

## Prevention and Management of Pressure ulcer in Neurosurgical wards at RIMS, A single centre experience.

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**Abstract-** A pressure ulcer is a localized injury to the skin or underlying tissue, usually over a bony prominences, due to unrelieved pressure. Pressure ulcers remain a major health problem affecting approximately three million adults. Prevalence differs based on settings but is 25% on the average. The cost of treatment of pressure ulcers is expensive. Cost of its treatment is two and a half times the cost of preventing them. Even though management of pressure ulcers involves multidisciplinary approach, its development is an index of poor hospital care. Literature was reviewed and relevant information on the current trend in the prevention and management of pressure ulcers is provided to sensitize doctors of their indispensable role in pressure ulcer management. Management includes identifying at risk persons and implementing specific prevention measures as well as wound care. Pressure ulcers significantly threaten the wellbeing of patients with limited mobility. It is associated with increased morbidity and mortality and lawsuits due to pressure ulcers are on the rise. Doctors remain at the forefront of protecting and safeguarding the patient from pressure ulcers. Every doctor must therefore embrace the new trend in the management of pressure ulcers to reduce cost of medical services, period of hospital stay as well as avoid litigation.

**Keywords:** Prevention, management, doctor, pressure ulcer

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### I. Introduction

A pressure ulcer is a localized injury to the skin or underlying tissue usually over a bony prominence, as a result of unrelieved pressure or pressure in combination with shear. <sup>[1]</sup> Pressure ulcers are caused by unrelieved pressure applied with great force (shear) over a short period or with less force (friction) over a long period that disrupts blood supply to the capillary network, impeding blood flow and depriving tissues of oxygen and nutrients. This external pressure must be greater than normal arterial capillary closure pressure of 32 mmHg to lead to inflow impairment and resultant local ischemia and tissue damage. Pressure ulcers are a serious health issue for patients in all kinds of health care settings and even at home thus reduction of pressure ulcer prevalence in long-term care (LTC) is a Healthy People 2010 initiative. Approximately three million adults are affected in the United States. Pressure ulcer incidence has been determined to be a quality of care indicator for LTC facilities and compliance is regulated by the Center for Medicare and Medicaid. <sup>[2]</sup>

A Canadian Association of Wound Care-supported study in 2004 by Drs. Gail Woodbury and Pamela Houghton indicated that the prevalence of pressure ulcers was 25% in acute care, 30% in non-acute care, 22% in mixed health-care settings, and 15% in community care. <sup>[3]</sup> These figures translate into untold patient suffering, caregiver anguish, and extra work for health-care providers, and millions spent in health-care budget. Pressure ulcer incidence is associated with an increased morbidity and mortality nearly 70% die within 6 months. <sup>[4]</sup> Its incidence increases in LTC. <sup>[5]</sup> Lawsuits due to pressure ulcers are on the rise. <sup>[6]</sup> Skin and wound allegations are the second leading cause of litigation in LTC. <sup>[7]</sup> Bed-ridden patients are prone to pressure ulcers. Prevention and management of a pressure ulcer therefore focuses on eliminating or reducing risk factors in such patients which could be intrinsic or extrinsic <sup>[8]</sup> Factors include:

- Impaired or restricted mobility/immobility as in limited mobility. Patients with spinal cord injury, cerebrovascular accident, pain, fractures, post-surgical procedures, coma or sedation, arthropathies and progressive neurogenic disorders (Parkinson disease, Alzheimer disease, multiple sclerosis), either have limited mobility or are immobile
- Poor nutrition as in conditions of anorexia, dehydration, poor dentition, dietary restriction, malnutrition (overweight/under weight) is also an intrinsic factor
- Other factors are sensory impairment as in reduced level of consciousness and decreased pain sensation
- Reduced skin tissue perfusion secondary to disease process or medication
- Incontinence; urinary or fecal and other sources of moisture, e.g. wound exudates

- Acute chronic and terminal illness
- Posture (e.g. when a lot of time in one position)
- Cognition; psychosocial status as depression or psychosis
- Previous history of pressure ulceration
- Co-morbidity (diabetes, systemic signs of infection, blood supply peripheral vascular disease, pain and medication, congestive cardiac failure, immunodeficiency, or use of corticoids, malignancies, end-stage renal disease, dementia and aging skin).<sup>[3]</sup>

**Extrinsic factors include:**

- Pressure from any hard surface (e.g. bed, wheel chair, and stretcher)
- Friction from patient's inability to move well in bed. Skin can be damaged when the body is rubbed, dragged or slid against a surface such as bed sheets
- Moisture from bowel or bladder incontinent.

**Clinical Manifestations of Pressure Ulcer**

Clinical manifestations depend on the stage of the ulcer though early signs of pressure ulcers include the following: Skin redness, warm area, spongy or hard skin and erosion of the top layers of skin or a sore with bacterial invasion.<sup>[8]</sup>

Management of pressure ulcers encompasses both prevention and treatment of the sores.

It implies that the Doctors uses the standard tools as recommended by National Pressure Ulcer Advisory Panel and European Pressure Ulcer Advisory Panel in assessment, classification, and appropriate intervention that will be goal oriented and cost effective. This involves assessment of patient for intrinsic and extrinsic factors to the development of a pressure ulcer using relevant risk assessment scales e.g. Braden, Waterlow or Norton's Scales<sup>[8]</sup> as well as needs for bed mobility, adequate tissue perfusion and adequate nutritional status. Once the risk level of the patient is determined (Nursing diagnoses), the nurse and her colleagues, along with the patient where possible, can create plan of prevention and care appropriate to their risk level.

**First line of management is to identify at risk individuals**

Not everyone under ones care will be at risk for developing a pressure ulcer. Most people have the ability to shift their weight enough to take the pressure off whenever discomfort sets in. By doing so, they lower their risk of having tissue damage. However, some patients have a reduced ability or no ability at all to either recognize when ischemia (restricted blood flow to an area) is occurring, or to move themselves to relieve the pressure. To determine who is at risk, the nurse must conduct a risk assessment for each patient upon admittance to your facility or care. The Braden Scale for Predicting Pressure Sore Risk is a widely used validated tool for assessing patient risk. It takes into account all of the factors above.

**Assessment using the braden scale**

According to Kozier, Erb, Snyder, Berman the **Braden Scale for Predicting Pressure Ulcer Risk** is a tool that was developed in 1987 by Barbara Braden and Nancy Bergstrom.<sup>[10]</sup> The purpose of the scale is to help health professionals to assess a patient's risk of developing a pressure ulcer.<sup>[11]</sup> The Braden scale assesses a patient's risk of developing a pressure ulcer by examining the following six criteria.

***i. Sensory perception***

This parameter measures a patient's ability to detect and respond to discomfort or pain that is related to pressure on parts of their body. The ability to sense pain itself plays into this category, as does the level of consciousness of a patient and therefore his ability to cognitively react to pressure-related discomfort.

***ii. Moisture***

This category assesses the degree of moisture the skin is exposed to. Excessive and continuous skin moisture can pose a risk to compromise the integrity of the skin by causing the skin tissue to become macerated and therefore be at risk for epidermal erosion.

***iii. Activity***

This category looks at a client's level of physical activity since very little or no activity can encourage atrophy of muscles and breakdown of tissue.

**iv. Mobility**

This category looks at the capability of a client to adjust their body position independently. This assesses the physical competency to move and can involve the client's willingness to move.

**v. Nutrition**

The assessment of a client's nutritional status looks at their normal patterns of daily nutrition. Eating only portions of meals or having inadequate nutrition can indicate a high risk in this category.

**vi. Friction and shear**

Friction and shear looks at the amount of assistance a client needs to move and the degree of sliding on beds or chairs that they experience. This category is assessed because the sliding motion can cause shear which means the skin and bone are moving in opposite directions causing breakdown of cell walls and capillaries.

**Scoring with the braden scale**

Each category is rated on a scale of 1 to 4, excluding the 'friction and shear' category which is rated on a 1-3 scale. This combines for a possible total of 23 points, with a higher score meaning a lower risk of developing a pressure ulcer and vice-versa. A score of 23 means there is no risk for developing a pressure ulcer while the lowest possible score of 6 points represents the severest risk for developing a pressure ulcer.

The Braden Scale assessment score scale is presented below:

- Very High Risk: Total Score less than 9
- High Risk: Total Score 10-12
- Moderate Risk: Total Score 13-14
- Mild Risk: Total Score 15-18
- No Risk: Total Score 19-23.

The Waterlow scale is the most widely used risk assessment scale in the UK and Ireland, even though there is no evidence to suggest it is more effective than the other most commonly used scales-Braden scale and Norton scale.<sup>[12]</sup>

The **Norton Pressure Sore Risk Assessment Scale scoring System** rating varies from 20 for minimum risk down to 5 for maximum risk. It is scored under physical, mental condition, activity, mobility, and incontinence. Scores range from 4 (best condition) to 1 (worst condition).

Coding is thus:

- <10: Very high risk
- 10-14: High risk
- 15-18: Medium risk
- >18: Low risk.

The Waterlow scale<sup>[13]</sup>

The patient is assessed under various categories and scored accordingly. The categories are:

Build/weight and height, skin type and visual risk areas, sex/age, continence, mobility malnutrition screening. Tissue malnutrition and Neurological deficit are classified as Special Risks. Scores assigned vary from 0 to 8. More than one score category can be used.

Score Rating:

- At risk = 10+
- High risk = 15+
- Very high risk = 20+.

Other scales include Glamorgan Paediatric Pressure Ulcer Risk Assessment<sup>[14],[15]</sup> and Douglas Scales.<sup>[8]</sup>

The **second line of management** of a Pressure ulcer is **preventive measures** for at risk patients which include the following.

**Skin care**

- **Inspection:** Ensure the skin is in good shape. The maintenance of skin integrity is a key component in the prevention of pressure ulcers. Once the skin begins to break down, it is at even higher risk for further damage. Regular skin inspection should be carried out. Look for reddened areas, or in dark skinned people,

areas that are darker than usual, which may indicate a breakdown is imminent. Protecting and monitoring the condition of the skin is important for preventing pressure sores and identifying stage I sores before they worsen

- **Bathing:** Skin should be cleaned with mild soap and warm water and gently patted dry. Or a no-rinse cleanser can be used. Reddened areas should not be rubbed. Many clinicians believe this stimulates blood flow, but in fact it tends to cause further trauma and damage the skin
- **Protection:** Skin that is vulnerable to excess moisture can be protected with talcum powder. Dry skin should have lotion applied. Keep skin clean and free from irritation. Use moisturizers where required but ensure that substances within the moisturizer are irritant-free. For skin that is too moist, the use of powders can help keep it dry. Use of skin moisturisers are reasonable preventive measures
- **Managing incontinence:** Urinary or bowel incontinence should be managed to prevent moisture and bacterial exposure to skin. Care may include frequently scheduled assistance with urinating, frequent diaper changes, protective lotions on healthy skin, urinary catheters or rectal tubes. Controlling moisture: Fluid from incontinence can irritate skin and predispose it to breakdown. Keep fluid away from skin through the use of barrier creams, incontinence systems and prompted voiding where possible.

The **third line of action is pressure reduction.** Taking the pressure off the patients will depend on their own capabilities . For patients who are mobile, they should be encouraged to move. Some patients will need help and encouragement to get out of bed, or off the chair, and go for regular walks, swim, or do other activities. Where patients are able to get out of bed, they should be encouraged to do so whenever possible. In addition to reducing the risk for pressure ulcers, regular movement stimulates blood flow and reduces the risk for other problems that arise from long periods of immobility, such as pneumonia. Pressure reducing devices are classified as static or dynamic.

- **Static devices include:** Foam, water, gel, and air mattress or mattress overlays. Foam mattress or one that is filled with gel or air can be used. Foam wedges may also be used (materials that are placed between the knees or used to relieve heel pressure). Chair cushions and pillows are inclusive. Pads are kept under the patient's bottom to absorb wetness and help keep skin dry
- **Dynamic devices:** e.g. Dynamic devices, such as alternating pressure devices and low-air-loss and air-fluidized surfaces, use a power source to redistribute localized pressure. Pressure-reducing surfaces lower ulcer incidence by 60% compared with standard hospital mattresses although there is no clear difference among pressure-reducing devices. <sup>[16],[17]</sup>

Dynamic devices are generally noisy and more expensive than static devices. Dynamic surfaces should be considered if a patient cannot reposition him or herself independently or if the patient has a poorly healing ulcer. If there is less than 1 inch of material between the bed and a pressure ulcer when feeling beneath the static surface, the device may not be effective and an alternative should be considered. <sup>[18]</sup> Ring cushions can cause a pressure ulcer and should not be used.

The **fourth line of action** is provision of **accessible and adequate support.** Patient may need more intensive support services, or care givers may need more intensive support services or care givers may need more training or assistance with lifting and turning the patient. Patients with communication or sensory disorders are particularly vulnerable to pressure ulcers because they may not feel discomfort or may express discomfort in a typical way.

The **fifth action is improving mobility** . For patients who cannot move themselves or who have difficulty moving themselves: Reposition them. The schedule should be based on the patient's level of risk as well as other factors such as the presence of lay caregivers and the availability of pressure redistribution devices. Repositioning the patient is not always easy. The doctors must remember to take into account the comfort level of patients who are put into positions they do not normally assume, it needs to ensure that it is not putting the patient into a position that will put pressure on another body part. It must make sure you use proper repositioning techniques and body mechanics to ensure that both you and the patient are not injured during the process. Doctor also needs to ensure pain management is part of the turning schedule. Some patients can reduce pressure by repositioning themselves using manual aids such as trapeze bar. Position of the patient should be changed as scheduled when the patient is in bed.

Repositioning in a bed or wheelchair

### **Frequency**

Repositioning should occur every 2 hours. Position should be changed every 1-2 hours to keep the pressure off any one spot. <sup>[19]</sup> According to recommendations from the Agency for Health Care Policy and Research, patients who are bedridden should be repositioned every 2 hours. <sup>[20]</sup> Patient should shift his weight in his wheelchair every 15-20 minutes and if with assistance changes in position is every hour.

### **Repositioning devices**

People with enough upper body strength may be able to reposition themselves with the assistance of a device such as a trapeze bar. Using bed linens to help lift and reposition a person can reduce friction and shearing. In moving the patient, nurses should lift the patient or use a draw sheet (a special sheet used for this purpose) to move him. Sheets and clothing should be dry and smooth, with no wrinkles. If patient is on wheelchair, he should be encouraged to can do wheelchair push-ups. Pressure-release wheelchairs, which tilt to redistribute pressure, should be provided.

### **Special mattresses and support surfaces**

Special cushions, foam mattress pads, air-filled mattresses and water-filled mattresses can help a person lie in an appropriate position in bed or chair, relieve pressure and protect vulnerable areas from damage. The fitting of patient to wheel chair should be checked once or twice a year. If the patient gains weight, the doctor or physical therapist should review size of wheelchair. Patient must sit on a foam or gel seat cushion that fits his wheelchair. Patient **should not** sit on donut-shaped cushions. A physical therapist can advise on the appropriate placement of cushions and their role in regular repositioning.

### **Bed elevation**

Hospital beds that can be elevated at the head should be raised no more than 30 degrees angle to prevent shearing. Being flatter keeps the body from sliding down. Sliding may harm the skin. To minimize shear, the head of the bed should not be elevated more than 30 degrees and should be maintained at the lowest degree of elevation needed to prevent other medical complications, such as aspiration and worsening congestive heart failure symptoms.<sup>[21]</sup>

### **Protecting bony areas**

Bony areas can be protected with proper positioning and cushioning. Rather than lying directly on a hip, it's best to lie at an angle with cushions supporting the back or front. Cushions should also be used to relieve pressure against and between the knees and ankles. Heels can be cushioned or "floated" with cushions below the calves. Patient should **never** be dragged to change his position or get him in or out of bed. Dragging will cause skin breakdown. The health care provider should get help if there is need in moving him on the bed or getting in or out of bed. For patients who are at very high risk: Implement a full range of pressure reduction strategies, in addition to repositioning. The strategies one implements should be based on level of risk and available resources.

The **sixth line of action** is ensuring that the patient is **adequately nourished**. Adequate nutrition is a cornerstone, not only for healing ulcers, but for preventing them as well. As part of a programme of pressure ulcer prevention ongoing nutritional assessments need to be done to ensure the patient is receiving enough nutrition in the form of calories, protein, hydration and vitamins and minerals. If a patient is unable to consume enough nutrients through regular meals and snacks, other methods must be considered, such as supplementation or Enteral support. A nutritional consult is recommended for any patient who has ANY difficulty consuming adequate nutrition. Although poor nutrition is associated with pressure ulcers, a causal relationship has not been established. One large trial has shown that oral nutritional supplementation reduces risk, but several other trials have not.<sup>[22]</sup>

- **Diet:** He may need to increase the amount of calories, protein, vitamins and minerals in his diet. The doctor may also prescribe dietary supplements, such as vitamin C and zinc
- **Fluids:** Adequate hydration is important for maintaining healthy skin. The care team can advise on how much fluid to drink and signs of poor hydration, such as decreased urine output, darker urine, dry or sticky mouth, thirst, dry skin, or constipation
- **Feeding assistance:** Some patients with limited mobility or significant weakness may need assistance with eating in order to get adequate nutrition.
- **Seventh action** focuses on **education**. Everyone should continue to learn about pressure ulcer prevention. Education is ongoing, and the more caregivers know about how to prevent pressure ulcers, as well as how to implement what they have learnt, the more successful they would be at preventing pressure ulcers. Educate patients, caregivers and families about the patient's ability to perceive ischemic pain as a response to pressure. It is important that patients, caregivers and family members understand that the human body has a built-in method to raise the alarm, through pain. In some people anyway, this alarm method may not work properly or at all due to their level of orientation. These categories of patients are at high risk for the development of pressure ulcers.

The **eight line of management** is **effective communication** must be instituted. To reduce the rates of pressure ulcers for the patients under your care, it is important that you communicate regularly with the other members of the care team. This includes patients and their families, your colleagues, including all staff, and your management team. Reduced rates of pressure ulcers can only occur with a full-on culture change in the facility, not through isolated activities, or changes in one area, or modifications by one group of people. It cannot work effectively if everyone does not get involved and support the process.

#### **Lastly is treatment of the sore**

Despite proper risk assessment and preventive interventions, some pressure ulcers are unavoidable. The doctors should note the number, location, and size (length, width, and depth) of ulcers and assess for the presence of exudate, odor, sinus tracts, necrosis or eschar formation, tunneling, undermining infection, healing (granulation and epithelialization), and wound margins and report to the physician. Most importantly, the physician should determine the stage of each ulcer. Assessment of an established pressure ulcer involves a complete medical evaluation of the patient. A comprehensive history includes the onset and duration of ulcers, previous wound care, risk factors, and a list of health problems and medications. Other factors such as psychological health, behavioral and cognitive status, social and financial resources, and access to caregivers are critical in the initial assessment and may influence treatment plans. The presence of a pressure ulcer may indicate that the patient does not have access to adequate services or support. The patient may need more intensive support services, or care-givers may need more training, respite, or assistance with lifting and turning the patient. Patients with communication or sensory disorders are particularly vulnerable to pressure ulcers because they may not feel discomfort or may express discomfort in atypical ways.

Collaborative care should be encouraged. The management of pressure ulcers is interdisciplinary, including primary care physicians, dermatologists, infectious disease consultants, social workers, psychologists, dietitians, podiatrists, home and wound-care nurses, rehabilitation professionals, and surgeons. The basic components of pressure ulcer management are reducing or relieving pressure on the skin, debriding necrotic tissue, cleansing the wound, managing bacterial load and colonization, and selecting a wound dressing. Pressure ulcers are invariably colonized with bacteria; however, wound cleansing and debridement minimize bacterial load. A trial of topical antibiotics, such as silver sulfadiazine cream (Silverex), should be used for up to 2 weeks for clean ulcers that are not healing properly after 2 to 4 weeks of optimal wound care. Quantitative bacteria tissue cultures should be performed for non-healing ulcers after a trial of topical antibiotics or if there are signs of infection (e.g., increased drainage, odor, surrounding erythema, pain, warmth). A superficial swab specimen may be used; however, a needle aspiration or ulcer biopsy (preferred) is more clinically significant. Systemic antibiotics are not recommended unless there is evidence of advancing cellulitis, osteomyelitis, and bacteremia.

#### **Complications of pressure ulcer**

Although noninfectious complications of pressure ulcers occur, systemic infections are the most prevalent. Noninfectious complications include amyloidosis, heterotopic bone formation, perinealurethral fistula, pseudoaneurysm, Marjolin ulcer, and systemic complications of topical treatment. Infectious complications include bacteremia and sepsis, cellulitis, endocarditis, meningitis, osteomyelitis, septic arthritis, and sinus tracts or abscesses. Osteomyelitis has been reported in 17% to 32% of infected ulcers and may lead to nonhealing ulcers with or without systemic manifestations.<sup>[23]</sup> Plain radiographs and bone scans are often unreliable. Magnetic resonance imaging has 98% sensitivity and 89% specificity for osteomyelitis in patients with pressure ulcers.<sup>[24]</sup> However, needle biopsy of the bone (via orthopedic consultation) is recommended and can guide antibiotic therapy. Bacteremia may occur with or without osteomyelitis, causing unexplained fever, tachycardia, hypotension, or altered mental status. Overall mortality is high with both conditions, and empirical antibiotics pending culture results should cover methicillin-resistant *Staphylococcus aureus*, anaerobes, enterococci, and gram-negative organisms, such as *Pseudomonas*, *Proteus*, and *Providencia* species. Rates of surgical complications and recurrence rates are high. Complication rates have been reported at 7-49%.<sup>[25]</sup> Osteomyelitis has been cited as the major cause of breakdown after surgery and a bone biopsy is recommended to diagnose osteomyelitis in stage IV.<sup>[1]</sup>

#### **Innovative technology in prevention of pressure ulcer**

According to Nashville<sup>[26]</sup> and Bartex,<sup>[27]</sup> WellSense a company in United States of America gives control in preventing pressure sores by **Unveiling First-Ever Bedside Patient Pressure Mapping System Designed to Assist Caregivers in Effectively Repositioning Patients**. By positioning a "smart" M.A.P. System (an acronym for Monitor, Alert and Protect) coverlet with built-in pressure sensors over a patient or resident sleep surface, the M.A.P. identifies areas of pressure and produces a color-coded, live image on an easy-to-read bedside monitor. The System also monitors the buildup of pressure over time at preset intervals; it also alerts the caregivers when a periodic repositioning is due. Future planned advances in M.A.P. technology could include

sheer alerts, moisture and temperature sensing as well as other adaptations for different seating surfaces and bed-fall early warning. Today, most bed-fall systems only alert once someone has already exited the bed. Similar to the "engine overheat" red light in older cars, once it goes off the event has already taken place. Apart from M.A.P there are other key innovations in the USA and Canada<sup>[28],[29]</sup> which include:

- Recognition that patients with chronic illness often develop pressure ulcers as a secondary complication and the need for better management of chronic illness
- Adoption of the Chronic Care Model in Canada: A national paradigm shift in health care from a system that is reactive to illness, to one that is proactive in supporting wellness or keeping people as healthy as possible
- Recognition of the need to target education programmes at community nursing assistants who have the potential to impact on patient's lifestyles
- Recognition that pressure ulcer prevention programmes must focus on the early detection both of pressure ulcers and of the factors that lead to their development
- Recognition that patients experiencing any of the following are at an increased risk: Recent weight loss, high immobility, recent bowel or urinary incontinence, taking more than eight medications
- Introduction of the Pressure Ulcer Awareness and Prevention (PUAP) Programme. This activity consisted of a national sustained campaign to raise awareness of the need to prevent pressure ulcers
- M.A.P
- Development of a new bedside tool (interRAI PURS)<sup>[29],[30]</sup> for healthcare facilities using a Minimum Data Set (MDS), which predicts the risk of developing pressure ulcers and is useful in targeting clinical resources for prevention and monitoring activities.

## II. Recommendation

Residents should put best practice activities into place for each patient based on their risk as identified by the Braden Scale. This is because of the evidence-based benefits of guidelines implementation.

## III. Conclusions

Most pressure ulcers can be prevented. Bedsores are easier to prevent than to treat. By following some simple steps that are based on best practice, the health professional can team up with the patient and other caregivers to create an environment where pressure ulcers are reduced or eliminated. What's needed is awareness on the part of patients and healthcare professionals about how pressure ulcers can be prevented and a commitment to the actions required to do so. Position changes are a key to pressure ulcer prevention. These changes need to be frequent, repositioning needs to avoid stress on the skin, and body positions need to minimize the risk of pressure on vulnerable areas. Other strategies include skin care, regular skin inspections and good nutrition. Pressure ulcer prevention is an often overlooked aspect of health care. The provision of prevention programmes is essential.

Whatever technology that may be in place, the key concept needed to revolutionize pressure ulcer care throughout the world is an old one: The recognition that **prevention is better than cure** and thus the promotion of prevention strategies by all health workers is essential. As far back as 1894 Florence Nightingale wrote about the benefit of supporting preventionbased practice. This often overlooked aspect of health care must be taken seriously as the world enters an era of chronic disease management that will end in a financial crisis if prevention programmes are not implemented.

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