Importance of nutrition in preventing and treating pressure ulcers


Abstract
Pressure ulcers are painful, and affect patients’ health, mobility and well-being. They also cost the NHS between £1.4-2.1 billion a year. Although a large proportion of pressure ulcers are avoidable, many still occur and, because pressure ulcer incidence is an indicator of care quality, it can put carers under scrutiny.

The National Institute for Health and Care Excellence states that adequate risk assessment of pressure ulcer development, including the role of malnutrition, improves care. Adequate nutrition is vital for the prevention of pressure ulcers and malnutrition can hinder healing when pressure ulcers have developed. The risk of malnutrition should be assessed with a recognised tool, such as the Malnutrition Universal Screening Tool, and appropriate treatment plans should be drawn up for patients identified as being at risk of malnutrition to improve their nutritional state. For example, the dietary intake of people with poor appetite can be supplemented with nutritious snacks between meals.

The aims of this article are to help readers understand risk factors for malnutrition and how dietary intake can be manipulated to improve patients’ nutritional state. It also aims to highlight how improving nutritional intake helps to prevent pressure ulcers. On completing the article, readers will be able to consider and review their own practice.

Keywords
diet, nutrition, older people, pressure ulcers, pressure ulcer prevention, tissue viability

Introduction
While most pressure ulcers are preventable, vulnerable people are at risk of pressure ulcer development. This not only has health consequences for patients, but is also expensive for the NHS. The estimated cost of managing pressure ulcers is £1.4-2.1 billion per year (Bennett et al 2004), with grade IV pressure ulcers costing about £14,108 per patient (Dealey et al 2012). Increasingly, the incidence of pressure ulcers is seen as an indicator of the quality of care provision, and healthcare providers’ pressure ulcer prevention record can be scrutinised and assessed.

The National Institute for Health and Care Excellence (NICE) has published a clinical guideline on the prevention and management of pressure ulcers (NICE 2014). The institute has also published a quality standard (NICE 2015), which highlights how good quality care can result in pressure ulcer prevention. The quality standard focuses on how prevention of pressure ulcers has the greatest effect on patients’ health and that this is best achieved by ensuring risk assessments are routinely completed.

Poor nutritional intake and poor nutritional state have long been considered risk factors for pressure ulcer development as well as causes of delayed healing in existing ulcers (Posthauer et al 2015). While good quality
Evidence to recommend specific nutritional elements is lacking, the NICE (2014) guideline highlights the importance of a good overall nutritional state and the correction of any deficiencies as the focus for preventing and healing pressure ulcers. The quality standard (NICE 2015) states that malnutrition is a risk factor for pressure ulcers and, if identified, should trigger a specific pressure ulcer risk assessment.

**TIME OUT 1**

**Malnutrition and pressure ulcer development**

Before reading on, note down the mechanisms you believe link malnutrition with an increased risk of developing pressure ulcers. We will review this later.

### Malnutrition

Obese and underweight patients can be considered as having malnutrition because both states can result from an imbalance of nutrients. Body mass index (BMI) is the most commonly used reference point for measuring body size. BMI is calculated from a person’s weight and height, where BMI = weight (kg) ÷ height² (m²). A BMI of 18.5–25kg/m² is considered to be in the healthy range (NICE 2006). A BMI above 25kg/m² is considered to be overweight and one above 30kg/m² is considered obese. Overweight results from an energy intake above requirements and can be the consequence of a high intake of energy-dense food. This does not necessarily mean an overweight person has a balanced diet, which could be low in micronutrients such as vitamins and minerals. Increasing body weight affects mobility and can hinder attempts to relieve pressure, thereby increasing the risk of pressure ulcers.

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**BOX | Possible causes of malnutrition**

- Anorexia or loss of appetite due to illness.
- Nausea and vomiting due to illness or treatment for illness such as antibiotics.
- Poor mobility, such as loss of hand dexterity resulting in inability to eat or embarrassment about making a mess when eating.
- Swallowing problems that limit choice of food.
- Illnesses, such as chronic obstructive pulmonary disease (COPD), that cause breathing difficulties.
- Illnesses that increase energy requirements, such as cancer and COPD, trauma during recovery from surgery, and spasms associated with neurological conditions.
- Conditions, such as diarrhoea, pancreatic insufficiency and inflammatory bowel disease, that prevent absorption of nutrients. Some medications can also affect absorption.

(Thomas and Bishop 2007)

Increasing body weight also reduces blood circulation, which reduces healing capacity if pressure ulcers are present. Obesity is also associated with an increased risk of type 2 diabetes, which has an adverse effect on circulation and healing. Efforts should be made, therefore, to prevent excessive weight gain in all people (Cai et al 2013).

A BMI less than 18.5kg/m² is underweight and associated with insufficient nutritional intake compared with requirements. Due to the significant effect of undernutrition on pressure ulcers and its increased prevalence in older people, this article focuses on underweight patients. Inadequate nutritional intake is referred to as malnutrition for the remainder of the article.

While definitions of underweight or overweight are based on BMI, they can be inaccurate in older people due to the reduced stature associated with ageing (Omran and Morley 2000). In addition, BMI does not correlate with functional ability, which is due to the associated loss of muscle mass and strength, or sarcopenia, in the older population. This means that a higher BMI in an older person indicates a higher percentage of body fat than in a younger adult. An improving BMI may not therefore indicate improved functional ability and a concomitant reduced risk of pressure ulcers (Milne et al 2009).

To understand malnutrition risk, therefore, a BMI assessment may not be enough. As part of routine monitoring, risk of malnutrition should be assessed regularly in all patients because their health can change and affect their nutritional states (NICE 2006). Validated screening tools are recommended to help assess patients’ risk of malnutrition (NICE 2012) and the Malnutrition Universal Screening Tool (MUST) is the most commonly used such tool in the UK (Elia 2003). It is a quick and simple five-step tool to assess risk of malnutrition that uses BMI as one of its parameters, but also considers unintentional weight loss over the preceding 3-6 months. This is significant because, even if someone has a healthy BMI, rapid weight loss indicates an acute change in intake compared with requirements. An unintentional weight loss greater than 5% of initial weight over this time indicates a high risk of malnutrition.

The MUST includes a score for people who have acute illnesses or who have gone, or are likely to go, without food for more than five days. These factors put people at a higher risk of malnutrition. Once the MUST is complete, strategies can be followed to ensure...
that those most at risk of malnutrition receive the care they require.

**TIME OUT 2**

**Malnutrition Universal Screening Tool**  
Visit the British Association for Parenteral and Enteral Nutrition (BAPEN) website and familiarise yourself with the Malnutrition Universal Screening Tool, including understanding how to estimate BMI when height or weight cannot be obtained. Consider why it is important to use such a tool in a methodical way, assessing and reassessing patients on a regular basis.

**Risk in older people**  
While measures such as MUST are useful they do not necessarily provide all the answers. For example, MUST will not identify changes in muscle strength, which affects function and the ability to relieve pressure (Flood et al 2014). Other methods, such as measuring hand-grip strength, can correlate with improved health outcomes, but care home residents with cognitive impairments can find complying with instructions to complete these methods difficult (Stow 2015).

Older adults also have reduced skin elasticity, and are therefore more prone to pressure ulcers and difficulties with healing when pressure ulcers develop. However, if older people have an adequate nutritional state they will have a better body composition and therefore better padding over bony prominences. They are also more likely to be able to fight infections and illnesses, thus reducing the overall risk of them developing pressure ulcers (Dorner et al 2009).

BAPEN (2015) highlights that 35% of care home residents are at medium or high risk of malnutrition. It also states that 30% of residents have a BMI <20kg/m² compared with 4% of the general population (BAPEN 2015). Care home residents should have their weight measured monthly to allow tracking of weight changes (NICE 2006).

The heightened risk of malnutrition, and reduced mobility, muscle mass and skin integrity, put older people at a much higher risk of pressure ulcer development.

**TIME OUT 3**

**Weight loss**  
Review with colleagues how often you weigh the patients you care for and how you monitor changes. Are weight records located in the same place as your nutritional assessments? Is there a record of when the weighing scales were last calibrated?

Weight loss can be insidious. Make brief notes about a case in which such problems arose and patient review became especially important.

**Reducing the risk of malnutrition**  
It is vital to assess the risk of malnutrition and put in place care plans for those identified at higher risk. While correcting malnutrition is recommended for the prevention and management of pressure ulcers, it is also important for all health conditions. Evidence shows that routine screening and monitoring of the nutritional state of people in care homes costs half of that of treating malnutrition (Meijers et al 2012).

Some patients’ health can change rapidly before routine screening is completed. Where a risk of malnutrition is identified, it is important to consider what caused it and how to solve it. Several factors can put people at risk of malnutrition by affecting their intake and absorption of nutrients, or by increasing their energy requirements (Box 1).

The consequences of failing to meet nutritional requirements can cause further problems (Box 2). In view of these consequences and the increased risk of co-morbidity in older people, it is not surprising that older people are most at risk of malnutrition, with about 10% of people over the age of 65 years in the UK affected by it (European Nutrition for Health Alliance 2006) and approximately 30% of older adults admitted to hospital identified as being at risk of malnutrition (Elia 2015).

**TIME OUT 4**

**Risk factors**  
Older adults are often affected by multiple risk factors. Return to the patient you profiled in time out 3 and consider whether he or she was affected by any of the risks listed in Box 1. If so, outline how one risk seemed to work with others to reduce the patient’s nutritional state and skin integrity.
Ensuring adequate nutrition
Screening for malnutrition should be carried out regularly. It is recommended that, in residential and nursing care, people are screened on admission and, if a risk is identified, more often thereafter (NICE 2006). For those who live at home, it is suggested that screening is completed by community nurses during the first face-to-face visits.

In view of the link between malnutrition and pressure ulcers, screening to identify malnutrition should be completed if a risk of pressure ulcer development has been identified. The risk of malnutrition changes during periods of illness, when nutritional intake should be reassessed and monitored carefully.

If a risk of malnutrition is identified, actions should be taken promptly. It is important to consider what factors contribute to the risk:

» Do patients need a medication review?
» Do they have constipation or nausea from medical treatment or a condition?
» Have they had any changes in taste?
» Do they have any difficulties with the mechanics of eating, such as ill-fitting dentures or swallowing problems?
» Do they have difficulties obtaining food?

After considering these questions, it is important to identify the services that could help resolve the issues they raise.

Oral intake
Monitoring of oral intake should include fluid as well as food. Dehydration causes a loss of skin integrity and can cause confusion, which can compromise compliance with pressure area care.

The easiest way to monitor intake among people in care homes where staff work different shifts is by recording it for a few days. A complete food chart covering two or three consecutive days provides much richer data than one covering a longer period incompletely. These food charts should include information on frequency and portion sizes.

People living at home can be asked for food recall, where they are interviewed about their dietary intake over specified periods.

When reviewing food charts or dietary recall, it is important to consider whether patients are eating sufficient amounts, and whether there is enough variety in what they are eating or whether they are choosing foods they find easier to eat (Thomas and Bishop 2007).

Oral hygiene
Poor oral health can make eating difficult and painful, causing patients to choose less nutritious, softer options. An oral hygiene assessment, as recommended by NICE (2016), helps to determine if additional support is required to maintain adequate oral health.

TIME OUT 5
Food charts
Pose three colleagues a challenge by asking them what they think is relevant to include in a patient’s food chart. Were the responses from your colleagues consistent?

If entries in the food chart differ significantly, how would you compare them? What are your local guidelines to ensure that the recording of dietary intake is consistent?

Addressing poor nutritional intake
If people do not eat enough at meal times, it is important to find alternative ways to meet their nutritional needs. When someone has a loss of appetite, large meals can be overwhelming.

One option is to have nutritious snacks between meals. These can include:

» Fruit cake or malt loaf.
» Plain or fruit scones with butter, jam and cream.
» Crumpets or muffins with butter and jam.
» Toast with jam, butter, peanut butter or yeast extract.
» Nuts, crisps or dried fruit.
» Biscuits or cereal bars.
» Crackers with cheese.
» Full-fat yoghurts, rice pudding, mousse, custards or trifles.
» Cheese and apple cubes.

Other options include fortifying meals to ensure people increase their nutritional intake with every mouthful they eat. Meals can be fortified by (Thomas and Bishop 2007):

» Using full-fat milk in drinks, breakfast cereals, soups, puddings and when mashing potatoes.
» Adding grated cheese to mashed potatoes, jacket potatoes, soups and vegetables.
» Adding cream, condensed or evaporated milk to soups and puddings.
» Adding fruit purees to puddings.

BOX 2. Possible consequences of malnutrition

» Reduced immune function, which increases the risk of further illnesses.
» Reduced muscle strength.
» Reduced skin integrity, which increases the risk of pressure ulcer development and reduces the rate at which skin lesions heal.
» Depression and anxiety.
» Difficulties maintaining body temperature.

(Stratton et al 2003)
» Adding additional pulses and beans to soups and meat dishes.

» It is also possible to fortify milk by adding four tablespoons (2oz or 56g) of dried milk powder to each pint. This can then be used in drinks and on cereal. Your local dietetic department may be able to offer more specific nutritional advice and other healthcare professionals can help you support patients. For example, occupational therapists can assess whether patients require any special utensils, physiotherapists can assess seating positions for eating and pressure relief, and speech and language therapists can help with swallow assessments to make sure food is of an appropriate consistency.

Specific nutritional needs
Optimal nutrition is vital for improving health outcome, but is not the only factor in preventing pressure ulcers. For some people, pressure ulcers occur when severe illnesses lead to prolonged bed rest. For these people, consideration then needs to be given to how nutrition may help to improve healing at a time when they may be struggling with other health problems.

NICE (2014) highlighted that nutrition is important due to the role that nutrients have on collagen formation, the substance the body produces to heal wounds. It also stated that correcting any nutritional deficit is vital so that the body is able to produce the required collagen. This again highlights the importance of recognising and monitoring nutritional state. Those who are at risk of malnutrition will have fewer resources available to promote healing.

Nutrients
While maintaining a balanced nutritional intake and correcting all nutritional deficits are important, protein, iron, zinc and vitamin C are important in healing pressure ulcers. This is not included specifically in the NICE (2014) guideline. A Cochrane review (Langer and Fink 2014) stated that evidence is lacking to support routine supplementation with these nutrients, but has historically been considered important especially when pressure ulcers are healing as these nutrients are required for tissue growth and repair.

Protein forms the basis of the enzymes that are required for wound healing, cell multiplication and collagen formation. Ensuring an adequate protein intake seems essential (Dorner et al 2009). High-protein foods include meat, fish, dairy produce, eggs, pulses, beans and lentils. Meals containing these elements are recommended when someone has a pressure ulcer. If someone has a poor appetite then fortifying meals with these foods, as indicated previously, is recommended.

Iron, due to its presence in haemoglobin, is required to transport nutrients around the body (Dorner et al 2009). Iron is found more readily in red meats and to a lesser extent in pulses, eggs, fortified cereals and green vegetables. Eating iron-rich foods with a source of vitamin C will improve iron absorption from non-meat sources. Not only does vitamin C help with iron absorption, it also works with iron to produce collagen. Vitamin C is also important for immune function and deficiency can result in an inability to fight infections. Adequate dosages should be obtainable from dietary sources such as fruit and vegetables. However, it is a water-soluble vitamin so it is not stored in the body and requires a daily intake. It is also easily destroyed by heat, water and light so cooking will reduce its content in food. This becomes a particular problem when patients choose soft, overcooked options. Alternatives, including having fruit juice with each meal, may need to be considered. Megadoses have not been shown to improve healing (Dorner et al 2009).

Zinc is another element that is required for collagen formation and synthesis of protein. It is bound to albumin, which is a protein. Albumin levels in the blood can indicate the amount of protein available.

If pressure ulcers have high exudate levels then blood levels of albumin could be low and there will also be low levels of zinc, which will inhibit further the ability to produce collagen and therefore heal the pressure ulcer. Zinc is found in a variety of foods, most readily in red meats and poultry but also in pulses, wholegrains and fortified breakfast cereals. Overzealous supplementation with zinc, however, should be discouraged as it can lead to copper deficiency. As copper is also required for collagen formation, deficiency will affect healing rates (Dorner et al 2009).

TIME OUT 6
Nutrition
Once again return to your case study from time out 3 and review the patient’s dietary intake. Was the patient having sufficient nutrients to help with pressure ulcer healing? Which additional nutritional parameters could have been implemented to ensure a more balanced, nutritious intake? What further issues may have affected the provision of these elements? Perhaps consider the financial implications of additional food to those providing the meals. Do these costs outweigh the benefit or reduce other costs such as those for dressings?
Preventing and treating malnutrition in older adults is crucial due to the increased risk of malnutrition in this population. Evaluating patients' risk of malnutrition is essential, as it affects the management of diseases, especially pressure ulcers. Adequate nutritional state benefits not only the prevention and management of pressure ulcers but also other health conditions.

Adequate nutritional state will also add additional benefits for other health conditions. While care home residents will not have individually cooked meals, it is important to assess each person individually to meet their needs and food preferences. Having a variety of options, particularly snacks between meals, will help achieve this. Knowing who is at risk, what is causing the risk, and how the risk can be reduced is vital.

**Conclusion**
Patients’ nutritional state affects the prevention and management of pressure ulcers. While providing additional food items may be costly, it outweighs the cost for the patient and the NHS by reducing the risk of pressure ulcers and improving recovery. Identifying those who will benefit most from dietary interventions is appropriate.

Additional benefits for other health conditions, not only pressure ulcers but also conditions like diabetes, heart disease, and cancer, will help achieve this. Knowing who is at risk, what is causing the risk, and how the risk can be reduced is vital.

**References**


Importance of nutrition in preventing and treating pressure ulcers

TEST YOUR KNOWLEDGE BY COMPLETING SELF-ASSESSMENT QUESTIONNAIRE 5

1. A body mass index of <18.5kg/m² is:
a) Underweight
b) Healthy
c) Overweight
d) Obese

2. Obesity raises the risk of pressure ulcer development because it:
a) Affects mobility
b) Can hinder attempts to relieve pressure
c) Reduces blood circulation
d) All the above

3. According to the Malnutrition Universal Screening Tool, a high risk of malnutrition is indicated by an unintentional weight loss of what percentage of initial weight over the preceding 3-6 months?
a) 5%
b) 12%
c) 15%
d) 17%

4. What percentage of care home residents are at medium or high risk of malnutrition?
a) 20%
b) 30%
c) 35%
d) 50%

5. Older people are at greater risk of pressure ulcer development because of:
a) Malnutrition
b) Reduced muscle mass
c) Loss of skin integrity
d) All the above

6. A possible cause of malnutrition is:
a) Reduced immune function
b) Depression
c) Nausea and vomiting due to illness
d) Difficulties maintaining body temperature

7. Ways to fortify meals include:
a) Providing low-fat yoghurt
b) Adding grated cheese to mashed potatoes
c) Adding skimmed milk to soups
d) Providing low-carbohydrate breakfast cereals

8. Which of the following statements is true?
a) An adequate protein intake is not essential for wound healing
b) Protein, iron, zinc and vitamin C are important nutrients for wound healing
c) Iron is found readily in citrus fruits
d) Vitamin C is stored in the body

9. Over supplementation with zinc can result in:
a) Increased absorption of iron
b) Copper deficiency
c) Vitamin C depletion
d) Salmonella infection

10. A socio-economic factor that may increase the risk of malnutrition in older people is:
a) Changes in taste
b) Ill-fitting dentures
c) Difficulties in obtaining food
d) Polypharmacy

How to complete this assessment
This self-assessment questionnaire will help you test your knowledge. It comprises ten multiple choice questions broadly linked to the previous article. There is one correct answer to each question.
You can read the article before answering the questions or attempt the questions first, then read the article and see if you would answer them differently. When you have completed the questionnaire, cut out this page and add it to your professional portfolio. You can record the amount of time it has taken you to complete it.
You may want to write a reflective account. Visit journals.rcni.com/r/nop-reflective-account
Go online to complete this self-assessment questionnaire and you can save it to your RCNi portfolio to help meet your revalidation requirements.
Go to rcni.com/cpd/test-your-knowledge

This self-assessment questionnaire was compiled by Lisa Berry
The answers to SAQ 4 on caring for patients with Parkinson’s disease in general hospital settings, which appeared in the June issue, are:

This activity has taken me minutes/hours to complete. Now that I have read this article and completed this assessment, I think my knowledge is:

Excellent □ Good □ Satisfactory □ Unsatisfactory □ Poor □

As a result of this I intend to: _____________________________

________________________________________________________________________________________