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## **Association of Braden scale and subscale scores of patients with and without open wound pressure ulcers**

**Aamir Sharif**

Assistant Professor & Principal, Murshid School of Nursing and Midwifery, Murshid Hospital and Health care Centre, Karachi, Pakistan  
Corresponding author email: [aamir.kaimkhani1@yahoo.com](mailto:aamir.kaimkhani1@yahoo.com)

**Marvi Raza**

Lecturer, Department pathology, Ziauddin University Clifton campus Karachi, Pakistan

**Syeda Saima Qamar Naqvi**

Associate Professor, Department of Surgery Baqai Medical University, Karachi, Pakistan

**Pardeep Kumar**

Deputy Administrator, Murshid Hospital & Health care Centre, Karachi, Pakistan

**Rizwan Ahmed Khan**

Associate Professor, Abbasi Shaheed Hospital, Karachi, Pakistan

**Nida Lathiya**

Assistant Professor, Department of Physiology, Baqai Medical University, Karachi, Pakistan

**Sehar Iqbal**

Assistant Professor, College of pharmacy, Al Ain University, Abu Dhabi campus, United Arab Emirates (UAE)

**Abstract**---Background: PU is caused by physical elements such as shearing forces, friction, and dampness. Long periods of sitting or lying in the same position without moving can cause ischemia and necrosis of the skin and underlying tissues in patients with neurological problems. Schizophrenia, severe depression, and other serious mental illnesses, as well as any hygienic neglect and the older age group, between 60 and 80 years, also enhance the risk of PU development. Objective: To identify the association of braden scale with the development of open wound PU among patients who

were hospitalized with neurological disorders at a private tertiary care hospital in Karachi, Pakistan. Methodology: According to calculated sample size 93 people from Pakistan's Murshid Hospital and Healthcare Centre (MHHCC) were enrolled in the study using a cross-sectional analytical study design. An organized questionnaire was used to collect the demographic data and braden scale was used to associate the findings. SPSS 21 was used to analyze the data and the Chi-Square test was applied to find the association. Results: . Patients in group I had an average age of  $54.27 \pm 17.49$  years. It was  $52.23 \pm 19.77$  years in group II, with no statistically significant difference between the groups ( $p = 0.47$ ). Among the  $n = 33$  female participants, 19 patients (35.20%) were from group I and 14 patients (35.90%) were in group II, whereas the  $n = 60$  male participants, 35 patients (64.80%) were from group I and 25 patients (64.10) were in group II, with no statistically significant difference between the groups ( $p = 0.56$ ). Conclusion: An open wound pressure ulcer is strongly associated with a low Braden scale score.

**Keywords**---open wound, pressure ulcer, association, Braden scale.

## Introduction

Typically, a pressure ulcer (PU) is referred to as a bed sore, decubitus ulcer, or pressure sore however, necrosis or ischemic ulcer are less common terms used for PUs (1). According to a research, PU is caused by physical elements such as shearing forces, friction, and dampness (2). Long periods of sitting or lying in the same position without moving can cause ischemia and necrosis of the skin and underlying tissues in patients with neurological problems (3). Other triggering variables, including as obesity, diabetes mellitus, ageing, lowered immunity, dietary inadequacies, and co-morbidities, increase the susceptibility of these patients (4). Additionally, the inability of tissues to receive enough oxygen due to heart conditions like acute myocardial infarction, respiratory problems like respiratory distress and anemia, and nutritional deficiencies like low protein levels in the body prevent wounds from healing quickly, which results in the development of PU (5).

Pressure ulcers are a prevalent health issue that place a strain on the system as a whole. Patients and their families are financially burdened as a result of pressure ulcers, which raises the cost of treatment at the medical facility level (6). According to a research, PU in the United Kingdom (UK) costs between 1.4 and 2.1 billion pounds annually. Around 983 million Australian dollars are spent annually in Australia on pressure ulcer care. Patients with comorbid conditions are apprehensive and stressed, which increases their chance of developing PU (7). Schizophrenia, severe depression, and other serious mental illnesses, as well as any hygienic neglect and the older age group, between 60 and 80 years, also enhance the risk of PU development (8). It has been reported that on the artery side, tissues can withstand a maximum pressure of 30-32 mm Hg for a brief length of time. If capillary pressure rises even gradually above the level that is

tolerable, it blocks cellular blood flow, which leads to tissue death and ulceration (9).

Patients with pressure ulcers have experienced conditions like excruciating pain, anguish, infection, extended hospital stays, and even death. In addition, a meta-analysis conducted in Ethiopia revealed that one of the three patients who had spinal cord injuries also had PU (10). This demonstrates its widespread severity, which ultimately places a significant strain on the health care system (11). Therefore, analyzing the factors associated with the development of PU is need of time to reduce the burden on healthcare system and to improve the quality of life of the patients hence, the study aims to identify the association of braden scale with the development of open wound PU among patients who were hospitalized with neurological disorders at a private tertiary care hospital in Karachi, Pakistan.

## **Methodology**

In order to conduct a cross-sectional quantitative study on patients with neurological conditions at the Murshid Hospital and Healthcare Centre (MHHCC), a tertiary care facility in Karachi, from June 30 to September 30, 2021, an intentional consecutive non-probability-based sampling technique was used. The study received approval from the AKU Ethical Review Committee and was carried out in compliance with ethical standards for research, including those outlined in the Declaration of Helsinki by the World Medical Association. All patients or their representatives provided written informed consent, and anonymity was maintained. 97 patients satisfied the eligibility requirements for the study, of whom 93 volunteered to participate in the data collection. All hospitalized patients who met the inclusion criteria were enrolled in the study. The response rate was 95.9% as a result.

The criteria for patient inclusion were as follows: Patients over the age of 18 who are (i) inpatients, (ii) admitted for the previous three days to the hospital's neurological unit, and (iii) who provided their informed consent. The following criteria were used to weed out patients: Patients with Stage-I or higher-pressure ulcers who were admitted, as well as those who were approved for one-day treatment in the operating room and hemodialysis facility, pediatric and obstetric patients, and patients who couldn't be discharged because of an unstable medical condition. Using a standardized questionnaire, the respondents' primary data was gathered. during their visit to the chosen hospital, the researcher completed a questionnaire. The questionnaire asked about the respondent's demographics, specific hospital protocols, and preventive devices including air mattresses, pillows, air rings, and water balloons. Other questions asked about positioning, back care, mobilized beds to chairs, and physiotherapy. Followed by this Braden scale analysis was performed (12). The data were examined using SPSS version 21. The categorical variable was represented as frequency and percentage, whereas the numeric element was represented as mean standard deviation. To assess and determine the relationship between the development of open vs. closed wound pressure ulcers and the demographic and clinical risk factors, the Chi-Square test was used.

## Results

The study included  $n=93$  patients in total from the Murshid Hospital and Healthcare Centre in Karachi. According to operational definitions, the researcher classified the participants into two groups: "group I" for those without open wound PU and "group II" for those with open wound PU. The distinctions between these two groups suggest a relationship between a variable and the emergence of open wound PU. Patients in group I had an average age of  $54.27 \pm 17.49$  years. It was  $52.23 \pm 19.77$  years in group II, with no statistically significant difference between the groups ( $p = 0.47$ ). Among the  $n = 33$  female participants, 19 patients (35.20%) were from group I and 14 patients (35.90%) were in group II, whereas the  $n = 60$  male participants, 35 patients (64.80%) were from group I and 25 patients (64.10) were in group II, with no statistically significant difference between the groups ( $p = 0.56$ ).

Table 1. Shows the comparison of sensory perception, moisture, activity, mobility, nutrition, friction and shear between both the groups. Assessment of these all Braden scale parameters revealed significant difference between both the groups. Furthermore, in group I, the mean Braden score was  $14.31 \pm 3.20$ , while in group II, it was  $12.21 \pm 3.80$ . This difference between the groups was statistically significant ( $p = 0.03$ ). This indicates that an open wound PU is strongly associated with a low Braden scale score.

Table 1  
Comparison of Mean Braden Scale and Subscale Scores of patients with and without open wound pressure ulcers

Score	Without open wound PU	With open wound PU	<i>p</i> – value
Total Braden Score	14.31 (3.20)	12.21 (3.80)	0.03
Sensory perception	3.46 (0.72)	3.08 (1.06)	0.001
Moisture	2.96 (0.61)	2.49 (0.76)	0.005
Activity	1.67 (0.64)	1.38 (0.54)	0.18
Mobility	2.15 (0.66)	1.79 (0.66)	0.76
Nutrition	2.43 (0.72)	2.08 (0.93)	0.002
Friction	1.65 (0.52)	1.38 (0.49)	0.84

## Discussion

Health care professionals and patients must stay current on the causes, risk factors, and classification of PU to better understand diseases that can be prevented, despite all advancements in the prevention or management of PUs. As a result, multiple classifications are utilized to score PU (13). The Braden scale has been used in this study to forecast the development of PU. The Braden scale has been highly advocated in the literature as having the best sensitivity and specificity. Due to its sensitivity and specificity, ease of use in standard clinical practice, and ability to determine whether a patient is "at risk" or "of no risk" for the development of PU, it is seen to be adequately reliable (14, 15). In one study,

the specificity ranged from 64 to 90% while the sensitivity of the Braden score was 100%.

In the current investigation, a significant difference in PU was seen in the areas of nutrition, sensory perception, wetness, mean Braden score, back care ( $p = 0.03$ ), and sensory perception ( $p 0.001$ ). Additionally, a significant relationship between the mean GCS and length of hospital stay was discovered ( $p 0.001$ ). The average length of hospital stay for the 23 patients included in the study was 6.2 days, according to research conducted at the neurologic intermediate unit (NIMU) at Memorial Hermann Hospital in Houston, Texas, to identify the risk factors of pressure ulcerations among patients admitted to the intensive care unit, with or without any neurological disorder. Regarding PU, BMI, posture, duration of hospital stay, spinal/head injuries, stroke, lack of back care, diet, friction, activity, and mobility, the study found a significant difference in the mean Braden score ( $p 0.01$ ) (16).

This study found a substantial correlation between the mean Braden scores and all of the subscale scores of the Braden classification, which is in line with findings from earlier studies. The current study discovered that improved sensory perception may lower the likelihood of open wound PU in patients as it was discovered that group I had a value of  $3.46 \pm 0.72$  and group II had a value of  $3.08 \pm 1.06$ , with a significant difference between the groups ( $p 0.001$ ). It can be assumed that people with neurological diseases have an increased risk of developing open wound pressure ulcers due to a loss in sensory perception (17). These study results are consistent with metanalysis conducted in 2021 on individuals developed PU while being hospitalized, with ( $p 0.001$ ) also in Ethiopia, where a study came to the same conclusions (18).

The amount of wetness among participants was also measured in the current investigation. Group I's moisture score was 2.960.61 while Group II's was 2.490.76. The substantial difference demonstrates that higher moisture was strongly correlated with the occurrence of open wound PU in the groups ( $p = 0.005$ ). A low moisture score suggests that the skin is continuously moist due to bodily fluids. Additionally, a thorough analysis of 58 studies revealed the importance of moisture in the growth of PUs. According to reports, dampness has a substantial impact on PUs with and without open wounds (19). Extrinsic factors, such as perspiration, faeces, urine, and discharge that macerate the skin's surface, are what cause dampness. This causes blisters to form, which are vulnerable to rupturing. Additionally, too much moisture on the skin's surface weakens the skin barrier and makes it more vulnerable to pressure and friction. This ultimately results in an increase in ulcer development (20).

The nutrition level of the patients in groups I and II was 2.430.72 and 2.080.93, respectively, on the patients' assessment, with a significant difference in both groups ( $p = 0.002$ ). This shows that people with neurological impairments had a lower risk of developing open wound pressure ulcers when eating a balanced diet. Thus, it can be inferred from this study that one of the significant factors of pressure ulcers acquired in a hospital is a patient's nutritional status. This study's conclusion is in line with earlier research that demonstrated that patients' poor nutrition is a major risk factor for developing pressure ulcers while

hospitalized. In addition, the nutritional factors showed significant association in the mean Braden score of open and closed wound PU in patients (21). In accordance with the current study, another research showed that adequacy of nutrition, hydration, and a positive nitrogen balance plays a vital role in preventing and improving PU (22). Patients with a negative balance of nitrogen are at a higher risk for tissue ulceration and, therefore, delay in wound healing. However, due to scarcity of resources, the current study did not determine the nitrogen balance of patients.

## Conclusion

An open wound pressure ulcer is strongly associated with a low Braden scale score.

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