

# Importance of nutrition for elderly persons with pressure ulcers or a vulnerability for pressure ulcers: a systematic literature review

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## KEYWORDS

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## ABSTRACT

The number of elderly people, usually with multiple illnesses, is increasing in our society. In the public debate, many scientists predict that this could lead to a considerable increase in pressure ulcers. Since elderly care was reorganised in Sweden in 1993, the situation for older people has changed. In many cases, access to geriatric expertise and nurses has been reduced and the mortality rate among patients with pressure ulcers is increasing. A literature review, including a content analysis of 16 peer-reviewed articles published between 1995 and 2005, was conducted. The aim was to describe the importance of nutrition in reducing the risk of pressure ulcers and to focus on nursing interventions. The result shows that the analysis can be summarised around four areas: nutrition, prevention, nursing and economic aspects, which elucidate the importance of ensuring that an elderly person's need for energy is met and that nutritional supplements are effective for this group of patients. Early nursing intervention and the use of questionnaires are also stressed as being important. The economic aspects of pressure ulcers are also discussed.

## INTRODUCTION

Pressure ulcers occur in both hospital and community settings, most often in the care of elderly and/or immobile people, people with severe acute illness, and in those with neurological deficits. An increasing elderly population in parallel with a growing number of multiple illnesses is being seen in western society (National Board of Health and Welfare 2000a). Some researchers see a parallel risk of an increasing number of pressure ulcers, usually in connection with the growing number of hip fractures which are seen as having the greatest risk association with the development of pressure ulcers (Lindholm 2003).

The development of pressure ulcers is comparatively common. Kaltenhalter et al (2001) reported prevalence in the United Kingdom (UK) of between 4.4 per cent in a community unit and up to 37 per cent in palliative care. In addition to representing a major burden of sickness and having an immeasurable effect on quality of life, pressure ulcers are also costly for health care systems. In the UK, the cost of preventing and treating pressure ulcers in a 600-bed large general hospital was estimated to be between GBP 600,000 and GBP 3 million a year (Clark and Watts 1994).

Pressure ulcers or decubitus ulcers are areas of localised damage to the skin and underlying tissue which are caused by pressure or friction (Allman 1997). Reasons for pressure ulcers can include: a lack of appetite which leads to loss of weight, inactivity, paresis, dehydration and unconsciousness. A healthy person changes body position if pressure occurs. If this ability is impaired, the pressure leads to reduced blood flow, resulting in a lack of oxygen or nourishment to the skin and, if the exposure is sufficiently prolonged, an ulcer can occur.

The importance of a nourishing diet, usually in relation to the health risks of obesity, is often discussed. However among elderly people, it has generally been agreed that malnutrition rather than over-nutrition is a cause of concern (Potter et al 1988). Studies, including those conducted by Flodin et al (2000) and Kruiženga et al (2003) have revealed that an

increase in the length of hospitalisation is associated with malnutrition. Malnutrition has important effects on recovery, it impacts on psychological and biochemical systems and has been associated with impaired immune response, impaired muscle and respiratory function, delayed wound healing and an overall increase in complications (Potter et al 1995; Sullivan et al 1990; Kelly et al 1984). A large demand for a supply of vitamins and tracers is seen during healing and in recent years, research focusing on the importance of nourishment for healing has been conducted (for example, Peake et al 1998). In these studies, it has been shown that elderly people sometimes suffer from malnutrition. Research on malnutrition among elderly in-patients, with a focus on the causes of and risk factors for the development of pressure ulcers, reveals that malnutrition is important in treatment, care and rehabilitation and an important indicator for the origins of pressure ulcers in patients aged between 65 and 85 years (Bansal et al 2005).

According to Unosson and Ek (1994), patients who received extra nutritional supplementation developed no pressure ulcers or, if they did, healed better than patients without extra nutritional supplements. These findings stress the importance of a balanced diet in order to maintain nutritional status and interventions as a means of preventing malnutrition and its complications. Ek (1996) also reported that extra nutritional supplements reduce elderly hospitalised patients' mortality frequency. In older patients with hip fractures, Houwing et al (2003) reported that patients who did not receive nutritional supplements ran a non-significant greater risk of developing pressure ulcers.

Studies show that when nurses have an acceptable knowledge and control of a patient's nutrition, these patients' pressure ulcers heal well (Mathaus-Vliegen 2004). However nutrition is a problem in practice, and according to Langer et al (2005), 25 per cent of elderly hospitalised patients suffer from malnutrition and an albumin value below the accepted reference value (3.5 g/l). It also appears that the elderly people generally eat little and the wrong kind of

food. Irrespective of whether elderly patients are hospitalised or live in group dwellings or in their own homes, malnutrition is a problem. The economic consequences of malnutrition are substantial. In 1992, the economic cost to the United Kingdom National Health Service of preventing malnutrition was estimated at GBP 266 million a year, mainly due to an increase in the length of bed occupancy and associated treatment costs (Lennard-Jones 1992).

Health care professionals attempt to reduce the occurrence of severe pressure ulcers by identifying people at high risk and using preventive strategies, such as pressure relieving equipment. It is important that initiatives such as nursing interventions are based on the best available evidence. This systematic literature review of pressure ulcer healing in elderly patients (65 years and older) focuses on elderly patients' nutritional status and the connection between nutritional status and the development of pressure ulcers. The available scientific evidence relating to pressure ulcers was reviewed with the aim of describing the importance of nutrition in reducing the risk of pressure ulcers and focusing on nursing interventions.

## SEARCH METHODS

This review of the published research consisted of the following seven steps: specify the assessment problem; specify the inclusion criteria for studies; formulate a plan for literature search; conduct a literature search and retrieval; interpret the study evidence; and integrate the evidence and formulate a synthesis based upon evidence quality (SCTAHC 1993). A presentation of a structure for a focused research question is reported more extensively elsewhere (Stoltz et al 2004). Studies in English or the Nordic languages were only eligible for inclusion. Limitations regarding publication dates (January 1995 to December 2005) were actively applied during the database search.

The search strategy was designed to identify as much relevant published research as possible in the investigated research area using a systematic database search, focusing on sensitivity rather

than specificity. The sources of literature were the international database Medline, Cinahl and the Cochrane Database of Systematic Reviews. The following search words were used and adapted according to the prerequisites of each specific database: pressure ulcers, nutrition, prevention, decubitus and nutritional requirements. This created a foundation from which studies of pressure ulcers could be manually screened and selected.

A pilot search was conducted in the Medline database, after which minor changes were made to the search words. The final search resulted in 158 references of which 62 were retrieved in full article form as they potentially met the criteria for inclusion. In the first classification, the authors read the titles of articles and abstracts to identify and choose relevant articles for a more in-depth examination. Research papers which were not included in the study were either of poor quality or did not meet the review demands regarding the aim and research questions. Potential research papers were noted for retrieval and given a preliminary 'study type' classification as randomised controlled trials, uncontrolled studies, case reports, qualitative research and surveys. Filtering identified only a small number of randomised controlled studies and all the studies that included outcome measures were therefore selected. In addition, qualitative studies were included.

The assessment process was performed in two phases. After an initial screening process designed to make sure that the studies met all the inclusion criteria and to determine whether or not the studies should be further assessed in phase 2, 41 articles were excluded and a total of 21 remained. The 21 articles were subjected to a more in-depth classification and quality assessment. This second phase used specific protocols for studies with qualitative and quantitative analyses of data (SCTAHC/SCN 1999). After the final review process, 17 articles remained and they collectively represent the result of the systematic literature review.

A three-point scale was used in order to reflect the quality of the studies that were included: high (I), medium (II) or low (III) quality. A medium (II) grade

was used if studies did not meet the criteria for high (I) or low (III) quality (see table 1) (SCTAHC 1999). All the studies making up the foundation of this systematic review were read repeatedly and

the findings from these studies were summarised in tables (see table 2). The result of the review is a synthesis of these findings and quality assessments to arrive at conclusions.

**Table 1: Classification and quality assessment of studies**

Type of study	I = High	II = Medium	III = Low
RCT	Prospective, randomised, controlled trial. A study well planned and well carried out. Good description of material, method and intervention	–	Randomised, controlled trial with few participants or too many sub-studies Insufficiently described or high drop-out rate Lacking in description of results
P	Prospective study without randomisation. Well-defined research question, adequate number of participants, adequate statistical methods	–	Few participants, defective in accomplishment, uncertain statistical methods and measures
R	Adequate and well-defined number of consecutive participants, adequate statistical methods	–	Few participants, defective in accomplishment, uncertain statistical methods
Q	Study using qualitative analysis of data. Well-defined research question, relevant and well-described selection of participants and context. Method and analysis well described and well conducted. The results well described and comprehensive. Good communicability	–	Vaguely formulated research question, few or unsatisfactorily described participants Lacking in description of method, analysis or results

**Table 2: Classification and quality of studies**

Conclusion	Classification, quality of studies and references
Nutrition is an important factor for the origin of pressure ulcers and their avoidance	Ödlund Olin et al (DS, II) Dambach et al (CCT, II) Gunter et al (DS, II) Bourdel Marchasson et al (CCT, I) Horn et al (DS, I) Ödlund Olin et al (CCT, II) Sacks et al (DS II) Rypkema et al (CCT, I).
Early prevention and assessment of the patient's nutritional status are important	Anthony et al (DS, I) Lindgren et al (CCT I) Lindgren et al (DS, I) Fisher et al (DS, I) Horn et al (DS, I)
Nursing interventions and early care are important for the prognosis of people suffering from pressure ulcers	Bater-Jensen et al (DS, I) Thomas et al (DS, II) Horn et al (DS, I) Lindgren et al (DS, II) Lindgren et al (DS, I) Lindgren et al (CCT, I).
The importance of reduced suffering through nursing interventions, leading to positive economic effects for elderly people with pressure ulcers	Horn et al (DS, I) Sacks et al (DS, II) Fisher et al (DS, I)

## RESULT

The result of this study consists of 16 peer-reviewed articles, each with a quantitative analysis of data. Nine of the studies originate from Europe (Sweden 5, France 2, United Kingdom 1, and the Netherlands 1) and seven from the USA. When reviewing the included studies, four subject areas were revealed. They were later labelled: *the need for nutrition, the need for prevention, the need for nursing care and economic aspects*. In the quality assessment, eight studies were classified as high and eight as medium. None was assessed as being of low scientific quality. A summary of the included studies is given in table 2.

### The need for nutrition

Studies within this area report on the importance of nutrition among elderly patients with pressure ulcers and the importance of nutrition to prevent the progression of pressure ulcers. This is based on the findings from eight studies. The quality assessments were high (n=3) and medium (n=5).

In a group dwelling in Sweden, 89 per cent of elderly residents had nutrition problems or were judged as badly nourished. All the clients had experienced a significant loss of weight during the last year, leading to deterioration in daily life and deterioration in co-ordination ability and functional abilities (Ödlund-Olin et al 2005). Dambach et al (2005) and Guenter et al (2000) report that malnutrition correlates to pressure ulcers and that patients with pressure ulcers or who are vulnerable to pressure ulcers have a significantly lower energy intake than other patients. However through nutritional supplements, this risk can be reduced and the patient's nutritional status can then be preserved and the weight loss prevented (Horn et al 2004; Bourdel-Marchasson et al 2000). Nutritional supplementation leads to an increased capacity to manage daily activities and reduce the patient's sensitivity to infections (Ödlund-Olin et al 2003; Rypkema et al 2003; Sacks et al 2000).

### The need for prevention

After the final review process, a total of five studies focusing on early prevention and the interventions

that should be used remained. They formed this area of study. It is important to take account of the patient's nutritional status regarding factors such as weight and albumin. Four studies were evaluated as being of high scientific quality and one of medium quality.

Anthony et al (2000) report that the degree of dehydration and serum albumin are significant indicators for pressure ulcers in the patient group aged 64 years and older. The RAPS scale is a useful tool for identifying risk factors in elderly people and thereby predicting pressure ulcers (Lindgren et al 2002). Lindgren et al (2004) found that patients with pressure ulcers were significantly older, had a long institutional stay, had a lower weight, had lower diastolic pressure and had lower scores on the RAPS scale than those without pressure ulcers. Fisher et al (2004) state that important indicators for pressure ulcers are age, male gender, perception, humidity, mobility, nutrition and friction. Analogous to this, Horn et al (2002) report that intervention against incontinence, different kinds of pressure ulcer protection material, turning schedule, friction treatment and soft materials to sit on were the most commonly used pressure ulcer interventions.

### The need for nursing care

Nursing care and the importance of early attention for patients with pressure ulcers have been reported in six studies, of which four were judged as being of high quality and two of medium quality.

Studies reveal that the most important nursing intervention to prevent pressure ulcers was pressure reducing mattresses and nursing documentation (Bates-Jensen et al 2003), together with turning schedules (Lindgren et al 2000). According to Horn et al (2004), factors that are important for the progress of pressure ulcers are: the severity of disease, catheters and connection to different kinds of monitoring equipment, previous pressure ulcers, loss of weight and eating difficulties due to problems in the mouth and pharynx. The most common treatment measure, according to Lindgren et al (2000), was different techniques for pressure relief and protective bandages. Horn et al (2004)

stress, that the number of ulcers decreases if nurses interact with nursing-home patients for at least 15 minutes and with enrolled nurses for two hours a day. Even if a hospital stay increases the risk of pressure ulcers (Lindgren et al 2004; Lindgren et al 2002), pressure ulcers do not in themselves imply a reduction in survival (Thomas et al 1996).

### **Economic aspects**

Two articles highlight the importance of minimising both patient suffering and economic costs in connection with nutrition, prevention and nursing care. The scientific quality was evaluated as being high in one article and medium in the other.

Sacks et al (2000) state that different assessment tools are cost effective and easy to administer and can therefore be used as instruments in nursing homes. It is important to use the knowledge relating to pressure ulcers to identify patients that are vulnerable to such sores. By doing this, not only can a severe medical problem be minimised, but unnecessary suffering and economic costs can also be reduced (Fisher et al 2004).

### **DISCUSSION**

This systematic literature review of published research results arrives at the conclusion that pressure ulcer healing for elderly patients (65 years and older) is strongly associated with the elderly patient's nutritional status and different kinds of preventive nursing intervention. This study also concludes that the successful mastering of pressure ulcers not only reduces suffering but also reduces the financial costs.

It is easy to think that older people's nutritional status has improved in recent decades. However this was found not to be the case when both Ödlund-Olin et al (2005) and Guenther et al (2000) reported a high frequency of malnutrition among elderly people in both Sweden and the USA, figures that correspond to Morley's (1986) reported findings of under-nutrition in the USA population above 60 years of age in the early 1970s. Ek et al (1991) have shown that women above 79 years of age are over-represented in the group contracting pressure ulcers. This gender difference

could be the result of a skewed gender distribution in ages in the western world, with a higher mean age among females (National Board of Health and Welfare 2005).

This study also shows that people suffering from pressure ulcers are not only underfed but also have a higher age, reduced appetite and a reduced intake of liquid, need assistance with eating, have gastro-intestinal problems, have reduced mobility and have been exposed to stress during the last three months (Lindgren et al 2004; Fisher et al 2004; Horn et al 2004; Christensson et al 1999). The fact that patients who progress to pressure ulcers are significantly older than those who do not is frequently reported, for example in Bergström and Braden (1992), Christensson et al (1999), Guenther et al (2000), Lindgren et al (2000), Fisher et al (2004) and Horn et al (2004).

Morely (1986) calls this age skewing 'the anorexia of aging'; and by this he means that with increasing age, a change in the human body and organs leading to a natural loss of weight is seen. It is well known that increasing age results in a reduction in body mass index and a change in fat location on the body. It is important routinely to check older people's weight and nutritional status due to the fact that loss of weight increases the risk of pressure ulcers as this risk can be reduced through nutritional supplements (Dambach et al 2005; Guenther et al 2000). According to the National Board of Health and Welfare (2000b), nutrition should be regarded as synonymous with other medical treatment, especially for older people admitted to institutional care and therefore in need of investigation, diagnosis, treatment planning and documentation. It is not possible to give general energy recommendations for the older people, but in this systematic literature review, a caloric load of 25-50 calories per kg body weight for older people with pressure ulcers is recommended in three of the studies (Ödlund-Olin et al 2005; Dambach et al 2005; Mathus-Vliegen 2004).

The most common nursing interventions presented in the reviewed studies were different kinds of pressure-relieving measures, such as anti-decubitus

mattresses and individual turning schedules (Bates-Jensen et al 2003; Lindgren et al 2000; Ek 1987). Another frequently stressed nursing intervention is increased nurse-patient interaction (Horn et al 2004). In economic terms, pressure ulcer prevention is cost effective and nursing interactions indicate that increased nurse-patient interaction and careful documentation lead to early identification of patients who are vulnerable to bedsores.

### Excluded studies

In overall terms, the most common reason studies were not included regardless of origin was that they did not comply with the aims of this review. Some studies were not of acceptable quality and their method description was either limited or non-existent. Consequently, they were excluded. Studies that commented on pressure ulcer healing in an editorial or a letter or in a problem-oriented fashion without any systematic methodology were not included.

### Methodological considerations

The methodology that was chosen was a useful tool for identifying literature in a structured and systematic way. Within the resources made available to this study, this methodology helped to identify the best available scientific evidence. However the number of databases that were searched, as well as the search path that was chosen, may have been insufficient to identify all the relevant references. The reference lists from the included studies were not searched. In addition, some studies may lack an electronic database reference. In retrospect, the manual search and correspondence with senior researchers in the field could have been more extensive. A number of interesting studies were excluded because the age of the population which was limited to elderly individuals aged 65 and above.

While this systematic review was conducted in a rigorous manner, potential limitations must be acknowledged. The methodology and findings of the studies included in this review have been assessed by two independent reviewers (BH and LM), aided by review protocols. The protocols were not revised during the review process, which may be helpful in order to avoid introducing reviewer bias.

This objective of this review was to attempt to integrate the results of research conducted with qualitative and quantitative research data analysis. However this goal was not realised, as no articles with qualitative data analysis were found in this review. More work is needed, especially when it comes to empirical studies with qualitative approaches within this research field, as patient experience is closely associated with nursing care. More work is also needed when it comes to systematic reviews of qualitative research in order to guide future researchers.

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