

The Role of Physiotherapy, Nursing, and Nutrition in Managing Pressure Ulcers in Bedridden Patients: A Multidisciplinary Care Model in a Tertiary Hospital Setting

Hani M. Alenezi¹, Hedaiah F. Alotaibi², Fatmah T. Alrabodh³,
Norah Y. Alsulaiman⁴, Qamra S. Alsolmi⁵, Barrak A. Alawad⁶

Health Affairs at the Ministry of National Guard

Abstract

This study explores the effectiveness of a multidisciplinary care model involving physiotherapists, nurses, and dietitians in preventing and managing pressure ulcers in bedridden patients in a tertiary hospital. A mixed-methods approach was used to assess quantitative outcomes, such as the prevalence and severity of pressure ulcers, and qualitative insights from healthcare professionals and patients. The results showed a significant reduction in pressure ulcer prevalence, faster healing times, and improved patient satisfaction. Interdisciplinary communication and personalized care plans were key contributors to these positive outcomes, although challenges related to resource constraints were noted. The findings emphasize the importance of collaborative, patient-centered care in pressure ulcer management.

Keywords: Multidisciplinary care, pressure ulcers, physiotherapy, nursing, nutrition, bedridden patients, patient outcomes, tertiary hospital

Introduction

Pressure ulcers, also known as bedsores, are a significant health concern among bedridden patients, particularly in hospital settings. These ulcers are caused by prolonged pressure on the skin, often in areas over bony prominences, and can lead to severe complications, including infections, delayed healing, and increased hospital stays (Lyder, 2003). Bedridden patients, especially those with limited mobility or chronic health conditions, are at a heightened risk of developing pressure ulcers. This presents a challenge for healthcare professionals tasked with managing and preventing these conditions.

The prevention and management of pressure ulcers require a comprehensive approach that involves various healthcare disciplines. Physiotherapists play a crucial role in promoting mobility, repositioning patients to relieve pressure, and providing exercises that maintain skin integrity and circulation (Jaul, 2010). Nurses are responsible for skin assessments, hygiene management, and frequent repositioning, ensuring that the skin is protected from the constant pressure that leads to ulcers (Moore & Cowman, 2015). Additionally, clinical dietitians contribute by ensuring patients receive adequate nutrition, which is essential for maintaining healthy skin and promoting wound healing. Nutritional deficiencies, particularly in protein and essential vitamins, have been linked to a higher risk of pressure ulcers and delayed recovery (Dorner et al., 2009).

Given the complex nature of pressure ulcer prevention and management, a multidisciplinary approach is crucial. Collaboration between physiotherapists, nurses, and dietitians offers a holistic care model that addresses not only the physical aspects of mobility and skin care but also the nutritional needs that support healing. This study aims to explore the role of physiotherapy, nursing, and nutrition in managing pressure ulcers in bedridden patients in a tertiary hospital setting, highlighting the effectiveness of a multidisciplinary care model in improving patient outcomes.

Literature Review

1. Prevalence and Impact of Pressure Ulcers in Bedridden Patients

Pressure ulcers, also known as decubitus ulcers or bedsores, are localized injuries to the skin and underlying tissue, primarily caused by prolonged pressure on the skin over bony areas (Lyder, 2003). These ulcers are prevalent among bedridden patients, particularly those with limited mobility or chronic illnesses. Studies have shown that the incidence of pressure ulcers ranges from 5% to 23% in hospitalized patients, depending on their condition and level of care (Jaul, 2010). Pressure ulcers not only increase the risk of infections and other complications but also lead to extended hospital stays, increased healthcare costs, and a significant decline in patients' quality of life. Preventing and managing pressure ulcers is a multidisciplinary challenge that requires a comprehensive and coordinated approach.

2. Physiotherapy Interventions in Pressure Ulcer Management

Physiotherapists play a critical role in preventing pressure ulcers by enhancing patient mobility and reducing the duration of immobility. Regular repositioning of bedridden patients is essential to relieve pressure on vulnerable areas, and physiotherapists are instrumental in designing and implementing repositioning schedules. In addition, physiotherapists use range-of-motion exercises and muscle-strengthening techniques to improve circulation, which is vital for maintaining skin integrity and reducing the risk of pressure ulcers (Becker et al., 2017). Research has shown that consistent physiotherapy interventions can significantly reduce the incidence of pressure ulcers in bedridden patients by promoting movement and preventing prolonged pressure on the skin (Gefen, 2008).

Moreover, early mobilization programs designed by physiotherapists have been shown to accelerate recovery and improve patient outcomes by preventing the complications associated with immobility, including pressure ulcers. Studies have demonstrated that physiotherapy interventions targeting pressure relief and mobilization reduce the severity of ulcers in high-risk patients (Jaul, 2010).

3. Nursing Interventions for Pressure Ulcer Prevention and Management

Nurses are at the frontline of pressure ulcer prevention and care. Their primary responsibility involves regular skin assessments, repositioning patients, and providing appropriate wound care when ulcers develop. Studies show that early detection of pressure ulcers through frequent skin inspections can significantly reduce the progression of ulcers and prevent further complications (Moore & Cowman, 2015). Nursing care also involves ensuring proper hygiene and moisture control, which are key factors in maintaining skin integrity. Keeping the skin dry and clean reduces the risk of skin breakdown, a precursor to ulcer development.

In addition to regular skin assessments, nurses play a critical role in implementing repositioning protocols, adjusting support surfaces such as mattresses and cushions, and applying pressure-relieving devices (Wann-Hansson et al., 2008). Evidence suggests that proactive nursing interventions, particularly in terms of

patient positioning and using support surfaces, have been highly effective in reducing the incidence and severity of pressure ulcers in hospital settings (Moore & Cowman, 2015).

4. Nutritional Support in Pressure Ulcer Prevention and Healing

Nutrition plays a significant role in both the prevention and healing of pressure ulcers. Bedridden patients, particularly those who are malnourished or have underlying health conditions, are at an increased risk of developing pressure ulcers (Dorner et al., 2009). Proper nutrition is essential for maintaining skin integrity, supporting immune function, and promoting wound healing. Clinical dietitians assess the nutritional status of patients at risk of pressure ulcers and develop individualized nutrition plans to support tissue repair and overall health.

Protein, vitamins (particularly A and C), zinc, and hydration are critical nutrients for skin health and wound healing. Research has shown that patients with pressure ulcers often have deficiencies in these nutrients, and supplementing their diet can improve healing outcomes (Taylor, 2016). Clinical dietitians, therefore, play a crucial role in providing nutritional counseling, ensuring adequate caloric intake, and addressing specific nutrient deficiencies to optimize skin health and promote recovery in bedridden patients (Kj, 2005).

Several studies have demonstrated the benefits of a multidisciplinary approach that includes nutritional support for patients with pressure ulcers. Dorner et al. (2009) found that incorporating dietitians into the care team for bedridden patients reduced the incidence and severity of pressure ulcers by ensuring that patients received appropriate nutrition to support skin health and healing. This underscores the importance of addressing nutritional deficiencies as part of a comprehensive care plan for preventing and managing pressure ulcers.

5. The Importance of a Multidisciplinary Approach in Pressure Ulcer Management

A growing body of evidence supports the effectiveness of a multidisciplinary approach to pressure ulcer prevention and management. Combining the expertise of physiotherapists, nurses, and clinical dietitians has been shown to significantly reduce the incidence and severity of pressure ulcers in hospitalized patients (Gefen, 2008). Physiotherapists focus on mobility and pressure relief, nurses ensure frequent repositioning and skin care, and dietitians provide the nutritional support necessary for tissue repair and recovery. The integration of these disciplines creates a comprehensive care model that addresses the multiple risk factors associated with pressure ulcers.

Collaboration between healthcare professionals is crucial to ensuring that all aspects of care are addressed. Studies have shown that hospitals implementing multidisciplinary care teams have seen a reduction in pressure ulcer incidence by up to 50%, along with shorter recovery times and improved patient outcomes (Moore & Cowman, 2015). This approach emphasizes not only the importance of each discipline's contribution but also the need for effective communication and collaboration in achieving the best possible outcomes for patients.

Methodology

1. Study Design

This study employed a mixed-methods research design to assess the impact of a multidisciplinary approach, involving physiotherapy, nursing, and nutrition, on the prevention and management of pressure ulcers in bedridden patients. The quantitative component focused on measuring the prevalence and severity of pressure ulcers before and after implementing a multidisciplinary care model, while the qualitative

component explored the experiences and perspectives of healthcare professionals and patients through interviews. The study was conducted over a six-month period in a tertiary hospital.

2. Study Setting and Population

The study was conducted in the medical and surgical wards of a tertiary hospital where bedridden patients are at high risk of developing pressure ulcers. The study focused on patients who were immobile for extended periods due to illness, surgery, or injury, and who required comprehensive care to prevent or manage pressure ulcers.

Inclusion Criteria:

- Bedridden patients aged 50 years and older.
- Patients with existing pressure ulcers at the time of admission.
- Patients at high risk of developing pressure ulcers based on the Braden Scale for Predicting Pressure Sore Risk.

Exclusion Criteria:

- Patients with terminal illnesses where comfort care was prioritized over pressure ulcer management.
- Patients with conditions that contraindicated physiotherapy interventions (e.g., unstable fractures or severe respiratory distress).

3. Intervention: Multidisciplinary Care Model

A multidisciplinary care model was implemented, with a collaborative effort between physiotherapists, nurses, and clinical dietitians. The intervention included:

- **Physiotherapy:** Physiotherapists conducted individualized mobility assessments and designed repositioning schedules for each patient. They also provided passive and active range-of-motion exercises to promote circulation and reduce the risk of skin breakdown.
- **Nursing Care:** Nurses were responsible for regular skin assessments using the Braden Scale, repositioning patients every two hours, and maintaining proper hygiene to reduce the risk of skin damage. They also monitored the progression of any existing ulcers and implemented wound care protocols as needed.
- **Nutritional Support:** Clinical dietitians assessed patients' nutritional status and designed individualized nutrition plans aimed at promoting skin integrity and wound healing. Patients received supplements as needed, particularly those deficient in protein, vitamins, and minerals crucial for tissue repair.

4. Data Collection

Quantitative Data Collection

- **Pressure Ulcer Incidence and Severity:** Data on the incidence and severity of pressure ulcers were collected at two time points: before the implementation of the multidisciplinary care model and six months after its implementation. The severity of pressure ulcers was classified using the National Pressure Ulcer Advisory Panel (NPUAP) staging system (stages I-IV). The Braden Scale was used to assess patients' risk of developing pressure ulcers at admission and at regular intervals during the study period.
- **Healing Time:** For patients with existing pressure ulcers, healing time was measured from the initiation of the multidisciplinary care model to full resolution of the ulcer or improvement in ulcer stage.

Qualitative Data Collection

- Interviews with Healthcare Professionals: Semi-structured interviews were conducted with 15 healthcare professionals, including physiotherapists, nurses, and dietitians, to explore their experiences with the multidisciplinary care model. The interviews focused on:

- The effectiveness of collaborative care in preventing and managing pressure ulcers.
- The challenges and benefits of interdisciplinary communication and coordination.
- Perceptions of patient outcomes and satisfaction.

- Interviews with Patients: Semi-structured interviews were conducted with 10 patients who had received care under the multidisciplinary model. Patients were asked about their experiences with the care they received, their understanding of the role of different professionals in their treatment, and their satisfaction with the outcomes.

5. Data Analysis

Quantitative Data Analysis

Quantitative data were analyzed using SPSS version 28.0. Descriptive statistics (mean, standard deviation) were used to summarize patient demographics and the prevalence and severity of pressure ulcers. Chi-square tests were used to compare the incidence of pressure ulcers before and after the implementation of the multidisciplinary care model. T-tests were used to compare changes in the Braden Scale scores and healing time for pressure ulcers across patients. A p-value of <0.05 was considered statistically significant.

Qualitative Data Analysis

The qualitative data collected from interviews were analyzed using thematic analysis. The steps included:

1. Familiarization with the data: The research team reviewed and transcribed the interview recordings.
2. Initial coding: Open coding was used to identify recurring themes and concepts related to interdisciplinary care and patient experiences.
3. Theme development: Codes were organized into broader themes that captured the healthcare professionals' and patients' perceptions of the multidisciplinary care model.
4. Review and refinement: The research team reviewed the themes to ensure they accurately reflected the data and resolved any discrepancies through discussion.

6. Ethical Considerations

Ethical approval for the study was obtained from the ethics committee. Written informed consent was obtained from all participants, including patients and healthcare professionals, prior to data collection. Patients were assured that their participation would not affect the quality of care they received. All data were anonymized to protect patient and staff confidentiality, and the study adhered to the principles outlined in the Declaration of Helsinki.

7. Limitations

This study had several limitations. First, it was conducted in a single tertiary hospital, which may limit the generalizability of the findings to other healthcare settings. Second, the reliance on self-reported data from healthcare professionals and patients in the qualitative component may introduce bias, as participants may have tailored their responses based on their perceptions of the study. Future research could address these limitations by expanding the study to multiple institutions and incorporating a longer follow-up period to assess long-term outcomes.

Quantitative Results

The quantitative data collected before and after the implementation of the multidisciplinary care model showed significant improvements in the prevention and management of pressure ulcers. The results are summarized in the following table:

Outcome	Before Multidisciplinary Care	After Multidisciplinary Care	P-Value
Prevalence of Pressure Ulcers (%)	35%	20%	<0.01
Average Braden Scale Score	12.1	16.5	<0.01
Average Healing Time (Days)	45	30	<0.05
Stage I Ulcers (%)	50%	70%	<0.05
Stage II Ulcers (%)	35%	20%	<0.05
Stage III/IV Ulcers (%)	15%	10%	<0.05

Key Findings:

1. Prevalence of Pressure Ulcers:

The prevalence of pressure ulcers significantly decreased from 35% to 20% after the multidisciplinary interventions were implemented ($p < 0.01$). This demonstrates the effectiveness of combining physiotherapy, nursing care, and nutritional support in preventing pressure ulcers.

2. Braden Scale Score:

The average Braden Scale score, which assesses the risk of pressure ulcers, improved from 12.1 to 16.5 after the care model was introduced ($p < 0.01$), indicating a reduction in patients' risk of developing ulcers.

3. Healing Time:

The average healing time for patients with existing pressure ulcers decreased from 45 days to 30 days, showing faster recovery and better management of existing ulcers ($p < 0.05$).

4. Stage I and II Ulcers:

The proportion of patients with Stage I ulcers increased from 50% to 70%, while Stage II ulcers decreased from 35% to 20%, reflecting an improvement in ulcer prevention and early-stage management.

5. Stage III/IV Ulcers:

The incidence of more severe Stage III/IV ulcers decreased from 15% to 10%, showing that the multidisciplinary care model was effective in preventing the progression of pressure ulcers to more severe stages.

Qualitative Findings

The thematic analysis of interviews with healthcare professionals (physiotherapists, nurses, dietitians) and patients revealed several key themes related to the effectiveness and experiences of the multidisciplinary care model for managing pressure ulcers in bedridden patients. Below are the identified themes, sub-themes, and representative participant quotes.

Theme 1: Improved Interdisciplinary Communication and Collaboration

Participants emphasized the importance of communication and teamwork between physiotherapists, nurses, and dietitians, which resulted in better coordination of care for preventing and managing pressure ulcers.

Sub-theme 1.1: Enhanced Coordination of Care

- Nurse:

“We had regular interdisciplinary meetings where the physiotherapists and dietitians would discuss their patient care plans. This level of communication ensured that everyone was on the same page, which helped us be more efficient in repositioning and wound care.”

- Physiotherapist:

“Knowing the patient's nutritional status and collaborating with the nursing team allowed us to adjust the frequency and type of mobility exercises. This holistic approach worked much better than working in silos.”

Sub-theme 1.2: Shared Responsibility for Patient Outcomes

- Dietitian:

“I felt more involved in patient care because we were constantly updated on their physical status by the nursing team. This helped us tweak their dietary intake based on their healing progress.”

- Patient:

“I could see that everyone was working together. I didn't feel like my care was being handed off between professionals; they all knew what the other was doing to help me.”

Theme 2: Personalization of Patient Care

The multidisciplinary model allowed for individualized care plans tailored to the specific needs of each patient, including their mobility level, skin condition, and nutritional requirements.

Sub-theme 2.1: Customized Mobility Plans

- Physiotherapist:

“We personalized the mobility and repositioning strategies based on the patient's level of mobility and skin condition. For example, some patients could tolerate sitting for short periods, while others needed to be repositioned more frequently.”

- Patient:

“The physiotherapists made sure I was comfortable and gave me exercises to do even while I was in bed, which helped prevent new sores from forming.”

Sub-theme 2.2: Tailored Nutritional Support

- Dietitian:

“Nutritional assessments allowed us to provide personalized nutrition plans, especially for patients at higher risk for skin breakdown. We focused on increasing protein intake and ensuring proper hydration, which significantly supported wound healing.”

- Nurse:

“It was very helpful knowing the patients' nutritional needs were being met. We noticed wounds healed much faster when their dietary needs were adequately addressed.”

Theme 3: Improved Patient Outcomes and Satisfaction

Patients and healthcare professionals reported significant improvements in pressure ulcer prevention, healing times, and overall satisfaction with care under the multidisciplinary model.

Sub-theme 3.1: Faster Healing and Prevention of New Ulcers

- Nurse:

“We saw a reduction in the number of new ulcers forming, and the ones we were treating healed much faster compared to previous cases where only one discipline was involved.”

- Patient:

“The sores I had healed quicker than I expected. They were very careful to check my skin, move me often, and made sure I was eating well. It all worked together.”

Sub-theme 3.2: High Levels of Patient Satisfaction

- Patient:

“I really appreciated how attentive the team was. They made me feel like I was being taken care of from all angles. The nurses, physiotherapists, and dietitians were all great at explaining what they were doing to help me heal.”

- Nurse:

“Patients were more satisfied with the care they received because they could see how all the disciplines worked together to prevent pressure ulcers, which improved overall outcomes and patient morale.”

Theme 4: Challenges in Implementing the Multidisciplinary Model

Despite the benefits of the multidisciplinary approach, some healthcare professionals noted challenges related to time management, resource allocation, and maintaining regular communication.

Sub-theme 4.1: Time and Resource Constraints

- Nurse:

“We faced challenges in sticking to the repositioning schedules, especially when the ward was understaffed. Even though the dietitians and physiotherapists provided excellent support, there were times when we were stretched too thin to meet the recommended repositioning intervals.”

- Dietitian:

“It was difficult to see every patient on time due to the large number of patients we were managing. Customizing meal plans for each patient was time-intensive, and we had to prioritize based on severity.”

Sub-theme 4.2: Logistical Barriers to Consistent Communication

- Physiotherapist:

“We had some issues coordinating care because of differing schedules. While the interdisciplinary meetings were helpful, there were times when updates about a patient’s condition didn’t reach us as quickly as they should have.”

- Nurse:

“It was challenging to make sure everyone involved in a patient's care was updated in real time, especially when there were changes in care plans. We had to work hard to ensure communication stayed consistent.”

Discussion

The findings of this study underscore the positive impact of a multidisciplinary approach involving physiotherapists, nurses, and dietitians in managing pressure ulcers among bedridden patients in a tertiary hospital setting. The results highlight significant improvements in patient outcomes, including reduced pressure ulcer prevalence, faster healing times, and enhanced patient satisfaction. These findings align with previous research emphasizing the value of interdisciplinary collaboration in complex patient care (Moore & Cowman, 2015; Gefen, 2008).

Interdisciplinary Communication and Coordination

One of the key themes emerging from the qualitative data was the importance of effective communication and collaboration between healthcare professionals. Physiotherapists, nurses, and dietitians worked together to ensure that all aspects of patient care were addressed, from mobility and skin care to nutritional support. This level of coordination allowed for more comprehensive care, improving the overall outcomes for patients. Similar findings have been reported in studies that emphasize the role of interdisciplinary communication in preventing complications such as pressure ulcers (Becker et al., 2017).

The enhanced communication between team members led to shared responsibility for patient outcomes, with each professional contributing their expertise to the holistic care plan. This collaborative approach not only improved patient outcomes but also ensured that healthcare professionals were more informed about the patient's progress, enabling timely adjustments to care plans. The qualitative findings support existing literature that highlights the necessity of interdisciplinary meetings and regular communication to ensure the success of such care models (Wann-Hansson et al., 2008).

Personalized Patient Care

The multidisciplinary care model also facilitated the development of individualized care plans tailored to each patient's unique needs. Physiotherapists provided customized mobility and repositioning schedules based on each patient's condition, while dietitians ensured that nutritional plans supported skin integrity and wound healing. This level of personalization is crucial in pressure ulcer prevention, as patients' risk factors vary significantly depending on their mobility, health status, and nutritional intake (Dorner et al., 2009).

The study's findings emphasize that individualized interventions, especially in high-risk patients, contributed to better outcomes, such as reduced ulcer severity and faster healing times. This aligns with prior research that shows personalized care, particularly with tailored nutrition and physiotherapy interventions, is more effective in managing pressure ulcers than generalized approaches (Taylor, 2016).

Improved Patient Outcomes

The quantitative findings demonstrated a marked improvement in pressure ulcer prevalence, healing time, and severity after the implementation of the multidisciplinary care model. The significant decrease in pressure ulcer prevalence from 35% to 20% and the improvement in Braden Scale scores reflect the success of the care model in both preventing new ulcers and managing existing ones. These findings are consistent with the literature, which shows that pressure ulcer prevention programs led by multidisciplinary teams can reduce incidence rates by up to 50% (Moore & Cowman, 2015).

The qualitative data further supported these outcomes, with patients expressing satisfaction with their care and noting faster recovery times. Patients highlighted the attentive care provided by the interdisciplinary team, which they believed contributed to their quicker healing. This feedback from patients underscores the importance of a coordinated care approach in enhancing patient experience and outcomes.

Challenges in Implementation

Despite the positive outcomes, healthcare professionals did report some challenges in implementing the multidisciplinary model. Time and resource constraints, particularly in terms of maintaining repositioning schedules and delivering individualized nutritional plans, were noted. These challenges are consistent with the findings of previous studies, where workload and staffing shortages often hinder the full implementation of multidisciplinary care (Wann-Hansson et al., 2008).

Logistical barriers to consistent communication were also identified, particularly regarding timely updates on patient care plans. Although interdisciplinary meetings helped streamline communication, scheduling conflicts and busy wards made it difficult to ensure that all team members were always fully updated. This highlights the need for structured communication tools, such as shared digital platforms, to facilitate real-time information exchange between healthcare professionals (Brown et al., 2020).

Implications for Practice

The findings of this study have several practical implications for healthcare settings aiming to improve pressure ulcer management through multidisciplinary care:

1. **Enhancing Interdisciplinary Collaboration:** Regular interdisciplinary meetings and the use of shared communication platforms can help improve coordination and ensure that all aspects of patient care are addressed in a timely manner. Hospitals should prioritize facilitating regular updates among physiotherapists, nurses, and dietitians to optimize patient outcomes.

2. **Personalizing Patient Care:** The results emphasize the importance of individualized care plans tailored to the specific needs of each patient. Hospitals should encourage healthcare professionals to work collaboratively in designing personalized interventions, particularly for high-risk patients, to improve the effectiveness of pressure ulcer prevention and treatment.

3. **Addressing Resource Limitations:** To overcome challenges related to time and resources, healthcare systems should consider increasing staffing or redistributing workloads to ensure that critical interventions, such as repositioning schedules and nutritional assessments, are consistently implemented.

Limitations

This study has several limitations. First, it was conducted in a single tertiary hospital, which may limit the generalizability of the findings to other healthcare settings. The reliance on self-reported data in the qualitative component may also introduce bias, as participants may have tailored their responses based on their perceptions of the study's objectives. Additionally, resource constraints and staffing limitations could have impacted the full implementation of the care model, which may affect the reproducibility of results in different settings.

Conclusion

This study demonstrates that a multidisciplinary care model involving physiotherapists, nurses, and dietitians significantly improves patient outcomes in the prevention and management of pressure ulcers in bedridden patients. The integration of mobility, wound care, and nutritional interventions not only reduced the prevalence and severity of ulcers but also enhanced patient satisfaction and recovery times. Despite the challenges of time and resource limitations, the overall impact of the care model was positive, highlighting the need for continued interdisciplinary collaboration in pressure ulcer management.

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