

## PREVALENCE OF PRESSURE ULCER AND ASSOCIATED RISK FACTORS IN HOSPITALIZED PATIENTS IN TERTIARY CARE HOSPITAL

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### Abstract

**Background:** Pressure ulcers (PUs) are a common and preventable complication in hospitalized patients, particularly among those who are immobile, elderly, or critically ill. They significantly impact patient outcomes, increase the duration of hospital stay, and elevate healthcare costs. Nurses play a key role in prevention, yet the implementation of evidence-based practices often remains inconsistent, especially in resource-constrained settings like Pakistan.

**Material and Method:** A cross-sectional comparative study was conducted at Liaquat University Hospital, Hyderabad, involving 225 patients admitted for at least 24 hours across various wards including ICU, orthopedic, surgical, and medical units. Data were collected using a semi-structured questionnaire based on demographic information, Braden Scale risk assessment, presence and stage of pressure ulcers, and associated risk factors. The sampling technique was purposive, and data were analyzed using SPSS version 25 with descriptive and inferential statistics, including chi-square tests and logistic regression.

**Results:** The prevalence of pressure ulcers was found to be 39.6%. Most ulcers were detected in early stages (Stage I: 50.6%, Stage II: 47.1%). Immobility (62.2% completely immobile), poor mobility, moisture exposure, comorbid conditions (especially chronic illness), and suboptimal nutritional status emerged as significant risk factors. Braden Scale scores revealed that 50% of patients were at mild risk, while 17.4% were at high risk. Despite the availability of preventive tools, gaps in training, staff-to-patient ratio, and institutional support hinder effective management.

**Conclusion:** The findings underscore the need for consistent use of evidence-based nursing practices, improved staff training, regular risk assessments using tools like the Braden Scale, and better institutional support. Multidisciplinary collaboration is essential to reduce PU incidence and improve patient outcomes.

### INTRODUCTION

Pressure injuries present a significant burden to healthcare systems around the world, impacting the

health and quality of life of over seven million individuals globally.<sup>1</sup> Internationally, pressure ulcers

remain a significant health concern, which reported approximately 850,000 existing cases and 3.17 million new cases. These injuries accounted for the loss of around 130,000 healthy life years. Commonly affected areas include the sacrum and heels, with the condition primarily impacting older adults and individuals with restricted mobility, who represent the majority of those affected.<sup>2</sup>

Pressure Ulcer (PU) development remains to be a significant concern for at-risk patients<sup>3</sup>. Pressure ulcers, commonly referred to as bedsores, and is serious skin conditions caused by localized damage to the skin and underlying tissues, typically occurring over bony areas of the body. They are among the most frequent complications faced by bedridden patients in both acute and long-term care settings, placing a substantial physical, emotional, and financial strain on patients, their families, and healthcare providers. It results from sustained or intense pressure, often combined with shear and friction forces, leading to localized damage of the skin and underlying soft tissues. This typically occurs over bony prominences or beneath medical devices.<sup>4</sup>pressure sores or decubitus ulcers, involve localized damage, that typically develop in immobilized individuals on weight-bearing areas such as the buttocks, hips, heels, sacrum, spine, and elbows.<sup>5</sup>

In terms of demographic and clinical characteristics, studies have indicated that being male, of a younger age, and having a prior history of surgery for pressure ulcers are linked to a higher risk of ulcer recurrence.<sup>6</sup>Pressure ulcers are commonly found in older adults, especially those with extended hospital stays. Aging is a key risk factor, as it leads to physiological changes such as reduced subcutaneous fat, diminished skin elasticity and moisture, and increased skin dryness, all of which contribute to a greater risk of ulcer development.<sup>7</sup>The development of pressure injuries not only intensifies patient discomfort but also extends hospital stays, raises healthcare costs, and may lead to legal or medical conflicts.<sup>8</sup>

Pressure ulcers typically do not occur in healthy individuals, as they instinctively shift their body positions to avoid prolonged pressure on any single area.<sup>9</sup>Pressure injuries develop when prolonged pressure significantly restricts blood flow to the soft tissues in a specific area. While tissues can endure very

high pressure for brief durations, continuous exposure to pressure levels just above capillary filling pressure can initiate tissue damage, ultimately resulting in cell death and ulcer formation.<sup>10</sup>Earlier research has identified several risk factors associated with the development of pressure ulcers. These include immobility, poor nutritional status, hemodynamic instability, incontinence, spinal cord injuries, fractures or major orthopedic surgeries, impaired consciousness, older age, dehydration, reduced tissue perfusion, and chronic illnesses particularly in patients confined to bed.<sup>11</sup>

According to the updated classification criteria provided by the National Health Service (NHS), skin damage from pressure injuries can vary in severity from non-blanchable redness (Category 1) to full-thickness tissue loss that reveals deeper structures such as bones and tendons (Category 4).<sup>5</sup>As outlined in international guidelines, Stage I pressure injuries can serve as indicators for the potential development of more severe stages. Therefore, it is essential that every patient undergoes a thorough skin and tissue evaluation upon admission or when transferred to a healthcare facility as part of the overall risk assessment. Additionally, a skin assessment should be performed before the patient is discharged from the healthcare setting.<sup>12</sup>

A systematic assessment of mortality in the context of the Global Burden of Diseases Study found that pressure injuries led to 20,300 deaths worldwide in 2017.<sup>13</sup>International healthcare literature indicates that the incidence of pressure ulcers among hospitalized patients can reach up to 11%, with reported prevalence rates ranging from 3% to 22%.<sup>14</sup>The prevalence of pressure ulcers differs across healthcare settings and regions. A systematic review and meta-analysis involving 39 studies and over 2.5 million participants from 19 countries reported an overall prevalence rate of 12.8%. This indicates that pressure ulcers affect more than one in every ten hospitalized adult patients.<sup>15</sup>

A 2020 study reported that between 2008 and 2018, the global prevalence of pressure ulcers was 12.8%. Regionally, the rates were 14.5% in Europe, 13.6% in North America, 12.7% in South America, 3% in Asia, 12.6% in the Middle East, and 9% in Australia.<sup>16</sup>In the United States, approximately 2.5 million individuals face the risk of developing pressure ulcers

annually, with around 60,000 deaths linked to complications, particularly among surgical patients. These conditions continue to be prevalent across various age groups and healthcare environments following surgical procedures.<sup>17</sup> Similarly, In Brazil, the prevalence of pressure ulcers varies from 10.8% to 25.6%, with higher rates observed in intensive care units and lower rates among elderly individuals residing in long-term care facilities.<sup>18</sup>

A systematic review of 54 studies identified key risk factors for the development of pressure ulcers in both acute care and community patient populations, highlighting three main domains: mobility and activity levels, tissue perfusion, and skin or existing pressure ulcer conditions.<sup>19</sup> Over the past few decades, a significant number of studies on pressure ulcers have been conducted, including extensive epidemiological surveys; however, the majority of this research has been carried out in developed countries. In Pakistan, existing studies have largely concentrated on patients with head injury and spinal cord injuries, with limited attention given to other medical specialties.<sup>20</sup>

Nurses play a crucial role in the primary prevention of pressure ulcers by prioritizing patients' needs, preferences, and goals. Implementing evidence-based nursing practices is key to achieving positive outcomes and enhancing patient conditions. These practices are widely applied to elevate the overall quality of care.<sup>21</sup>

In recent years, developed countries have made notable progress in the prevention of pressure ulcers. While, In Pakistan, the allocation for health remains a minor portion of the national Gross Domestic Product (GDP), regularly staying under 3%. Recent statistics indicate that healthcare spending has dropped to below 1% of the country's total GDP.<sup>22</sup> Pressure ulcer prevention should begin as soon as a patient is identified as being at risk. Malinga (2016) noted that nurses often have limited knowledge and inadequate attitudes regarding the prevention of pressure ulcers, which can hinder effective care.<sup>23</sup> In Pakistan there is no reporting of the occurrence of pressure ulcer and their prevalence which may be associated risk factors in hospital ICU, Orthopedic, trauma and surgical setting.<sup>10</sup>

Present study intended to find out the prevalence and association between risk factors and Braden scale score among hospitalized patients at tertiary care

hospitals Liaquat university hospital Hyderabad and Jamshoro.

#### **Aim of the study:**

The aim of this study was to find out the prevalence of pressure ulcers and associated risk factors among hospitalized patients in a tertiary care hospital at Liaquat University Hospital, Hyderabad/Jamshoro.

#### **Objectives:**

- 1.To determine the prevalence of pressure ulcers among hospitalized patients in a tertiary care hospital.
- 2.To investigate the association of risk factors with pressure ulcers in hospitalized patients.

#### **Research Question**

1.What is the prevalence of pressure ulcers among patients admitted to a tertiary care hospital at Liaquat University Hospital?

What are the most significant risk factors and its association, which is contributing, to the development of pressure ulcers in tertiary care at Liaquat University Hospital?

#### **Methodology**

This study was conducted at Liaquat University Hospital, Hyderabad (LUH) .The LUMHS is consisted of 2068 beds. Intensive Care Unit (ICU), Orthopedic, Surgical, Medical, Urology and Neurology units were selected for the study. The comparative cross-sectional study design was conducted. The study duration was six months after approval from Ethical Review committee and advance studies and research Board (AS&RB), LUMHS. The study involved 225 participants, with the sample size calculated using the Open Epi sample size calculator, based on a 95% confidence level, a 5% margin of error, and an assumed prevalence of 17.6%. The Non-probability purposive sampling was used. All adult admitted patients and avail during the study period were the source and study population respectively. This study was included the individuals who had been hospitalized for a minimum of 24 hours, were at least 18 years old, and comprised both male and female gender . But those patients who were critically ill, who did not provide informed consent, those who were unavailable at the hospital during the data collection

period, and individuals under the age of 18 were excluded from the study.

In this study, a structured data collection tool was adopted (1, 2), .For data collection, the permission was obtained from the Medical Superintendent of Liaquat University Hospital, Hyderabad. Participants were recruited from wards at risk for pressure ulcers, such as medical, surgical, orthopedic, and intensive care units. They received a clear explanation of the study's objectives, the nature of participation, and the assessment tools used. Participants were assured of confidentiality and informed of their right to withdraw without affecting their medical care.

2. Data analysis was performed using SPSS version 24. Numerical data, like age and weight, were summarized with means and standard deviations, while nominal and ordinal data were described using frequencies and proportions. A confidence level of 95% and a significance level (p-value) of 0.05 were used, and the

chi-square test assessed associations between categorical factors.

### 3.RESULTS

**Socio-demographic and clinical characteristics of adult patients who were admitted at LUH, Hyderabad (N=225)**

**Table 1:** depicts the Demographical Information of the participants. A total of 225 admitted patients with a response rate of 100% were included in this study. The majority (63.11%) of the respondents were males and 36.89% were female. Most of the patients (87.5%) were married. About 37.3% of the patients were admitted in ICU. Followed by other wards (34.7%), orthopedic (17.3%), and surgical wards (10.7%). The high rates in ICU and orthopedic wards indicate a greater risk for pressure ulcers due to prolonged immobility.

Variable	Categories	Frequency	Percent
Gender	Male	142	63.11%
	Female	83	36.89%
	18-27 years	23	10.2
	28-37 years	17	7.6
	38 and above	185	82.2
Unit wise Patient's admission distribution	ICU	84	37.3
	Orthopedic	39	17.3
	Surgical	24	10.7
	Other wards	78	34.7
Marital status	Married	197	87.5%
	Unmarried	28	12.4%

**Table 2: Prevalence of pressure ulcer and Risk Assessment through Braden scale**

Variable	Categories	Frequency	Percent
Does the patient currently have a pressure ulcer?	Yes	89	39.6
	No	136	60.4
Risk category	No Risk (19-23)	06	2.7
	Mild Risk (19-23)	45	20.0
	Moderate Risk (15-18)	36	16.0
	High Risk (13-14)	104	46.2
	Very High Risk <9	34	15.1

Table 2 shows the prevalence of pressure ulcers among hospitalized patients was 39.6%, highlighting the need for improved preventive measures, especially for those at risk due to immobility, incontinence,

dehydration, and chronic conditions. According to the Braden Scale, 61.3% were at high or very high risk, while only 2.7% had no risk. This emphasizes the importance of routine risk screening and early preventive care to lower incidence rates.

**Table 3. Prevalence of pressure ulcer and Risk Assessment through Braden scale N=225**

Variable	Categories	Frequency	Percent
Use of pressure-relieving devices	Yes	217	96.4
	No	8	3.6
	Total = 225		100
Co morbidities	Chronic Disease	118	52.4
	Immobility/Reduced Mobility	57	25.3
	Spinal Cord Injury	3	1.3
	Dehydration	28	12.4
	Other	19	8.4
Total = 225		100	
Presence of incontinence	Urinary	22	9.8
	Both	59	26.2
	None	144	64.0
	Total = 225		100.0
Pressure ulcer anatomic site	Sacrum	15	6.7
	Buttocks	53	23.6
	Heels	44	19.6
	Elbow	17	7.6
	Back of head	3	1.3
	Back	93	41.3
	Total = 225		100.0

**Table 3: Description on associated Risk Factors**

The most common comorbidity among patients was chronic disease (52.4%), followed by immobility (25.3%) and dehydration (12.4%). Although spinal cord injury was less prevalent (1.3%), these conditions contribute to pressure ulcer risk, emphasizing the need for thorough clinical assessments in hospitals. A significant majority of patients (96.4%) used pressure-relieving devices, showing strong compliance with

preventive measures. Incontinence was reported in 36% of patients, with 26.2% experiencing both urinary and fecal incontinence, underscoring the necessity for targeted preventive care. The back is the most common site for pressure ulcers (41.3%), followed by the buttocks (23.6%) and heels (19.6%). This emphasizes the need for regular assessment and pressure relief in high-risk areas, particularly for immobile or bedridden patients.

**Table 4: Association of risk factors with pressure ulcer**

Variable and Category		Mild Risk	Moderate Risk	High Risk	Very High Risk	Total	Chi square	d.f	P value
Age	18-27 years	9	6	7	1	23	15.4	8	0.05
	28-37 years	6	3	7	1	17			
	>38 years	35	25	93	32	185			
Total		50	34	107	34	225			
Gender	Male	23	21	73	25	142			

	Female	27	13	34	9	83	11.25	4	0.02
Total		50	34	107	34	225			
Marital Status	Married	39	28	98	32	197	10.10	4	0.03
	Unmarried	11	6	9	2	28			
Total		50	34	107	34	225			
Does the patient currently have a pressure ulcer?	Yes	5	7	46	31	89	64.08	4	0.001
	No	45	27	61	3	136			
Total		50	34	107	34	225			

A statistically significant association was found between risk factors and pressure ulcers. Age and pressure ulcer risk level were significantly linked ( $p = 0.05$ ), with most patients in high-risk categories aged 38 or older. Gender also played a role ( $p = 0.02$ ), as male patients were more likely to be classified as high or very high risk. Marital status showed a marginal association with risk level ( $p = 0.03$ ), with more married patients in high-risk categories, possibly reflecting demographic differences. Additionally, a strong correlation was noted between Braden Scale risk level and pressure ulcer development ( $p = 0.001$ ), emphasizing the need for regular assessments and targeted prevention for high-risk patients.

## DISCUSSION

The present study was conducted to assess the prevalence and associated risk factors of pressure ulcers among hospitalized patients in Liaquat University Hospital, Hyderabad. The study population comprised 225 patients admitted to different wards, including medical, surgical, orthopedic, and intensive care units.

The current study revealed that the mean age of participants was 49.5 years with a standard deviation of  $\pm 13.4$  years. Participants were divided into various age groups, with the majority (82.2%) falling within the 38 years and above, a statistically significant association between age and pressure ulcer risk level ( $p = 0.04$ ), indicating that older patients are more vulnerable to pressure ulcer development. This trend underscores the impact of advancing age on skin integrity and overall physiological resilience. As individual's age and age related changes such as reduced skin elasticity, impaired mobility, slower wound healing and the presence of multiple comorbidities contribute to a heightened risk of pressure ulcers.<sup>24,15</sup> In contrast, some Literature suggests that younger patients with severe illnesses or

trauma can also develop pressure ulcers if preventive strategies are not actively implemented, emphasizing the importance of early assessment regardless of age.<sup>17-25</sup>

The current study examined the frequency of patient position changes as a preventive measure against pressure ulcer development. The results showed that the majority of patients (68.9%) had their positions changed three times per day, while 19.6% were repositioned only twice per day, and a smaller proportion (11.6%) received four repositioning daily. These findings suggest that while a significant number of patients are receiving position changes at an acceptable frequency, a notable portion may still be at risk due to less frequent repositioning. This finding is consistent with previous research, which associates prolonged immobility with ischemia, tissue necrosis, and ulcer formation. Inactivity disrupts capillary blood flow, leading to oxygen deprivation in localized tissues, which further accelerates skin breakdown.<sup>9</sup> Therefore, mobilization strategies and patient repositioning are vital to prevent pressure injuries, particularly in high-dependency settings such as ICUs and orthopedic units.<sup>26</sup>

The results of the study indicated a statistically significant association between gender and pressure ulcer risk level ( $p = 0.02$ ). A higher proportion of male patients fell into the high risk (73 out of 107) and very high risk (25 out of 34) categories compared to females, who were more frequently represented in the mild and moderate risk groups. Specifically, 69% of males were classified as high or very high risk, whereas only 51% of females were in these elevated risk categories. This finding suggests that male patients may be at greater risk for pressure ulcer development, although slightly more men had institutional-acquired pressure ulcers than women, overall differences regarding pressure ulcer occurrence were minor. Gender and/or sex can rather not be considered as an

independent risk factor for pressure ulcer development and differences regarding pressure ulcer prevention interventions seem to be minor.<sup>27,28</sup>

Moisture, especially related to urinary or fecal incontinence, also played a significant role in the development of pressure ulcers. In the present study, 21.8% of patients were often moist, and among those who had pressure ulcers, 32.6% experienced some form of incontinence. Moisture weakens the epidermal barrier, making the skin more susceptible to friction, shear, and bacterial colonization. This aligns with earlier studies that show a direct correlation between moisture levels and skin maceration, especially in older or bedridden patients.<sup>17,29</sup> Thus, maintaining skin dryness and using barrier creams or incontinence pads are critical components of nursing care.

Nutritional status, as assessed through BMI and dietary intake, showed that 16% of participants had probable inadequate nutrition, while 40.9% were overweight or obese. Nutritional deficiencies impair tissue repair and delay healing, whereas obesity may reduce perfusion to pressure-prone areas. Although 79.6% reported adequate nutrition, variations in nutrient absorption and metabolic demands of illness may still compromise healing. Literature supports that both under nutrition and over-nutrition contribute to poor skin resilience, highlighting the need for individualized nutritional assessment and intervention in hospitalized patients.<sup>30</sup>

The presence of comorbidities such as chronic diseases (38.2%) and reduced mobility (33.7%) further increased susceptibility to pressure ulcers. Conditions like diabetes mellitus, cardiovascular disease, and neurological impairments hinder wound healing and contribute to systemic inflammation, exacerbating skin breakdown. Similar findings are echoed in studies conducted in tertiary care hospitals globally, which establish a strong link between chronic illness and pressure ulcer development.<sup>31</sup> These findings support the need for early interdisciplinary risk identification, involving physicians, nurses, and dietitians.

The study recorded a pressure ulcer prevalence of 39.6%, which is higher than global averages but comparable to rates in other low-resource healthcare settings. The majority of ulcers were detected in early stages—Stage I (50.6%) and Stage II (47.1%)—

indicating timely identification in many cases, but also suggesting the need for stronger primary prevention protocols. Only a small percentage (2.3%) had Stage III ulcers, which demonstrates that while detection is happening, prevention strategies may still be insufficient or inconsistently applied. This underscores the importance of proactive surveillance and early intervention measures in hospital settings.

The findings of this study revealed that a significant proportion of patients were at elevated risk for pressure ulcer development. According to the Braden Scale, 46.2% of participants were classified as high risk and 15.1% as very high risk, indicating that over 60% of the patient population required urgent and intensive preventive measures. Only a small fraction (2.7%) were in the no risk category, while the remaining patients fell into mild (20.0%) and moderate (16.0%) risk levels. Furthermore, a statistically significant association was observed between risk category and the actual presence of pressure ulcers ( $p = 0.0001$ ). Among patients with existing pressure ulcers, the majority belonged to the high (46 patients) and very high (31 patients) risk groups, whereas very few cases were observed in the mild and moderate risk categories. These results affirm the Braden Scale's clinical utility as a valid predictive tool for pressure ulcer risk and highlight the need for proactive nursing interventions.<sup>31</sup> Evidence suggests that even when tools like the Braden Scale are available, their effectiveness depends heavily on proper nurse training and routine implementation.<sup>32,33</sup> The role of the nurse in regularly assessing risk on admission, daily, and at transfer or discharge is crucial.

Nurses were central to ulcer prevention efforts in this study. Their responsibilities included performing Braden assessments, repositioning patients (typically 2–3 times per day), managing moisture, applying dressings, and encouraging adequate nutrition and hydration. Despite these efforts, limitations such as high nurse-to-patient ratios, lack of training, and insufficient institutional support hindered effective implementation. Several studies confirm that although nurses are the frontline defenders against pressure ulcers, without ongoing education and adequate staffing, the quality of prevention can deteriorate. Evidence-based nursing practices, such as regular repositioning, pressure-relieving devices, use

of skin protection protocols, and patient/family education, are critical for successful prevention—but often remain underutilized due to these systemic barriers.<sup>34,35</sup>

The study also revealed institutional gaps, including limited access to pressure-relieving devices, inadequate documentation, and lack of standard protocols for pressure ulcer care. Addressing these issues requires more than individual efforts. It calls for institutional reform starting with staff training programs, the development of clear clinical pathways, and stronger collaboration between multidisciplinary teams. Physicians, nurses, nutritionists, and physiotherapists must work together to ensure that preventive and treatment plans are holistic and patient-centered.<sup>37,38</sup>

## CONCLUSION

This study identified a high prevalence (39.6%) of pressure ulcers among hospitalized patients at Liaquat University Hospital, Hyderabad. The most significant contributing factors were immobility, moisture exposure, poor nutritional status, and comorbidities. The majority of ulcers were in early stages (Stage I and II), indicating that many cases are preventable with timely interventions. The findings emphasize the crucial role of nurses in prevention through routine assessments, patient repositioning, and skin care. However, limitations in training, staffing, and institutional resources continue to hinder effective care. Implementing evidence-based practices and strengthening nursing capacity is essential to reduce the burden of pressure ulcers and improve patient outcomes.

### Limitations:

- The study used purposive sampling, which limits the generalizability of findings.
- Cross-sectional design restricts interpretation of cause-and-effect relationships.
- Reliance on documentation and patient records may be subject to reporting inaccuracies or omissions.

## 6.4 RECOMMENDATIONS

- **Regular Patient Assessment:** Encourage nurses to conduct Braden Scale assessments on admission and during every shift to identify risk early.

- **Patient Repositioning:** Implement standard protocols for repositioning immobile patients at least every two hours to prevent pressure buildup.

- **Staff Education:** Initiate regular workshops and hands-on training for nurses on evidence-based pressure ulcer care and staging.

- **Infrastructure Support:** Ensure all hospital wards, especially ICUs and orthopedic units, are equipped with pressure-relieving mattresses and related supplies.

- **Strategic Planning:** Health institutions should develop a five-year action plan for reducing hospital-acquired pressure ulcers through staff development, audit systems, and patient-centered care strategies.

## Authors Contributions

This work was carried out in collaboration among all authors.

The author AR Conceptualize and original writer of article

Data analysis and entered data in SPSS: AR, IAC & HBC.

Data collection: AR

Reviewing final draft & editing A, AR, IR and I.

All authors read and approved the final manuscript.

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