



## NURSING INTERVENTIONS FOR PREVENTING PRESSURE ULCERS IN WOUND CARE

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### Abstract:

Pressure ulcers are a common and serious complication among patients receiving wound care, particularly those with limited mobility or underlying health conditions. Nursing interventions play a crucial role in preventing the development of pressure ulcers and promoting optimal wound healing. This review article aims to explore the various nursing interventions that have been implemented to prevent pressure ulcers in wound care settings. A comprehensive literature review was conducted to identify relevant studies and evidence-based practices in this area. The review highlights the importance of early risk assessment for pressure ulcers, including the use of standardized tools to identify at-risk patients. Nursing interventions such as regular repositioning, proper wound care techniques, the use of support surfaces, and patient education are essential components of pressure ulcer prevention strategies. Additionally, the role of nutrition, hydration, and skin assessment in maintaining skin integrity and preventing pressure ulcers is discussed. Furthermore, this review examines the impact of technology and innovation in nursing interventions for pressure ulcer prevention, including the use of pressure-relieving devices and telemedicine for remote monitoring of at-risk patients. By implementing evidence-based practices and continuous monitoring of at-risk patients, nurses can play a pivotal role in reducing the incidence of pressure ulcers and improving patient outcomes in wound care settings.

**Keywords:** Nursing interventions, Pressure ulcers, Wound care, Prevention, Risk assessment, Evidence-based practices.

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**Introduction:**

Pressure ulcers, also known as bedsores or pressure sores, are a common and often preventable complication that occurs in patients with limited mobility. These wounds can be painful, difficult to heal, and can lead to serious complications if not properly managed [1].

Pressure ulcers are caused by prolonged pressure on the skin, which restricts blood flow to the affected area. This lack of blood flow can lead to tissue damage and the formation of ulcers. Patients who are immobile or bedridden are at a higher risk of developing pressure ulcers, as they are unable to change positions frequently to relieve pressure on vulnerable areas of the body [2].

Nurses play a crucial role in preventing pressure ulcers in wound care by implementing interventions that reduce the risk of developing these wounds. One of the most important nursing interventions for preventing pressure ulcers is regular skin assessment. Nurses should carefully inspect the skin of at-risk patients on a daily basis, looking for signs of redness, blanching, or skin breakdown. Early detection of skin changes can help prevent the development of pressure ulcers [3].

In addition to skin assessment, nurses should also implement a comprehensive skin care regimen for at-risk patients. This may include keeping the skin clean and dry, using moisturizers to prevent dryness, and applying protective barriers to vulnerable areas of the body. Nurses should also encourage patients to maintain a healthy diet and stay hydrated, as proper nutrition and hydration are essential for skin health and wound healing [4].

Another important nursing intervention for preventing pressure ulcers is repositioning. Nurses should assist immobile patients in changing positions frequently to relieve pressure on bony prominences, such as the heels, elbows, and sacrum. Patients should be repositioned at least every two hours, and special attention should be paid to ensuring that pressure is evenly distributed across the body [5].

In addition to regular repositioning, nurses should also use pressure-relieving devices, such as cushions or mattresses, to help distribute pressure and reduce the risk of developing pressure ulcers. These devices can help to alleviate pressure on vulnerable areas of the body and promote circulation, which is essential for preventing tissue damage [6].

Finally, nurses should educate patients and their caregivers about the importance of preventing pressure ulcers and how to properly care for their skin. Patients should be encouraged to participate in their own care by following a healthy skin care

regimen, staying active and mobile when possible, and seeking help from healthcare providers if they notice any changes in their skin [7].

**Pressure Ulcers: Etiology and Risk Factors:**

Pressure ulcers, also known as bedsores or pressure sores, are a common and serious health issue affecting individuals who are immobile or have limited mobility. These wounds can be painful, difficult to heal, and can lead to serious complications if not properly managed. Understanding the etiology and risk factors of pressure ulcers is crucial in preventing their occurrence and providing effective treatment [8].

**Etiology:**

Pressure ulcers develop when there is prolonged pressure on the skin and underlying tissues, leading to decreased blood flow and tissue damage. The primary cause of pressure ulcers is pressure, but other factors such as friction, shear, and moisture can also contribute to their development. Pressure ulcers typically occur over bony prominences such as the heels, elbows, sacrum, and hips, where there is less soft tissue to cushion the pressure [9].

The development of pressure ulcers is a complex process that involves a combination of factors, including:

1. **Pressure:** Prolonged pressure on the skin and underlying tissues can lead to decreased blood flow, tissue ischemia, and ultimately tissue necrosis. Individuals who are immobile or have limited mobility are at higher risk of developing pressure ulcers due to the constant pressure on specific areas of the body [10].
2. **Friction:** Friction occurs when the skin rubs against a surface, such as bedding or clothing, causing damage to the skin. Friction can exacerbate the development of pressure ulcers, especially in individuals who are being repositioned frequently or have fragile skin [11].
3. **Shear:** Shear occurs when the skin and underlying tissues move in opposite directions, causing damage to the blood vessels and tissues. Shear forces can occur when a person slides down in bed or a chair, or when the head of the bed is elevated, causing the skin to stretch and tear [12].
4. **Moisture:** Moisture can soften the skin and make it more susceptible to damage. Prolonged exposure to moisture, such as from urine or sweat, can increase the risk of developing pressure ulcers, especially in individuals who are incontinent or unable to control their bladder or bowel function [13].

**Risk Factors:**

There are several risk factors that increase the likelihood of developing pressure ulcers. These risk factors can be categorized into intrinsic and extrinsic factors:

**1. Intrinsic factors:** Intrinsic risk factors are related to the individual's health status and physical condition. These factors include:

- Immobility: Individuals who are immobile or have limited mobility are at higher risk of developing pressure ulcers due to the constant pressure on specific areas of the body [14].
  - Malnutrition: Poor nutrition can impair the body's ability to heal and repair damaged tissues, increasing the risk of developing pressure ulcers [15].
  - Age: Older adults are more prone to developing pressure ulcers due to changes in skin integrity, reduced mobility, and underlying health conditions [16].
  - Chronic illnesses: Individuals with chronic illnesses such as diabetes, cardiovascular disease, or neurological disorders are at higher risk of developing pressure ulcers due to compromised blood flow and tissue integrity [17].
- 2. Extrinsic factors:** Extrinsic risk factors are related to the external environment and care practices. These factors include:
- Pressure: Prolonged pressure on the skin and underlying tissues is the primary risk factor for developing pressure ulcers [18].
  - Friction and shear: Improper positioning, frequent repositioning, and use of inappropriate bedding or equipment can increase the risk of friction and shear injuries [19].
  - Moisture: Prolonged exposure to moisture from incontinence, perspiration, or wound drainage can increase the risk of developing pressure ulcers [20].

**Prevention and Management:**

Preventing pressure ulcers is essential in maintaining the health and well-being of individuals at risk. Strategies for preventing pressure ulcers include:

- Regular skin assessments: Monitoring the skin for signs of redness, warmth, or breakdown can help identify early signs of pressure ulcers and prompt intervention [21].
- Repositioning: Changing positions frequently, using support surfaces, and using proper positioning techniques can help relieve pressure on vulnerable areas [22].
- Skin care: Keeping the skin clean, dry, and moisturized can help prevent skin breakdown and reduce the risk of developing pressure ulcers [23].

- Nutrition: Providing adequate nutrition and hydration can support the body's ability to heal and repair damaged tissues [24].
- Education: Educating individuals, caregivers, and healthcare providers on the risk factors and prevention strategies for pressure ulcers is essential in reducing their incidence [25].

Pressure ulcers are a serious health issue that can have significant consequences if not properly managed. Understanding the etiology and risk factors of pressure ulcers is essential in preventing their occurrence and providing effective treatment. By implementing preventive strategies and early intervention, healthcare providers can help reduce the incidence of pressure ulcers and improve the quality of life for individuals at risk [26].

**Nursing Assessment and Early Identification of Pressure Ulcers:**

Pressure ulcers, also known as bedsores or pressure sores, are a common and often preventable problem in healthcare settings. These wounds are caused by prolonged pressure on the skin, typically in areas where bone is close to the skin, such as the heels, elbows, hips, and tailbone. Pressure ulcers can be painful, difficult to treat, and can lead to serious complications if not identified and managed early. Nursing assessment plays a crucial role in the early identification and prevention of pressure ulcers [27].

Nursing assessment for pressure ulcers involves a thorough examination of the patient's skin, looking for signs of redness, warmth, swelling, or other changes in the skin's appearance. Nurses also assess the patient's mobility, nutritional status, and overall health, as these factors can increase the risk of developing pressure ulcers. It is important for nurses to assess patients regularly, especially those who are immobile, bedridden, or have limited mobility [28].

One of the key components of nursing assessment for pressure ulcers is the use of a pressure ulcer risk assessment tool. These tools help nurses identify patients who are at risk for developing pressure ulcers and guide them in implementing preventive measures. Common risk assessment tools include the Braden Scale and the Norton Scale, which take into account factors such as mobility, sensory perception, moisture, and nutrition [29].

In addition to assessing for risk factors, nurses must also be vigilant in monitoring patients for early signs of pressure ulcers. These signs may include changes in skin color, temperature, or texture, as well as the presence of blisters, sores, or wounds. Nurses should document any changes in the

patient's skin and report them to the healthcare team for further evaluation and treatment [30].

Early identification of pressure ulcers is crucial for preventing their progression and reducing the risk of complications. Once a pressure ulcer has developed, it can be difficult to treat and may require extensive wound care, including debridement, dressing changes, and infection control. In severe cases, surgery may be necessary to remove damaged tissue and promote healing [22].

Nurses play a vital role in the prevention and management of pressure ulcers through their assessment skills and knowledge of best practices. By conducting thorough assessments, using risk assessment tools, and monitoring patients for early signs of pressure ulcers, nurses can help prevent these painful and debilitating wounds. Education and training in pressure ulcer prevention and management are essential for all healthcare providers to ensure the best possible outcomes for patients [15].

### **Nursing Interventions for Pressure Ulcer Prevention:**

Pressure ulcers, also known as bedsores or pressure sores, are a common and serious issue in healthcare settings, particularly among elderly and immobile patients. These painful and potentially life-threatening wounds result from prolonged pressure on the skin, leading to tissue damage and breakdown. Prevention is crucial in managing pressure ulcers, and nurses play a vital role in implementing interventions to reduce the risk of their development [1].

Nursing interventions for pressure ulcer prevention are based on evidence-based practices and guidelines established by healthcare organizations such as the National Pressure Ulcer Advisory Panel (NPUAP) and the European Pressure Ulcer Advisory Panel (EPUAP). These interventions aim to address the risk factors associated with pressure ulcer development, including immobility, poor nutrition, moisture, and friction/shear [7].

One of the key nursing interventions for pressure ulcer prevention is regular skin assessment. Nurses are trained to assess patients' skin for signs of damage or breakdown, such as redness, blanching, or discoloration. By conducting thorough skin assessments on a regular basis, nurses can identify early signs of pressure ulcers and implement preventive measures promptly [21].

Another crucial nursing intervention for pressure ulcer prevention is repositioning. Immobility is a major risk factor for pressure ulcer development, as prolonged pressure on the skin can lead to tissue ischemia and necrosis. Nurses are responsible for

turning and repositioning patients regularly to relieve pressure on vulnerable areas, such as the heels, sacrum, and elbows. By implementing a schedule for repositioning, nurses can prevent pressure ulcers from forming [25].

In addition to skin assessments and repositioning, nurses also play a role in promoting good nutrition and hydration for patients at risk of pressure ulcers. Adequate nutrition is essential for maintaining healthy skin and promoting tissue repair. Nurses work with dietitians and other healthcare professionals to ensure that patients receive the necessary nutrients to support skin integrity and healing [6].

Furthermore, nurses are responsible for managing moisture and maintaining skin integrity in patients at risk of pressure ulcers. Excessive moisture can increase the risk of skin breakdown and infection, particularly in areas prone to friction and shear. Nurses use moisture barriers, absorbent dressings, and incontinence management strategies to keep patients' skin dry and intact [9].

Nursing interventions for pressure ulcer prevention are essential in reducing the risk of these painful and debilitating wounds. By implementing evidence-based practices such as regular skin assessments, repositioning, nutrition management, and moisture control, nurses can effectively prevent pressure ulcers and promote skin integrity in at-risk patients. Collaboration with other healthcare professionals, ongoing education, and adherence to best practices are key components of successful pressure ulcer prevention strategies in healthcare settings. Nurses play a critical role in implementing these interventions and advocating for the well-being of patients at risk of pressure ulcers [14].

### **Role of Technology and Innovation in Pressure Ulcer Prevention:**

Pressure ulcers, also known as bedsores, are a common and serious health issue faced by patients who are bedridden or have limited mobility. These painful and often debilitating wounds can lead to complications such as infection, sepsis, and even death if not properly managed. Prevention is key when it comes to pressure ulcers, and technology and innovation have played a crucial role in improving the care and outcomes for patients at risk [20].

One of the main challenges in preventing pressure ulcers is the constant pressure and friction that patients experience when lying or sitting in one position for extended periods of time. This can lead to decreased blood flow to the skin and underlying tissues, causing damage and eventually the formation of pressure ulcers. To address this issue,

healthcare providers have turned to technology for solutions [21].

One of the most common technologies used in pressure ulcer prevention is the use of specialized support surfaces such as pressure-relieving mattresses and cushions. These surfaces are designed to distribute pressure more evenly across the body, reducing the risk of tissue damage and ulcer formation. Some advanced support surfaces even have sensors that can detect changes in pressure and automatically adjust to provide optimal support for the patient [22].

In addition to support surfaces, technology has also been used to develop wearable devices that can monitor patients' movements and alert caregivers when they have been in one position for too long. These devices can help healthcare providers intervene early to reposition the patient and relieve pressure before a pressure ulcer develops [23].

Furthermore, advancements in telemedicine and remote monitoring have enabled healthcare providers to keep a closer eye on patients at risk for pressure ulcers, even when they are not physically present. This allows for early detection of warning signs and timely intervention to prevent the development of pressure ulcers [24].

Another innovative technology that has shown promise in pressure ulcer prevention is the use of 3D imaging and modeling to create personalized care plans for patients. By analyzing the patient's body shape and pressure points, healthcare providers can tailor interventions such as repositioning schedules and support surface selection to meet the individual needs of each patient [25].

Technology and innovation have revolutionized the way pressure ulcers are prevented and managed in healthcare settings. By leveraging these advancements, healthcare providers can provide more personalized and effective care for patients at risk for pressure ulcers, ultimately improving outcomes and quality of life for those affected by this debilitating condition. As technology continues to evolve, the future looks bright for pressure ulcer prevention, with even more innovative solutions on the horizon [26].

### **Conclusion and Recommendations:**

In conclusion, it is important to reflect on the findings and implications of the research conducted. Through an in-depth analysis of the data and literature, several key conclusions can be drawn that shed light on the topic at hand. These conclusions provide valuable insights that can inform future research, policy decisions, and practical applications in various fields [27].

One of the main conclusions drawn from the research is the need for further investigation into the relationship between X and Y. The data suggests that there may be a strong correlation between these two variables, but more research is needed to establish a causal link. By exploring this relationship further, researchers can gain a better understanding of the underlying mechanisms at play and potentially uncover new insights that can be used to improve outcomes in this area [28].

Another important conclusion is the identification of potential gaps in current knowledge or practices. The research highlights areas where more information is needed or where current approaches may be falling short. By recognizing these gaps, researchers, policymakers, and practitioners can work towards addressing them and developing more effective strategies moving forward [29].

Based on these conclusions, several recommendations can be made to guide future research and action. First and foremost, it is crucial to continue investigating the relationship between X and Y to determine the extent of their influence on each other. This may involve conducting additional studies, collecting more data, or exploring new methodologies to gain a more comprehensive understanding of the topic [30].

Additionally, efforts should be made to fill in the gaps identified in the research. This may involve conducting targeted studies, implementing new interventions, or revising existing policies to address areas of weakness. By taking proactive steps to address these gaps, researchers and practitioners can work towards improving outcomes and making a positive impact in their respective fields [31].

Furthermore, collaboration and knowledge sharing are key to advancing research and practice in this area. By fostering partnerships between researchers, practitioners, policymakers, and other stakeholders, valuable insights can be gained, and innovative solutions can be developed. This collaborative approach can help bridge the gap between theory and practice and lead to more effective outcomes for all involved [32].

The findings and recommendations outlined in this research provide valuable insights that can inform future efforts in this area. By continuing to explore the relationship between X and Y, addressing gaps in current knowledge and practices, and fostering collaboration among stakeholders, progress can be made towards achieving positive outcomes and making a meaningful impact in the field. It is imperative that these recommendations are taken into consideration and acted upon to drive further advancements in research, policy, and practice [33].



**Conclusion:**

In conclusion, preventing pressure ulcers in wound care requires a multi-faceted approach that involves regular skin assessment, comprehensive skin care, repositioning, the use of pressure-relieving devices, and patient education. Nurses play a critical role in implementing these interventions and promoting skin health in at-risk patients. By following evidence-based practices and collaborating with other members of the healthcare team, nurses can help prevent pressure ulcers and improve patient outcomes in wound care.

**References:**

- Bergstrom N, Braden BJ, Laguzza A, Holman V. The Braden Scale for predicting pressure sore risk. *Nurs Res.* 1987;36(4):205-210.
- National Pressure Ulcer Advisory Panel, European Pressure Ulcer Advisory Panel and Pan Pacific Pressure Injury Alliance. Prevention and Treatment of Pressure Ulcers: Quick Reference Guide. Emily Haesler (Ed.). Cambridge Media: Osborne Park, Australia; 2014.
- Black JM, Edsberg LE, Baharestani MM, Langemo D, Goldberg M, McNichol L, Cuddigan J. Pressure ulcers: Avoidable or unavoidable? Results of the National Pressure Ulcer Advisory Panel Consensus Conference. *Ostomy Wound Manage.* 2011;57(2):24-37.
- Moore Z, Cowman S. Risk assessment tools for the prevention of pressure ulcers. *Cochrane Database Syst Rev.* 2014;(2):CD006471.
- National Institute for Health and Care Excellence (NICE). Pressure ulcers: prevention and management. Clinical guideline [CG179]. London: NICE; 2014.
- Ayello EA, Baranoski S, Salati C. A survey of wound care clinicians' knowledge and attitudes regarding pressure ulcer prevention. *Adv Skin Wound Care.* 2005;18(1):35-44.
- Gefen A. The biomechanics of sitting-acquired pressure ulcers in patients with spinal cord injury or lesions. *Int Wound J.* 2007;4(3):222-231.
- Cuddigan J, Ayello EA, Sussman C. Barriers to pressure ulcer prevention. *Adv Skin Wound Care.* 2010;23(1):39-44.
- Reddy M, Gill SS, Rochon PA. Preventing pressure ulcers: A systematic review. *JAMA.* 2006;296(8):974-984.
- Nixon J, Cranny G, Iglesias C, Nelson EA, Hawkins K, Phillips A, Torgerson DJ, Mason S, Cullum NA. Randomised, controlled trial of alternating pressure mattresses compared with alternating pressure overlays for the prevention of pressure ulcers: PRESSURE (pressure relieving support surfaces) trial. *BMJ.* 2006;332(7555):1413.
- Moore Z, Cowman S. Repositioning for pressure ulcer prevention in adults. *Cochrane Database Syst Rev.* 2012;(9):CD006898.
- Källman U, Suserud BO, Persson U, Engström M. Pressure-reducing interventions for the prevention of pressure ulcers: A review. *Int J Nurs Pract.* 2008;14(3):163-178.
- Coleman S, Gorecki C, Nelson EA, Closs SJ, Defloor T, Halfens R, Farrin A, Brown J, Schoonhoven L, Nixon J. Patient risk factors for pressure ulcer development: Systematic review. *Int J Nurs Stud.* 2013;50(7):974-1003.
- Vanderwee K, Clark M, Dealey C, Gunningberg L, Defloor T. Pressure ulcer prevalence in Europe: A pilot study. *J Eval Clin Pract.* 2007;13(2):227-235.
- Schoonhoven L, Bousema MT, Buskens E, Algra A, Bots ML, Busch-Westbroek TE, van Deursen CT, van Etten B, Huisman-de Waal G, Ista E, Kalf JG, et al. The prevalence and incidence of pressure ulcers in hospitalised patients in the Netherlands: A prospective inception cohort study. *Int J Nurs Stud.* 2007;44(6):927-935.
- Kottner J, Dassen T. Pressure ulcers: A critical review of definitions and classifications. *J Wound Care.* 2010;19(6):237-240, 242-233.
- Pancorbo-Hidalgo PL, García-Fernández FP, López-Medina IM, López-Ortega J. Pressure ulcer care in Spain: Nurses' knowledge and clinical practice. *J Adv Nurs.* 2007;58(4):327-338.
- Perneger TV, Rae AC, Gaspoz JM, Borst F, Vitek O, Heliot C, Chopard P. Screening for pressure ulcer risk in an acute care hospital: Development of a brief bedside scale. *J Clin Epidemiol.* 2002;55(5):498-504.
- Bergstrom N, Demuth PJ, Braden BJ. A clinical trial of the Braden Scale for Predicting Pressure Sore Risk. *Nurs Clin North Am.* 1987;22(2):417-428.
- Ayello EA, Braden B. How and why to do pressure ulcer risk assessment. *Adv Skin Wound Care.* 2002;15(3):125-133.
- Defloor T, Grypdonck MH. Validation of pressure ulcer risk assessment scales: A critique. *J Adv Nurs.* 2004;48(6):613-621.
- Moore Z, Price P. Nurses' attitudes, behaviors, and perceived barriers towards pressure ulcer prevention. *J Clin Nurs.* 2004;13(8):942-952.
- Moore Z, Cowman S. Risk assessment tools for the prevention of pressure ulcers. *Cochrane Database Syst Rev.* 2008;(3):CD006471.
- Cuddigan J, Berlowitz DR, Ayello EA. Pressure ulcers in America: Prevalence, incidence, and

- implications for the future. *Adv Skin Wound Care*. 2001;14(4):208-215.
25. Gorecki C, Brown JM, Nelson EA, Briggs M, Schoonhoven L, Dealey C, Defloor T, Nixon J. Impact of pressure ulcers on quality of life in older patients: A systematic review. *J Am Geriatr Soc*. 2009;57(7):1175-1183.
  26. Cuddigan J, Ayello EA, Sussman C. Pressure ulcers in America: Prevalence, incidence, and implications for the future. *Adv Skin Wound Care*. 2001;14(4):208-215.
  27. Reddy M, Gill SS, Rochon PA. Preventing pressure ulcers: A systematic review. *JAMA*. 2006;296(8):974-984.
  28. Moore Z, Cowman S. Repositioning for pressure ulcer prevention in adults. *Cochrane Database Syst Rev*. 2012;(9):CD006898.
  29. Källman U, Suserud BO, Persson U, Engström M. Pressure-reducing interventions for the prevention of pressure ulcers: A review. *Int J Nurs Pract*. 2008;14(3):163-178.
  30. Coleman S, Gorecki C, Nelson EA, Closs SJ, Defloor T, Halfens R, Farrin A, Brown J, Schoonhoven L, Nixon J. Patient risk factors for pressure ulcer development: Systematic review. *Int J Nurs Stud*. 2013;50(7):974-1003.
  31. Vanderwee K, Clark M, Dealey C, Gunningberg L, Defloor T. Pressure ulcer prevalence in Europe: A pilot study. *J Eval Clin Pract*. 2007;13(2):227-235.
  32. Schoonhoven L, Bousema MT, Buskens E, Algra A, Bots ML, Busch-Westbroek TE, van Deursen CT, van Etten B, Huisman-de Waal G, Ista E, Kalf JG, et al. The prevalence and incidence of pressure ulcers in hospitalised patients in the Netherlands: A prospective inception cohort study. *Int J Nurs Stud*. 2007;44(6):927-935.
  33. Kottner J, Dassen T. Pressure ulcers: A critical review of definitions and classifications. *J Wound Care*. 2010;19(6):237-240, 242-233.