The Impact of Obesity on the Development and Care of Acute and Chronic Wounds

By Simon Palfreyman, RN, PhD

Introduction

At the turn of the last century and for the first time ever in world history, the number of adults who were overweight became greater than those who were malnourished and underweight.[1] Since then the pace of worldwide weight gain has only accelerated, and we are currently in the midst of a global obesity epidemic. Not only has the number of people who are obese increased, but the weight of those who are obese has also increased.[2] These increases will have and are having profound impacts on public health and the delivery of health-care services.[3] If current trends continue, obesity will become the "new normal" for the majority of the population, with over 50% of the U.S. population being classified as obese by 2030.[4]

The phenomenon of excess weight gain is not confined to one country; obesity is a worldwide public health problem in both developed and less developed countries.[3] In 2013, over 14 million people in Canada classified themselves as obese or overweight. This equates to approximately 40% of the population. Over 5 million people (15%) were in the highest obesity category.[5]

The steady increase in the number of obese people has also meant that more obese people need access to health services for both primary and secondary care. However, health-care providers have been slow to adapt to the challenges in delivering care for this group of patients. Those who are obese can experience poorer quality care and be forced to compromise their safety, dignity and health-care experience.[6]

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Obesity and the BMI Classification

Ethnic and gender differences can make it difficult to define obesity precisely.[7] Nonetheless, the Body Mass Index (BMI) has been adopted worldwide as a classification of weight.[8] The BMI is the ratio of weight to height and is calculated by dividing weight in kilograms by height in metres squared (i.e., BMI = (weight in kg) / (height in metres)^2).

The BMI is in essence a proxy measure of body fat as it is a measure of weight rather than excess fat and can be influenced by age, ethnicity and muscle mass.[8] The most widely accepted boundaries for BMI classification are shown in Table 1.

Table 1. Classification of BMI based on the Canadian Guidelines for Body Weight Classification[9] in Adults and National Obesity Education Initiative Expert Panel[10]

BMI Range	Classification
Less than 18.5	Underweight
18.5 to 24.9	Normal weight
25 to 29	Overweight
30 to 34.9	Obese class 1
35 to 39	Obese class 2
Over 40	Obese class 3 (Morbid obesity)
Over 50	Super obesity

The consequences of being overweight and obese have been well documented and include increased rates of cardiovascular disease, diabetes, liver disease, certain cancers, hypertension and early death.[11] In addition, those who are overweight and obese often face stigmatization and discrimination by society and health providers.[12]

Obesity and Wound Care

The increasing prevalence of obesity means that there is an ever-increasing number of obese patients who have chronic and acute wounds or who are at risk of developing a wound. There are multiple challenges in caring for this group of patients from their admission through to discharge, including the need for additional staffing, training and equipment.[13] In order to effectively manage and deliver care for this vulnerable group of patients, there is an urgent need to evaluate the strategies for preventing, treating and caring for their chronic and acute wounds.

There are risks associated with being obese compared to being normal weight in terms of developing different types of wounds and also in relation to how wounds may develop or ultimately heal.[14] First, patients who are obese and have difficulty mobilizing can be at increased risk of developing pressure ulcers. Second, mobility issues may result in spending long periods sitting or sleeping overnight in a chair. This inactivity leads to the development of dependent edema and venous stasis and the risk of venous leg ulceration.[15] Finally, those patients who need surgical intervention are at greater risk of wound dehis-

cence, hematoma development and infection.[16]

The greater the level of obesity the more likely that a wound will result in an adverse outcome.[17,18] Figure 1 illustrates how obesity can be linked to wounds and wound outcomes. Many wounds can be linked to the direct impact of obesity on a person's mobility, physiology and environment.

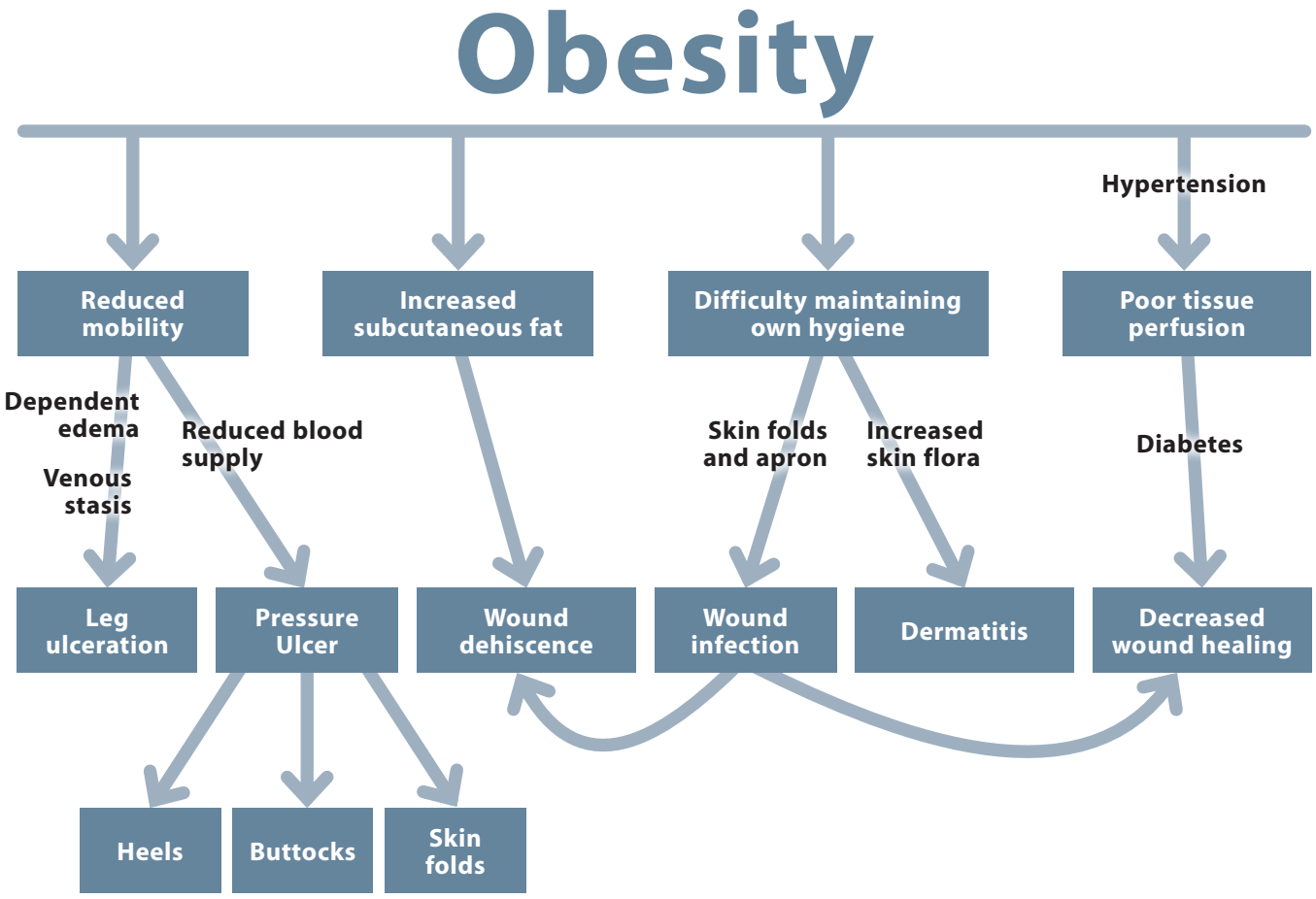
In addition to developing wounds, obese patients can also experience other skin conditions that could predispose them to further skin breakdown.[19] These conditions include those linked to friction between skin folds such as intertrigo and dermatitis associated with moisture and incontinence.

Surgical Wounds

The number of surgical patients who are obese has increased right along with the number of obese people in society. Although being obese may have a negative impact on mortality and morbidity in general, there is some evidence that this may not necessarily be the case for surgical interventions. There exists an "obesity paradox" for those undergoing general surgery who are not in the highest class of BMI (> 40), which seems to provide a protective benefit to being overweight.[20] Those who are overweight or moderately obese have a lower risk of death, but as weight increases the risk of complications, including complications with the surgical wound, increases.[21]

Being obese can have a major impact on wound outcomes for many different surgical procedures. For example, in colorectal surgery, obesity prolongs the time taken to perform the operation and can increase the risk of wound dehiscence, development of a hernia at the incision site and stoma complications.[22] In vascular surgery and

Figure 1. The links between obesity and wound development



spinal surgery, wound infection rates for those in the highest obese group can be twice as high as those for a normal weight patient.[23,24]

There are many potential factors that can increase the risks of wound complications for those who are obese. These factors could be linked to the likelihood of obesity predisposing the patient to having co-morbidities that can result in wound complications such as diabetes, hypertension or anemia.[11] The risks may also be related to surgery for obese patients taking longer and being more complex.[25]

In general, those patients who are both obese and have a surgical wound have higher risks of infection, dehiscence and poor wound healing.[25] Wound infection in particular is a common complication in the post-operative period for this group of patients[26] and can be eight times higher compared to non-obese patients.[27] The evidence for higher rates of infection is strong and consistent across different types of surgery.[16,27,28,29] However, the evidence for wound dehiscence has been criticized as being contradictory, with some studies indicating a higher rate linked to obesity but others showing no statistical link.[30] It is unclear whether these variations are related to surgical technique, time in theatre or wound-specific factors.[31]

The surgical wound can also take longer to heal in obese patients compared to those who are not obese.[25,32] The reasons for increased healing times are not fully understood but could be related to obesity impairing micro-circulation, tissue perfusion and the immune response to infections.[33,34] Increased healing time may also be affected by the comorbidities associated with obesity such as diabetes, immobility, poor nutrition and reduced pulmonary function.[25]

and restrictions with movement, which can lead to impaired function of both the one-way valves in the major leg veins and the calf-muscle pump.[36] The consequences of impaired blood flow include development of venous hypertension and chronic venous insufficiency.[37] Additionally, the interconnected nature of the venous and lymphatic systems means that obesity also has an adverse effect on the movement of fluid in the lymphatic system.[38] Accumulation of lymph fluid in the skin tissue and lymphedema can be localized to the lower limb but can also occur in the abdominal apron.[39] Because lymph fluid is an ideal medium for bacteria, recurrent cellulitis and infections are common.[40]

"The care of obese patients requires significantly more nursing time and resources."

Leg Ulcers

Obesity can also be associated with leg ulceration, with more than two–thirds of those having a venous ulcer having a BMI of over 30.[35] This increased incidence of leg ulceration is thought to be related to the weight of the abdomen

For those who are obese, the treatment of the venous ulcer through compression bandages and hosiery can also be more challenging for clinical staff, more complex and less effective. Obese patients often require additional resources in terms of time, equipment and skills. Clinical staff

often report that it can be difficult to achieve therapeutic compression pressures with the application of compression bandages to obese legs due to the shape of the legs and the physical effort that can be necessary to apply the bandages.[6]

Pressure Ulcers

Pressure ulcers occur over bony prominences and are a consequence of reduced mobility and inability of the patient to relieve their own pressure areas.[41] Those who are obese have additional body fat over bony prominences but also have difficulty with movement and turning themselves when in bed. The pressure on the skin tissue results in a chronic reduction in blood that can result in the development of pressure ulcers.[42] Other risk factors in the development of pressure ulcers in obese patients include moisture, shear and friction.[43] These factors can occur in areas of the body where skin rubs together and moisture collects, such as in skin folds, under breasts, between the buttocks and between the thighs.

There can be differences in the incidence, location, category and type of pressure ulcer for those who are obese. There is still some debate regarding whether obesity can be a risk factor in the development of pressure ulcers, with some studies showing that there is no linkage and perhaps even a reduced chance of pressure ulcers in the obese elderly.[44] Yet obese patients have also been shown to have a higher risk of pressure ulcers than those in the normal weight range, with those in the higher obesity categories having the most risk.[45] The chance of developing a pressure ulcer has been found to be nearly 20% higher for nursing home residents who were moderately or severely obese compared with those who were not obese.[46] Such studies have suggested that being moderately or severely obese should be classified as a risk factor for pressure ulcers and that allowance should be made for the proportion of obese patients when evaluating the prevalence of pressure ulcers within an institution. The risk of pressure ulcers for those with obesity can be higher and the consequences more severe compared to the normative population. A recent review of patient safety reports in the U.S. highlighted that those with Class III obesity can have a greater risk of pressure ulceration (33.1% compared to 15.5%) and that they are more likely to have a serious event (resulting in patient harm) than the normative population (20.7% compared to 2.3%).[47]

"Being obese can have a major impact on wound outcomes for many different surgical procedures."

Obese people may also be at increased risk

Key Points

Clinicians should keep in mind the following key points for preventing or treating wounds in overweight or obese patients:

- ☞ All wounds: Wounds may take longer to heal in obese patients due to comorbidities and other factors.
- ☞ Following surgery: Obese patients have a higher risk for complications, including wound infection and dehiscence.
- ☞ Pressure, friction, shear and moisture: Don't assume body fat will prevent pressure ulcers. Look in non-typical locations such as heels for PUs and in skin folds for intertrigo.
- ☞ Lower leg: Watch for dependent edema in the legs, which may indicate risk for development of leg ulceration in this high-risk population.
- ☞ Protect your patients and yourself with special equipment, training and teamwork!
- ☞ Treat obese patients with the same consideration as all other patients.

of heel pressure ulcers due to the increased weight of their legs and restricted movement.[48,49] However, the link between obesity and the risk of heel pressure ulcer development remains unproven and some studies have found no link.[50]

One hypothesis for an increased risk of pressure ulcers is that the presence of skin folds may increase friction and harbour bacteria, which may predispose obese individuals to infection and skin breakdown.[51] However, the increased risk could simply be a result of clinical staff finding it more difficult to identify and manage pressure ulcers in this group of patients.[52]

The care of obese patients requires significantly more nursing time and resources.[53] This may mean that if there are shortages of personnel, lack of equipment or increased workload, obese patients may not get the necessary assistance with mobility or pressure area care. There may also be issues within health-care organizations in terms of a lack of awareness of the additional needs and specialist training that may be necessary to care for obese patients.[6]

Clinical Implications

Caring for the increasing number of obese patients can be challenging and time intensive.[52] It requires effective systems of communication to co-ordinate care in order to maximize the use of resources—both personnel- and equipment-related.[45] Health-care providers also need to be aware of the additional training that staff may require to improve moving and handling techniques and reduce the risk of injury.[54] Health-care provision for obese patients requires more resources compared to non-obese patients in terms of staffing, environment, specialist equipment and supplies.[6,13] Those who are obese can be vulnerable and at risk of discrimination; they are blamed by society for their condition and looked on as "repulsive."[55] Although there are signs that increased exposure to caring for those who are obese is improving attitudes, health-care professionals can still stigmatize and discriminate in favour of non-obese patients.[56,57] This stigmatization and discrimination can impact the care that obese patients receive in terms of both access to services and quality.[58]

The evidence suggests that patients who are obese have an increased risk of certain types of wounds and poorer outcomes once the wound has developed. These are the result of both physical and physiological differences from non-obese patients. Clinical staff need to be aware of these differences in order to both reduce the risk of wounds occurring and to improve wound healing. Table 2 highlights some key best practice strategies for caring for those who are obese.

Table 2. Best practice considerations for obese patients who have or are at risk of a wound

Skin assessment and pressure relief	• Skin and pressure area assessment on initial admission or transfer • Regular evaluation of turning/pressure-relief regimen • Checking of areas prone to pressure ulcers such as buttocks and between skin folds • Listening to patients regarding any areas of the skin where they are experiencing pain
Moisture management	• Use of barrier creams • Personal hygiene – keeping skin dry and clean • Use of incontinence aids – pads, etc.
Specialist equipment	• Beds and mattresses designed for the obese patient • Lifting aids • Reduction of shear and friction through low-friction slides and covers • Mobility aids • Pressure-relieving seat cushions
Training for staff	• Physical and emotional care • Use of equipment • Identification of at-risk patients • Assessment of wounds to identify issues such as wound infection and dehiscence

Summary

The rising incidence of obesity has resulted in an increased number of patients with obesity within all health-care settings. Obesity is linked to comorbidities and impacts that can result in poorer health outcomes. In addition, obese individuals are at risk of developing wounds; these wounds can be more complex and difficult to heal compared to those of non-obese individuals. Examples include:

- When having surgical interventions, those who are obese have a higher risk of wound complications, including wound infection and dehiscence.
- Due to issues with mobility, moisture, shear and friction, obese patients can be at increased risk of developing pressure ulcers compared to normal weight patients. The location of pressure ulcers may also differ significantly compared to other patients.
- Dependent edema in the legs means that obese patients are at increased risk of leg ulceration compared to non-obese patients.

The development of wounds, and the additional care necessary, can further increase the complexity and costs of care for obese patients. It is important that health-care providers rise to the challenge of caring for this group of patients.

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