up to date, making the information thereof reliable and valid for generalization. Based on this approach, another 1028 articles were eliminated leaving behind 1777 articles for further subjection to exclusion and inclusion criteria. Further elimination was based on the specifics of the article context which entailed selecting only sources of literature that concentrated on blisters suffered by post-operation patients, eliminating another 1238 literature sources leaving behind only 539. The final selection was based on whether the articles addressed blistering as a problem and gave any form of alternative aimed at reducing the incidence of blistering and this process finally eliminated 533 and only six literature sources were found relevant for synthesis and responding to the clinical question. The six articles addressed the causes of blistering in post-surgical patients, impacts of post-surgical blisters, prevention of blistering and possible alternatives for standard dressing materials.

## Literature Review Protocols and Hierarchy of Evidence

The Critical Appraisal Skills Program (CASP) was found useful in the synthesis of the selected literature using the ten critical questions as enlisted in Appendix A. Further, the Appraisal of Guidelines for Research Evaluation II tool was essential in the determination of the quality and strength of the selected sources of evidence. The hierarchy of evidence was also critical in classifying the selected literature in order of reliability and validity of the findings in levels. As such, one study was regarded as Level I since it was a systematic review in the form of qualitative literature review, two as Level II since they were randomized controlled trials, one Level III since it was a meta-analysis, and two as Level IV since they were case studies and reports as illustrated in Table 1. The strengths and limitations of all these studies will be highlighted in the discussion of the five themes garnered from the twelve articles and which form the backbone of responding to the clinical question for this study.

## Review of Literature

Sellæg, Romild, and Kuhry (2012) in their randomized controlled trial suggested that the method used for covering the wound after surgery is a risk of blistering by itself. In their RCT, these authors used 100 participants who had undergone a hip replacement surgery with the aim of finding out whether using newer approaches had a more preventive intervention for developing blisters than the use of the standard dressings after surgery. Eventually, Sellæg, Romild, and Kuhry (2012) found out that blisters were caused by different causes alongside some predisposing factors. However, three of the most common causes highlighted in this study included the status of the skin at the time of the surgery, the type of dressing used and the surgical draping method used. Predisposing factors may include behavioral aspects such as smoking and poor nutritional habits, age, obesity and the nature of surgical procedure an individual is likely to undergo. Furthermore, gender was considered to be a predisposing factor in the causation of blistering among participants with women having a higher probability of developing these blisters following surgery. As an explanation for this occurrence, Sellæg, Romild, and Kuhry (2012) proposed that the differences in the structure of the skin in men and women may play a significant role, with the women’s skin being thinner than that of men explaining its proneness to damage.

Sellæg, Romild, and Kuhry (2012) reiterated that the nature of the surgical procedure undertaken was likely to affect the potential of blister formation after that. According to their findings, an overwhelming majority of up to 90% of the patients undergoing a prosthesis as compared to those undergoing elective hip replacement suffered from the skin blisters after the surgery. Nevertheless, it was notable that the sample size undergoing revision prosthesis was relatively small making it difficult to draw a conclusive assumption from such a localized generalization. One of the assumptions of the study by Sellæg, Romild, and Kuhry (2012) was that the longer the time taken during a surgical operation, the higher the probability of suffering from skin blister. This assumption could be justified because of the possible increased stress on the location of the surgery if more time than necessary is taken during surgery. These authors established that more time taken to undertake the surgical procedure was associated with less possibility of developing a surgery associated blister. Nevertheless, Sellæg, Romild, and Kuhry (2012) conducted their surgeries by comparing more than 100 minutes time length to less than 100 minutes time length.

In a case report, Hallawi (2015) classified the surgical blisters as either clear-fluid or blood field with varying effects on the comfort and clinical outcomes of the patients. Hallawi (2015) observed that the fluid-filled blisters healed faster than the blood-filled blisters which had a healing delay of one week. However, this study suggested both venous insufficiency and diabetes mellitus as additional predisposing and etiological factors of suffering from post-surgical blisters. The study included aging in the list of etiologies but went further to explain that the degenerative changes in the elderly and the underlying atrophy thereof were important reasons behind the compromised skin structure and higher incidence rates of skin blisters on these patients after surgery.

Steinberg, Chernofsky, and Luria (2015) agreed that fracture blisters could be caused by trauma and insisted on the ability of such blisters to cause complications on arthroplasties particularly at the hip and knee sites. They also reiterated that these blisters could be associated with the dressing used, adding weight into the current research which seeks to develop a new dressing technique using the Mepilex Border dressing. Several incidences of patient discomfort, postoperative morbidity and prosthesis sepsis have been reported in addition to increased lengths of hospital stay (Steinberg, Chernofsky & Luria 2015).

One of the greatest challenges in the development of blisters after a surgical operation is the high cost of medical care required to deal with the aftermath of the blister complications. It is impossible, for instance, to underestimate the adverse effects of the rapture of such blisters which break the skin for bacterial access. Research has continued to approve the existence of hospital-acquired infections in most hospital settings, a situation that would be worsened by an open wound resulting from a ruptured blister. The patient would at some point be required to chip in financially to support the high costs of treatment associated with such unexpected outcomes of healthcare. In the recent past, however, such costs have been transferred to the hospital facilities and surgical leaders to bear in an attempt to decrease the occurrences while undertraining such surgical operations (Bredow et al., 2015). The transfer of such liabilities to the hospital and physicians, however, does not rule out the fact that the patient outcomes would be negatively affected by such delays in the hospital facilities following blistering occurrences.

Furthermore, the increased hospital stays may end up complicating the situation for the patients who undergo surgical operations in such settings. A good example is the occurrence of falls among the critically ill, the aged and patients with chronic illnesses who are subjected to surgical operations associated with blistering.

The study by Healy, Mullard, Campbell and Dimick (2016) identifies the costs incurred by patients who have undergone surgery depending on the quality of care they receive. They identify that most of the costs come from the complications rather than the surgery itself. Most facilities have also realized the burden of these costs and offered incentives to staff who provide high-quality care. However, such policies have failed to create a direct impact on the hospital or those who pay for surgical-related complications in terms of minimizing their budgets. In some instances, these policies have been found ineffective in reducing the burden since it puts the financial accountability on the hospitals. The authors’ literature search established that the costs that arise from surgical complications are borne by third-party payers.

Healy, Mullard, Campbell and Dimick (2016) achieved their aims of evaluating the costs of surgical complications by performing an observational study that used data on surgical complications Michigan Surgical Quality Collaborative (MSQC). This method was effective in accessing the records on complications arising from surgical procedures hence making it possible to evaluate their costs combined. It was also an excellent move in rating the quality of care that was given during and after surgery since more numbers of complications directly imply a poor quality service. Various post-surgical occurrences were used to determine whether a complication occurred during the immediate, pre- and post-surgical operation. They included, among others, mortality, deep incisional SSI, pulmonary embolism, myocardial infarction, and urinary tract infections. Multiple linear regression analysis was then performed so as to project the actual payments, variable costs, costs incurred by the third party payers who give insurance to the patients, as well as the hospital.

It was evident from the 5120 episodes analyzed by Healy, Mullard, Campbell and Dimick (2016) that the costs of surgical related complications are being avoided by both the hospital and insurers. The complications have a significant financial burden that none of the parties would like to incur. It is for this reason that they struggle to ensure that the quality of surgery is improved so as to minimize their expenditures complications. This study is, therefore, significant in helping to understand the cost impacts of poor quality surgical care hence come up with working policies towards the minimization of such complications.

### Prevention of postsurgical blisters

Steinberg, Chernofsky, and Luria (2015) described several recommendations that can be practiced with effectiveness to reduce the incidence or severity of blisters associated with surgery. For instance, these authors suggested that severe complications of the blisters could be unroofed following by adequate provision of care using silver sulfadine in a similar way to most burn injuries. Similar recommendations were suggested by the findings of Strauss et al. (2006) who investigated the preventive mechanisms of combined injuries including blisters associated with surgical procedures. Even though the use of silver sulfadine as suggested by these two cohorts is helpful in preventing the severity of the blisters, the method is still controversial awaiting further findings in its support. Some types of surgeries, however, rarely present with associated blistering, making it important to consider the safest surgical procedure before proceeding. For instance, such blisters are rarely reported in elective wrist surgeries, and when they occur, it is quite difficult to differentiate between real blisters and normal swellings following the surgical operation. Such blisters may also be confused with hematomas and wound dehiscence implying that they may not be as detrimental as blisters occurring during other surgical procedures like knee and hip replacement surgical operations. To prevent such blisters and complications thereof, Steinberg, Chernofsky, and Luria (2015) recommended the use of elevation and compressive garments specifically to patients with elective wrist surgeries considering that this case report was concerned with such injuries among three patients. In fact, one of the patients involved in the case analysis was sufficiently treated with an elevation within only two weeks since the blister-like swelling presented. There was no need to apply a compressive dressing on either of the three patients treated in this way, proposing a newer and better mechanism of preventing blister complications in patients after surgery. To limit the occurrence of such blister complications in the clinical settings, Steinberg, Chernofsky, and Luria (2015) also recommended the use of a clear film dressing containing high moisture vapor transmission rates.

Aspects associated with blistering that may need to be well taken care of to prevent associated complications include significant postoperative swellings, significant compressive forces applied by the postoperative bandage, and pressure applied by the postoperative splints in cases where such splints are used. Care should be taken to avoid wound closure before deflating the tourniquets used during surgical operation to minimize the associated strain and possible occurrence of surgical blisters. Two of the patients in the case report by Steinberg, Chernofsky, and Luria (2015) were found to have such surgical swellings that could later develop into blisters because of applying wound closure strips before deflating the tourniquets. Furthermore, the operative procedures should be conducted according to the manufacturer’s instructions when using Steri-Strip skin closures in a way that minimizes the tension to reduce the incidence of blisters (Steinberg, Chernofsky & Luria, 2015). Most are the times when the circumference of the limb under surgery increases following the deflation of the tourniquet. When this tourniquet is used for longer periods during lengthy surgeries, such increases in limb circumference are more pronounced and decrease at a slower rate. The swelling that occurs following the deflation may facilitate the causation of blistering irrespective of whether the closure strips are done appropriately or not.

Another preventive mechanism against blistering is avoiding or effectively managing contact dermatitis which acts as a possible cause of such blisters. Contact dermatitis occurs as a side effect of using antimicrobial agents as an important protocol when preparing for a surgical operation as reported by Sheth and Weitzul (2008). The fact that most of the blisters are localized along the surgical operation region makes it possible that the use of such antimicrobial agents may play a significant role in blister causation. Checking on the possible effects of such antimicrobial agents on the patient before surgery, therefore, may aid in preventing against such blisters. Reassurance may be helpful in treating patients with postsurgical blisters within a period of days to weeks if the blister is fluid-filled and possibly longer if it is blood-filled.

Apart from the use of different types of dressings to prevent blistering, Allegranzi et al. (2016) proposed the use of perioperative oxygen (80%), normothermia, normovolemia, blood glucose control, and prophylactic negative pressure wound therapy to achieve similar and sometimes better patient outcomes. Instead of applying the antimicrobial agents, Allegranzi et al. (2016) reported the associated benefits of using antimicrobial-coated sutures. They also insisted on the use of advanced dressings like hydrocolloids, hydrogels, fibrous hydrocolloids and vapor permeable films justifying the use of Mepilex Border dressings.

Hopper, Deakin, Crane and Clarke (2012) performed two prospective clinical audits to come up with a dressing method that gave quality wound care. They aimed at comparing the impacts of using traditional and current wound dressing options, and their associated disadvantages the compromised wound care. Traditional dressing that were applied on fifty patients included Mepore and Mölnlycke. A complete audit cycle was performed on another group of fifty patients who used modern dressing such as Aquacel Surgical and ConvaTec. The researchers determined clinical outcomes based on aspects such as wear time, blister formation, length of hospitalization, and the number of dressing changes that had to be made. Statistical analysis was done using the p values obtained for each variable. It was found out that traditional dressing had a significantly shorter wear time as compared to that of the modern types such that it was 2 days and 7 days respectively. This findings translates to a further finding that traditional dressing required more changing times, which could be a potential cause for pain during and trauma that is likely to induce the formation of blisters. When the modern dressing was used, 75% of the patients were released by day four while it took a minimum of six days to get patients on the traditional dressing discharged.

The audit by Hopper, Deakin, Crane and Clarke (2012) was significant in establishing the complications associated with traditional dressing. They include the formation of blisters, prolonged hospital stays, and many changes. Its contribution to the current study is the role of dressing in causing blisters hence the need to select an appropriate dressing that minimizes or prevents blister formation.

### Other risks Associated with Post-Surgical Care

Uckay, Hoffmeyer, Lew, and Pittet (2013) identify the proper care of the surgical wound as an aim of preventing the occurrence of surgical site infections (SSIs). Failure to cover up the wound appropriately could make it a conducive breeding site for disease-causing microorganisms. Alternatively, the patient could also contact hospital associated infections (HAIs) through the open wound that is not properly covered. However, the authors identify that HAIs are less likely to occur in orthopaedic and trauma surgical wards. Nevertheless, other patients who have undergone surgical procedures such as C-sections are susceptible to HAIs if their wounds are not covered properly, or if the dressing used makes the area dump such that bacteria begin breeding in the area. The utmost reasons that have been identified by Uckay, Hoffmeyer, Lew, and Pittet (2013) regarding the prevention of SSIs are related to the morbidity, mortality, and increased hospital bills that patients have to spend. This not only puts a burden on the patients but also compromises clinical service. SSIs could pose a serious health outcome since they make the patient susceptible to the entry of low inocula implant-related microorganisms into the body that could multiply to ranges that are able to induce a disease as well as the pathogenicity that can be caused by skin commensal organisms.

The authors were key in establishing the ways in which SSI can be prevented in both orthopedic and trauma patients since the causes are also established. To achieve, this they conducted a literature review on articles that were relevant to this research aim. Uckay, Hoffmeyer, Lew, and Pittet (2013) found out the direct link of SSI to surgery since they established that successful prevention measures are those that have been implemented in operating theatres. They also found articles that reported of a match between the strains that were isolated in postoperative infection and those that were found on the fingers of surgeons. However, they failed to include data records that specified actual figures of SSI acquired in the theatre and those which patients contacted while receiving postoperative care in the wards. This can be a good link in establishing the exact places where a change can be effected to ring a total improvement in patient care. If patients acquire SSI both in the theatre and in the wards, a preventive mechanism implemented in the theatre alone is less likely to cause a significant change.

Their review of literature was insightful in identifying systemic patient-related factors as key determinants in influencing the process of wound healing hence playing a role in the probability of the patient suffering from a SSI. Such established factors include high blood glucose level, diabetes mellitus, smoking, immunosuppression, poor blood clotting activity and malnutrition. Their influence could be felt either before or after the operative period hence the necessary precautions are given to minimize the negative effects. For instance, before performing an orthopaedic surgery, it is advisable that high-dose corticosteroid administration should be tapered. Also, since the patient is subject to losing a lot of blood, glycaemia and anticoagulation.

A lot of evidence was found to be linked with the ability to perform surgical hand preparation before performing an operation. In as much as this intervention was found to be the most important in preventing orthopaedic SSI, no RCT was found to have carried out the research due to ethical concerns. It would be unethically right to have one group of patients undergoing a surgery whereby the surgeons have performed hand hygiene and the control group which has surgeons without hand preparation. However, with the massive evidence on the probability of HCW’s hands to transfer microorganisms from surfaces or patients to others, the use of alcohol-based hand rubs or other hand sanitation methods is of significant relevance. Uckay, Hoffmeyer, Lew, and Pittet (2013) also established the prophylactic role of antibiotics in preventing SSI in orthopaedic operations. Glycopeptide antibiotics were found to be of significance in performing routine prophylaxis. They identify the need for this prophylaxis in cases where a patient has an open fracture and before a dental procedure. Other measures such as surgical site preparation, active surveillance and multimodal interventions, the use of personal protective equipment, and behavioral aspects have been linked with the surgeon’s expertise. Above all, they found out the stress that literature puts on the proper care of the wound since it is a potential entry point for disease-causing microorganisms.

### Alternative dressings

Langlois et al. (2015) sought to find out the most appropriate wound dressing following a primary total hip (THA) or knee (TKA) arthroplasties. They compared the effectiveness of the conventional gauze method and the use of an absorbing hydrofibre through a randomized control trial. Langlois et al. (2015) identify that proper wound is an essential strategy in increasing satisfaction among the ever increasing patients who require lower limb arthroplasties. Wound healing is promoted when the dressing used keeps the area clean, moist, and warm. To promote such an environment, the dressing should be able to absorb most of the exudate, and be as permeable as possible to an extent that prevents the area from being moist. Also, a proper dressing is supposed to be a watertight barrier with the external environment while at the same time allow some fresh air to the wound. The RCT involved 80 patients; 40 of whom had undergone THA while the other half had a TKA. It was found that when hydrofibre dressings were used to cover the wound, higher levels of satisfaction were reported by both the patients and the nurses. This is because the number of dressing changes that had to be performed reduced since the hydrofibre dressing is capable of absorbing for long periods of time. The authors, therefore, recommend the use of these dressings since they not only improve patient satisfaction but also spare nurses’ time since they have to make less dressing changes.

Apart from the hydrofibre dressing recommended by Langlois et al. (2015), Ter, Yavuz, Aydogdu & Biçer (2015) also test the efficacy of two adhesive products which are the nonwoven porous adhesive bandage (NPAB) and the transparent film adhesive bandage (TFAB). This efficacy is evaluated in terms of whether or not they affect the integrity of the skin when they are used to fix the dressings used in knee and hip surgical procedures. This study is importance in establishing whether any of them causes post-surgical blisters since it has been evidenced that excessive pulling of the skin by adhesives is responsible for the development of the blisters. Since the dressings used in knee and hip surgeries are fixed directly on the kin, they should incur a minimal pulling effect on the skin during their removal.

Ter et al. (2015) performed a prospective randomized controlled trial that included 300 patients who had undergone hip and knee surgeries. They were divided into two groups whereby one group was treated with NPAB while the other one used dressings that were reinforced by the TFAB. Evaluation of the adhesive’s suitability was then done basing on their ability to induce skin complications such as edema, formation of blisters, peeling off of skin, and maceration. They found out that 10.7% skin impairment occurred when TFAB was used and only 4.0% with the use of NPAB. A subsequent regression analysis revealed that TFAB had a 2.5-fold capability of causing an impaired skin integrity. They, therefore recommended the use of NPAB on surgical dressings for hip and knee surgeries since it has a lower likelihood of altering the integrity of the skin.

After rigorous data analysis through SPSS, Chi-square and t tests, this study was effective in finding a dressing method that prevents a secondary wound infection hence allowing the wound to heal faster. Identifying an ideal surgical wound dressing requires the consideration of the adhesive’s impact on the integrity of the surrounding skin. Some adhesives worsen the condition of the wound since they could cause a pull of the skin so close to the wound that the wound tears afresh. This cases a lot of dissatisfaction in the patient especially if the wound was fast healing and then they suddenly have to feel the pain of a fresh wound due to the pulling impact of the adhesive. The formation of blisters is another effect that is likely to be experienced with the use of an improper adhesive. This occurs when there is high friction between the adhesive material and the underlying connective tissue of the sin. The concept of adhesives also forms an essential area of investigation since some adhesives can create tension which could burst some capillaries hence affecting local capillary circulation.

Bredow et al. (2015) conducted a randomized controlled trial in a university hospital setting to assess whether the risks of postsurgical blistering, as well as wound complications, could be reduced within a six-day time frame by using alternative dressings as opposed to the use of the standard dressing.  A total of 100 patients was randomized after signing an informed consent, and the study took seven days to be completed. This study was conducted to fill a gap that showed an increasing elderly population requiring joint replacement and spinal surgical procedures. Furthermore, it should be remembered that such surgical procedures have been associated with blistering in the past and newer mechanisms should be considered while applying the dressings after surgical operations (Bredow et al., 2015). Blistering following surgical operations is a painful outcome of treatment that leads to delayed healing as well as susceptibility to infection following the compromise skin integrity. As such, researchers need to invest more time looking for possible interventions that ensure a reduction in the rate of incidence of these complications or at least a minimization of its severity.

The RCT conducted by Bredow et al. (2015) created insights on the need to use a Mepilex Border Post-Op dressing in the continued attempt to reduce the incidence of blistering after surgery.  The Mapilex Border Post-Op dressing is one of the most comfortable dressing materials usable in a postsurgical situation. This dressing can absorb blood oozing out of the surgical site with a documented reduction in the risk of maceration. This dressing uses the Safetac technology specifically designed to achieve minimal pain and trauma around the surgical site. The Mepilex Border Post-Op dressing emerged a successful alternative to the standard dressing used for surgical wounds in an RCT that compared the efficiency and safety of Mepore Pro, Mepilex Border and Hypafix Transparent dressings in 150 consecutive hip surgery trials. In fact, the prevalence of tape blister occurrence was the lowest  recorded at 3% when the Mepilex Border dressing was used to cover the hip surgical wounds while the prevalence of Mepore Pro was 59% (p=<0.01) and Hypafix was 61% (P=<0.01) (Pelet, Denault & Provost, 2012). The standard dressing is changed after every two days with a possibility of unnecessary pressure which may eventually cause blistering. Furthermore, letting this standard dressing stay on the surgical wound for two days may either expose the wound to infections or increase the friction between the dermis and the epidermis to cause blistering. The Mepilex Border Post-Op dressing, however, has been found to provide comfort during the period of dressing and can stay without the need for changing the dressing for up to seven days. If the wound edges are proficiently closed, this dressing can reduce the risks associated with postoperative superficial wound infections (Bredow et al., 2015).

Beldon (2013) identifies the need to develop the nursing profession by using care plans that have been proven to be better in their clinical outcomes. She stresses that nurses can only improve their care if they identify a limitation in their practice and develop the urge to perform better. Competence in the profession is built on the constant improvement of knowledge as far as evidence based practice is concerned. This literature review stresses on the essence of nurses maintaining professionalism since they are guided by the professional code that holds them responsible for ethical, moral and professional responsibility. As she narrows down to wound management, Beldon (2013) reiterates that it is not as easy as novice nurses think since the selection of a proper dressing comes with experience. She identifies the essence of selecting a dressing that matches with each patient without causing discomfort or affecting wound healing. Wound management has several impacts such as the clinical impact to the patient who has to receive competent, safe, and knowledgeable care. Also, economical and professional roles have found their implication during this care.

Proper wound management ought to begin with wound assessment whereby the nurse comes up with an evidence-based care plan that takes into account the findings from the assessment. It is during this stage that the nurse identifies the causes of the surgery and factors that are likely to affect the healing process. This helps them in selecting an appropriate dressing method that brings maximum patient satisfaction as well as improving patient outcomes. The assessment is holistic since it addresses various aspects that affect wound healing such as nutrition, pain, vascular and skin assessment. While there is evidence supporting the role of nutrition in wound healing, the nurses also need to assess for pain and ensure that less pain is caused when they are pulling off an adhesive. Beldon (2013) goes ahead to identify some of the requirements of an ideal dressing. Primarily, the dressing ought not to be toxic, and should not introduce particles and other small non-biodegradable units into the wound. These are just some of the primary requirements while secondary requirements include the possession of antimicrobial activity and odor-absorbing capability.

The text provides various wound dressings whose selection depends on the ability of the nurse to identify the suitability of the material of the dressing to the wound environment. Such factors to consider include the ease with which the dressing can be removed without causing trauma. This information is significant since it gives the care providers a variety of products and their characteristics hence they can even discuss them with the patients so as to come up with a suitable choice. For instance, a choice may be needed for a specific dressing for a patient who prefers to shower daily. She identifies the diversity of dressings that are being used in surgical care as a result of the generation of more sophisticated products. The care giver, therefore, needs to carry out an evaluation based on the advantages posed by various products, their preference by the patients, as well as their affordability. Various products have been identified by Beldon (2013) citing their clinical applications and scenarios where each one needs not to be used. For instance, hydrocolloid dressings are available in both small and large sizes and can even be cut into smaller pieces that fit small wound areas without having to waste a bigger piece. They are effective in maintaining a moist environment around the wound; a condition that allows autolytic debridement. Moisture is also advantageous in reducing pain hence promoting patient satisfaction. The frequency with which it is removed is reduced since it can stay for up to seven days without having to be changed depending on the amounts of fluids that are released at the site of the wound. It is recommended for a wide range of wounds including abrasions, surgical wounds and burns. However, it is not recommended for patients with diabetic foot/ heel ulcers (Beldon, 2013).

Hydrofiber is another type that has been found to be highly effective in its absorbent nature that ensures that exudate, blood, and pus are absorbed by the dressing other than contaminating the wound area. However, the nurse is advised to monitor the exudate levels since when they fall, the dressing will being sticking on the edges of the wound thus make its removal painful. Removal of such a stuck dressing not only causes post-operative blistering, but could also tear the healing wound. An alginate dressing contains calcium alginate which, upon gaining contact with the wound, causes an exchange for the calcium ions with sodium from the exudate hence leading to the formation of alginate gel. The dressing should only be applied when dry on any wound that releases exudate. On the other hand, polyurethane is not recommended for dry wounds. It can be used for exuding or cavity wounds whereby it offers advantages regarding its high absorbability. Antimicrobial dressings are essential in killing bacteria that could have infected a wound or exudate. However, they can only be used for wounds that have been found to be highly colonized by bacteria. Film dressings are usually preferred due to their high levels of comfort and their ability to reduce friction on the skin around the wound (Beldon, 2013). This article was resourceful on the various advantages that are played by various dressings and the role of critical evaluation by the care giver in selecting a dressing that works for a specific patient.

## Synthesis of Evidence

The reviewed literature suggests that the causes of blisters are varied but important to discuss since effective prevention can only be achieved once the causes are established. These causes revolve around the pressure exerted on the surgical wound site although predisposing factors such as gender, age, the status of the skin and disease conditions like obesity and diabetes mellitus also play a significant role as highlighted by Hallawi (2015). The impacts of these blisters have been documented in the six research articles selected for synthesis in this study. Further research with a bigger sample size and power calculations is necessary to prove the work published by Koval et al. (2007) wrong, especially because the authors were able to prove that patients who underwent a long surgical procedure were at a higher risk of developing skin blisters at the surgical site. In fact, Koval et al. (2007) had suggested that the length of time taken during surgery was more detrimental regarding blister formation than the type of dressing used to cover the surgical wound.

In addition to increasing the length of hospital stay, these blisters and their complications increase the hospital expenses to the patient, the hospital facility, and physicians who are forced to bear the costs of carelessness while handling surgical patients to discourage the vice (Bredow et al., 2015). Complications such as blister ruptures expose the surgical wound to microbial colonization which may worsen the situation and increase discomfort, worsen patient outcomes and increase healthcare costs. Even with these many negative impacts as documented by Steinberg, Chernofsky, and Luria (2015), the blister formation can be prevented since its management has been proven to be extremely expensive. Management requires a change from the normal practices of the wound covering that entail using standard dressings which require constant changing every two days. These frequent changes in the wound dressings expose the surgical wounds to nosocomial infections which can be prevented by using newer methods of dressings. Even though the dressing type used plays a role in the causation of blisters on the surgical site, other patient-related factors must play an additional role as earlier suggested by Haukeland and Ravskog (2002) who noticed the development of blisters even outside the adhesive dressing. This finding is quite significant considering that Koval et al. (2007) also mentioned an inability to reduce the incidence of blisters even after using a spica bandage to dress the surgical wound.

All the same, a strong adhesive tape used on the surgical wound may be said to adhere strongly to the surgical site, and if not carefully removed, it may cause skin damage at this site. Such damage can be associated with the significant friction caused between the epidermis and the dermis layer of the skin which may eventually cause skin blisters. The use of clear film dressing was initially recommended by Cosker et al. (2005) and exhibited positive outcomes among the patients that agreed to participate in the research. This finding established a basis for the study outcomes reported by Sanusi (2011) that the use of a stretching adhesive dressing was associated with high rates of blistering even though the study only concentrated on such outcomes after patients underwent a laparoscopy operation. The alternative to the traditional standard dressing is the use of Mepilex Border Post-Op dressing which provides more comfort and the ability to absorb blood exudates from the surgical wound (Bredow et al., 2015).

## Recommendation

Following the findings presented by the synthesized literature, the use of Mepilex Border Post-Op dressings among surgical patients is a beneficial move towards reducing the incidence of blisters among such patients. This study presented some of the most important benefits of this new technology in dressing surgical wounds considering their causes, their impacts on patient outcomes and possible preventive mechanisms.

# Chapter Three: Proposal Implementation

## Introduction

This EBP project is aimed at decreasing the number of blisters in post-surgical patients via the implementation of Mepilex border dressing compared with the current practice. This change has been necessitated after a thorough review of literature that linked the type of dressing in causing blistering. As a result, patients get dissatisfied and professional fail to get the best output out of their service. Some of the dressings used also take much of the staffs’ time since they have to be changed frequently. The use of Mepilex border dressing will be used and evaluated for a period of three years to determine the improvements it poses as far as prevention of blisters after surgery is concerned.

## Methodology

  Kurt Lewin came up with three steps that have formed the basis of many successful change programs. The steps are what define Lewin’s theory of change management that will be used to guide the implementation of my EBP project. According to Lewin, a change program follows a process that first enables the stakeholders understand that there is the need for the change before letting them move to the new evidence based way of practice or behavior. As they get used to managing scenarios using the new intervention, it will slowly become a norm for them such that they will not be continually pushed to act in a certain way. This theory was selected for my change program because it enables staff adopt a new way of practice permanently without instances of getting back to the practice that had been proven to raise complications. It is, therefore, my expectation that it will help all the stakeholders to embrace the exclusive use of Mepilex border dressing without ever going back to the traditional dressing methods that have been found to be key contributors to the formation of blisters and other complications such as pain.

change entails creating the perception that a change is needed, then moving toward the new, desired level of behavior and finally, solidifying that new behavior as the norm. The model is still widely used and serves as the basis for many modern change models.

The first step of the theory is the unfreezing step whereby awareness is created of how the status quo is responsible for the identified disadvantages. This step should be performed with the highest level of accuracy since it is the determinant of whether or not there will be resistance to change. On most occasions, stakeholders tend to resist because of the lack of total conviction that their old practice or behavior hinders the realization of the organization’s goal. Since change requires them to act differently, they may not find a reason to struggle learning the new proposed way of practice. Therefore, in ensuring the success of this step in my project, I will constantly engage all the stakeholders through effective communication. They will even be provided with literature sources that explain how blisters occur in post-operative wounds. This will lay a background on the role of the type of dressing used to cover the wound in the epidemiology of the blisters. Communication will not only be done with the administration but also with the specific stakeholders who take care of the patients at the wards. These include the surgeons, the bedside nurses, and even the patients themselves. Patients are in a better position to give an account of the quality of the current dressing methods, and the complications they suffer as a result. I will not only talk about the problem but also how it will be solved and the anticipated outcomes. Involving the stakeholders makes them understand the impacts of the problem and prepares them to the change as they aim at making their output better. An elaboration of the impacts of blisters on patients such as morbidity and mortality, they will understand the urgency with which the change should be implemented since it will not only save patients’ lives but also improve their clinical outcomes due to early discharges that have been evidenced with the use of Mepilex border dressing. The staffs’ time will also be save since they will have to change the dressing less frequently.

The overview of the underperformance, causes, and need for change prepares staff for the second step of the model in which the change is then implemented. Lewin refers to this as the changing step whereby change implementation is characterize by a transition. The reality of the change intervention is realized during this step since the stakeholders engage in the exact proposed activity. This stage is usually characterized by uncertainty and fear hence it could be the most difficult to overcome. However, if the unfreezing step is conducted rigorously, the fears of the stakeholders are addressed therein. Good preparation makes the change step easier to overcome because the employees will have prior knowledge on their anticipated outcome. For my EBP, the success of this step will be ensured with the support and adequate time that will be given for stakeholders to adjust. It is during this period that nurses and other wound care stakeholders will strive to have the exclusive use of Mepilex border dressing during the care of post-surgical wounds. Constant reminders will also be used in forms of stickers in the ward will be used to emphasize on the essence of maintain the change program. This strategy is essential in ensuring that a nurse does not opt to another dressing other than Mepilex for any reason whatsoever.

In the final refreezing step, the change will have become part of the organization’s culture hence it will have stabilized. At this point, the nurses will not be waiting for a reminder to help them embrace the evidence based practice. Once a change program has reached this stage, it is an achievement because the stakeholders cannot revert to their previous ways of practice. This stage will be considered to have been reached in my EBP if nurses will not need reminders to embrace the exclusive use of Mepilex border dressing. It will, therefore, be an excellent evaluation point of whether my goal will have been realized. The three-year timeframe is enough for everyone to have adapted to the change since it is considered that some staff may be slow in catching up with the change. It will be my role as the APN to collect, analyze, and interpret the data collected after this period and link it to the project’s aims. Both qualitative and quantitative data will be collected because there will be the need to evaluate the smoothness of the sin area around the wound to ascertain blistering, and also account for the number of hospital stays when Mepilex border dressing is used. The workability of the practice change will them be evaluated in terms of the absence of blisters, short hospital stays, patient satisfaction, minimized change sessions.

## Setting of the EBP

The EBP will take place in a 35 bed capacity ward that houses patients who are nursing wounds after undergoing total hip (THA) and knee (TKA) arthroplasties. These patients are usually under various wound dressing, but in this project, only the exclusive use of Mepilex border dressing will be used.

## Factors Facilitating the Implementation

           It has been identified in the literature search that dressings have a significant role to play in the development of blisters. This could be either through the pulling effect of the adhesive tapes which causes the fingerlike linkages between the epidermis and the dermis to flip apart. In as much as this causes a lot of pain and discomfort to the patient, it also lengthens the wound healing duration. Some dressings also need to be removed frequently hence causing frequent pain to patients as well as causing nurses to spend more time having to make the numerous changes.

## Barriers

              Some of the barriers to implementation include resistance to change and the fear of the unknown. However, these have been addressed in my selected theory of choice in which it has been identified that the best way to prevent resistance is the active involvement of all stakeholders. This creates a forum where I will explain the change and get feedback and demystify their unknown fears.

## Summary

              In conclusion, this EBP will give significant insights in improving the clinical outcomes of patients who have undergone surgical procedures. This goal is in line with the anticipated output of every healthcare worker to improve the health of their patients. Patients who undergo surgery get their problems rectified through a painful process hence they need to be helped to heal faster. Subjecting them to secondary complications reduces their satisfaction and could impact on their general life. Their wounds should be allowed to heal faster and in a manner that does not subject them to pain, SSI or blisters. This project carried out a rigorous literature search that linked the use of dressing types to causing blisters. Mepilex border dressing has been recommended since it not only requires less changing times but also reduces the occurrences of these blisters around the wound area.

The dressing is aimed at reducing the formation of blisters due to the established reason o the friction and tension that occurs between the dermis and the epidermis during the removal of a dressing. Less changing times imply that these push and pull actions are minimized hence preventing the seeping of interstitial fluid into the space between the two layers of the skin. This project has based its evidence on the significant impact that can be realized I the prevention of blisters when the right dressing is used. Appendix E gives an overview of some of the factors that define an efficient dressing. In as much as the dressing should stay for up to a week without removal, it should be absorbent enough to prevent the build-up of exudate in the wound area, or the spilling of the exudate. These considerations were appraised in proving the role of the Mepilex border dressing in improving the quality of care for post-surgical patients. Traditional dressing has been replaced by modern ways which have more advantages that promote wound healing. It was my responsibility as my researcher to blend the factors and come up with a dressing that offers holistic care. My objective was to find a strategy that improved patient satisfaction by preventing the occurrence of the complications they previously had to undergo after surgery.

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