# The Use of The Pressure Ulcer Scale for Healing (Push) in Patients with Pressure Ulcers and Multimorbidity: A Case Study

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**Abstract**

Pressure ulcers are a complication that becomes more complex when experienced by patients with multimorbidity such as Congestive Heart Failure (CHF), Chronic Kidney Disease (CKD), and thrombocytopenia. These conditions can lead to prolonged healing, high risk of infection, systemic complications, and even death. Interventions must be accompanied by appropriate tools to evaluate wound healing optimally. The Pressure Ulcer Scale for Healing (PUSH) is a tool for accurately, practically, and simply assessing the progression of pressure ulcers. However, its use for evaluating pressure ulcers remains limited. To describe the use of PUSH in patients with pressure ulcers and multimorbidity. This study used a case study design involving a 56-year-old patient with a grade III pressure ulcer on the buttocks measuring 121.5 cm2 with granulation tissue, minimal necrosis tissue, pus, and active bleeding. Wound progression was evaluated using PUSH over 4 days during wound care. Results: The PUSH score increased to 16 with a wound size of 150 cm2 moderate exudate, and extensive necrosis tissue. This indicates that the wound condition has not improved, prompting an evaluation of the wound care and factors hindering wound healing. Although PUSH aids clinical decision-making, it has limitations in assessing wound depth and systemic conditions as it only evaluates three parameters. Conclusion: The PUSH instrument is a simple and efficient tool for monitoring the healing of pressure ulcers and has the potential to indicate changes in wound condition as a result of an intervention, thereby aiding clinical decision-making. PUSH is recommended for routine use in clinical practice, while continuing to evaluate systemic conditions comprehensively and involving a multidisciplinary team.

**Keywords**: Multimorbidity, Pressure Ulcer Scale for Healing, Pressure Ulcer

## Introduction

Patients with chronic diseases often require hospitalization with prolonged bed rest, especially in patients with immobilization. Symptoms experienced by patients, such as pain and edema in the lower extremities, weakness, and fatigue, can make it difficult for patients to perform activities and spend a significant amount of time lying in bed. Prolonged bed rest can impair blood circulation, particularly in areas of the skin that are frequently subjected to pressure and overlying bony prominences. This leads to tissue hypoxia and necrosis, known as pressure ulcers (Riani et al., 2022)

The prevalence of pressure ulcers varies considerably, with incidence rates ranging from 2.2% to 23.9% in long-term care units, 0.4% to 38% in acute care units, and 0% to 7% in home care settings. Some hospitals in the United States report a prevalence of pressure ulcers ranging from 4.7% to 29.7%, and in the United Kingdom, from 7.9% to 32.1%. Acute care facilities (nursing homes) in Europe range from 3% to 83.6%, while acute care and rehabilitation facilities in Singapore range from 9% to 14% ((NPUAP, 2020). Data from the Ministry of Health indicate that the prevalence of pressure ulcers in Indonesia reached 33.3% in 2018. This figure is higher than the prevalence in Asia, which ranges from 2.1-18%, and in the ASEAN region, which ranges from 2.1-31.3% (Kemenkes, 2023). The prevalence of pressure ulcers in West Java reached 11.44%, making it a significant health issue, particularly among vulnerable groups and patients with chronic conditions (Riskesdas, 2018). Pressure ulcers are also one of the top ten most common diseases in Garut District (BPS, 2018). Therefore, appropriate and comprehensive management is essential to prevent further complications.

Pressure ulcers are localized tissue damage to the skin and underlying soft tissues that typically occur in areas of the body that are prominent due to prolonged or continuous pressure, such as from hard surfaces like bones, medical devices, or certain objects. Pressure ulcers can present as intact skin or open wounds that cause pain. This injury is typically caused by prolonged high pressure or pressure combined with friction. Due to its slow healing process and tendency to recur due to various inhibitory factors, this wound is classified as a chronic wound (Perdanakusuma, 2017). If not properly managed, pressure ulcers can have serious consequences, as they are associated with complications that result in 60,000 deaths annually. Pressure ulcers also increase the risk of mobility limitations and reduced daily activities, which can worsen the severity of the wound and further deteriorate the patient's condition. Additionally, pressure ulcers can increase the cost and duration of patient care, reduce patient and family satisfaction with hospital care, and negatively impact the quality and standards of hospital services (Agustina & Rasid, 2020; Walther et al., 2022).

Patients with pressure ulcers and multimorbidity such as CHF, CKD, and thrombocytopenia will experience various symptoms, including pain at the pressure ulcer site, edema due to CHF and CKD, which can impair mobility, shortness of breath, fatigue, impaired tissue perfusion, electrolyte imbalances, dry and itchy skin, easy bruising, and others (Bauer et al., 2021). This occurs because CHF causes a decrease in cardiac output, resulting in reduced peripheral tissue perfusion, including in wound areas. Oxygenation and nutrient supply to wound tissues are disrupted, slowing the wound healing process. Additionally, edema caused by fluid retention exacerbates pressure on pressure-prone areas (Mervis & Phillips, 2019). In CKD patients, metabolic disorders, anemia, and accumulation of uremic toxins can impair tissue regeneration. Thrombocytopenia also disrupts hemostasis and coagulation processes, making it difficult for wounds to form initial blood clots, which are crucial for the healing phase (Thomas, 2018). Therefore, appropriate interventions are necessary for these patients to prevent further complications.

Interventions provided to patients with pressure ulcers must be accompanied by appropriate tools to evaluate wound healing optimally. The Pressure Ulcer Scale for Healing (PUSH) is a tool for assessing the progression of pressure ulcers. PUSH provides a valid measure of pressure ulcer healing over

time and accurately distinguishes between healing and non-healing wounds. This tool is clinically practical and evidence-based, making it effective for monitoring changes in the status of pressure ulcers (Gardner et al., 2005). The use of the PUSH instrument has been limited in previous studies, so this case study contributes new insights to clinical practice by highlighting a practical, quick, and simple assessment tool that enables healthcare professionals to easily monitor wound progression.

PUSH has been proven valid and reliable in several studies. A study conducted by Thomason et al., (2014) compared the PUSH instrument and the Bates-Jensen Wound Assessment Tool (BWAT) with similar results, both valid and reliable in monitoring the healing of pressure ulcers. PUSH only assesses three parameters: wound size, exudate quantity, and tissue type, making it simpler, more practical, and easier to use in daily clinical practice. Therefore, PUSH is recommended for routine monitoring, while BWAT, which consists of 13 parameters, is more appropriate for research or when a more detailed wound assessment is required. Zeigler et al., (2016) explains that systematic PUSH measurements on pressure ulcers have the potential to indicate changes in wound condition as a result of clinical interventions, thereby guiding effective decision-making. This study aligns with Park, (2014), which analyzed 309 cases of stage II pressure ulcers, finding that PUSH provides consistent scores, enabling comparisons between patients and assessing the effectiveness of interventions. PUSH helps determine care priorities and modify interventions based on wound healing. Furthermore, PUSH is not only effective for evaluating pressure ulcers, research by Hon et al., (2010) demonstrates that PUSH is a valid and responsive evaluation tool for monitoring and documenting the progression of diabetic ulcers and venous ulcers.

This case study is important to report because it illustrates the complexity of managing patients with pressure ulcers and multimorbidity, including CKD, CHF, and thrombocytopenia, which interact and exacerbate the condition of the patient's wounds. Therefore, an appropriate wound assessment tool is needed to monitor wound healing optimally and assist in decision-making regarding treatment. The use of the PUSH instrument plays a crucial role in evaluating wound progression, as it consists of simpler indicators compared to other instruments, thereby facilitating objective and consistent monitoring of wound healing progress. The objective of this case study is to describe the use of the PUSH instrument in patients with pressure ulcers and multimorbidity

## Research Methods

This study uses a descriptive case study method, which specifically describes individual cases of disease, treatment, and patient responses that can provide new insights for nursing education. The patient in this case is a 53-year-old man diagnosed with CHF, CKD, thrombocytopenia, and a pressure ulcer who was receiving treatment at a hospital in West Java. The pressure ulcer was located on the buttocks, classified as grade III with an area of 121.5 cm2 and presented granulation tissue, slight necrosis, pus, and active bleeding. The researcher implemented nursing interventions including wound care, mobilization every 2 hours, olive oil for dry skin, and pain management, which included deep breathing relaxation for wound pain and cold compresses for pain associated with hot edema.

This case study uses the Pressure Ulcer Scale for Healing (PUSH) to assess the healing progress of pressure ulcers based on three components: wound size, amount of exudate, and type of tissue at the wound base. The total score is calculated from these three components, with a score range of 0–17. A decreasing score over time indicates improved wound healing. PUSH monitoring is conducted during each wound care session using honey dressing, starting with removing the dressing, followed by cleaning the wound and observing the exudate present on the wound. The wound is then cleaned with saline solution, and necrotic tissue is removed through conservative debridement to allow pus to drain. The length and width of the wound are measured using a ruler, and the type of tissue present on the wound is observed and documented. The wound is

then dressed with gauze impregnated with honey. This honey dressing is applied once daily, in the morning.

Data collection was conducted through two main sources, namely primary data and secondary data. Primary data was obtained directly from patients through comprehensive physical examinations and interviews to identify their main complaints, medical history, and subjective experiences. Meanwhile, secondary data was obtained from medical records, including medical history, results of supporting examinations, and treatments administered. Interviews were also conducted with patient's families to supplement information about the patient's condition from the perspective of their immediate environment. Data collection was conducted over a period of 4 days from September 25 to September 28, 2024. After all data were collected, they were analyzed using narrative analysis, which involves the systematic and in-depth organization and interpretation of data to provide a comprehensive overview of the patient's clinical condition within the observed context.

The ethical principles used in this case study refer to informed consent, whereby patients and their families are first given a thorough explanation of the procedure, and then asked to give their consent voluntarily without pressure or coercion. Patient confidentiality is maintained by using initials, and during the intervention process patients are treated ethically and with respect. This case study was conducted in accordance with procedural standards aimed at providing benefits and minimizing risks or adverse effects for the patient.

## Case Description

A 53-year-old male patient was admitted to a hospital in West Java with complaints of worsening buttock wounds, swelling throughout the body (anasarca edema), and shortness of breath. Prior to admission, the patient had been treated for two weeks at a clinic for shortness of breath and anasarca edema. However, after two weeks of treatment, the patient's condition worsened, and severe pressure ulcers developed on the buttocks, leading to referral to the hospital in West Java. The patient has a history of Congestive Heart Failure (CHF) in 2022 and has been undergoing treatment and regular monitoring, which improved the patient's condition. However, in August 2024, the patient experienced recurrent shortness of breath accompanied by generalized edema. After examination, the patient was diagnosed with pressure ulcers, Chronic Kidney Disease (CKD), and thrombocytopenia.

The patient has an IV line in the left upper extremity with 10 drops/minute of NaCl solution, a nasal cannula at 6 liters/minute, and a urinary catheter. Physical examination findings include BP 142/88 mmHg, HR 75 beats/minute, RR 28 breaths/minute, SpO2 93% with nasal cannula support, temperature 37. 4°C, CRT < 2 seconds, warm extremities, decreased skin turgor, no cyanosis, no jugular vein distension, symmetrical chest movement, presence of accessory breathing muscles, dry skin, tenderness on both extremities and abdomen. There is grade III anasarca edema with a depression of 4-6 mm and a duration of > 1 minute, as well as a grade III pressure ulcer on the patient's buttocks with an area of 121.5 $cm^2$, with granulation tissue, slight necrosis, pus, and active bleeding.

During treatment, the patient has not undergone debridement or hemodialysis due to unstable condition, such as decreasing blood pressure when hemodialysis was about to be performed. The patient received therapy with Metronidazole 3x500 ml, Ceftriaxone 2x1 ml, Omeprazole 2x40 ml, Ketorolac 1x1 ampoule, Ranitidine 1x1 ampoule, Farsix 2x40 ml, Bisoprolol 1x1. 25 ml, Angintriz 2x35 ml, Albumin 2x20 ml, and Sagestam 3x/day. The patient underwent diagnostic examinations such as a complete blood count, ECG, scrotal ultrasound, and chest X-ray, which revealed bilateral scrotal edema and cardiomegaly with bilateral pleural effusion. The results of the complete blood count on September 20, 2024, were as follows: Hemoglobin 14.1 g/dL, White Blood Cells 16,070/$mm^3$, Platelets 118,000/$mm^3$, Fasting Blood Glucose 133 mg/dL, Urea 210 mg/dL, Creatinine 2.73 mg/dL, SGOT 39 U/L, Albumin 2.44 g/dL, Protein +1 (30 mg/dL) g/L, Urobilinogen negative, Neutrophils 77%, Lymphocytes 8%, Monocytes 12%.

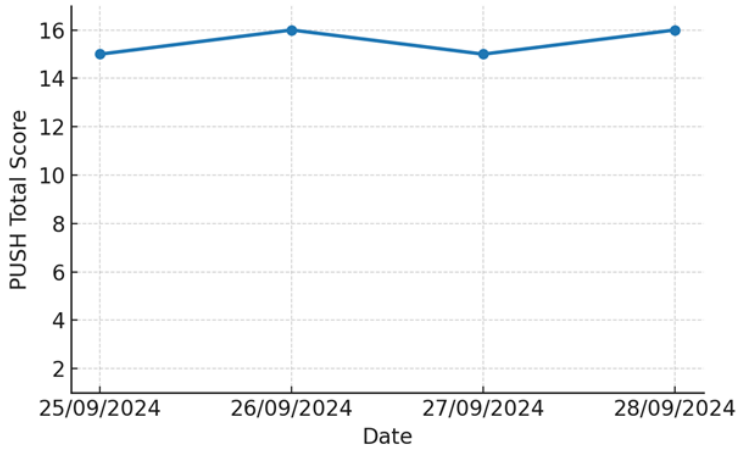
## Results

This case study used PUSH as an instrument to monitor wound development over a period of 4 days and was observed periodically during each wound care session. The patient's pressure ulcer was classified as grade III, located on the buttocks with an area of 121.5 cm2, granulation, slight necrosis, pus, and active bleeding. The following is the progression of the pressure ulcer condition based on monitoring using the PUSH instrument

**Table 1. Wound Development Based on the Pressure Ulcer Scale for Healing**

| Date | Wound Size | Score | Exudate Amount | Score | Type of Skin Layer | Score | Total PUSH Score |
|---|---|---|---|---|---|---|---|
| 25/09/2024 | 9x13.5 = 121.5 cm2 | 10 | Many | 3 | Granulation | 2 | 15 |
| 26/09/2024 | 9x14 = 126 $cm^2$ | 10 | Many | 3 | Slough | 3 | 16 |
| 27/09/2024 | 10x14 = 140 $cm^2$ | 10 | Medium | 2 | Slough | 3 | 15 |
| 27/09/2024 | 10x15 = 150 $cm^2$ | 10 | Medium | 2 | Necrotic | 4 | 16 |

Based on Table 1, the evaluation results using PUSH, which consists of wound size, amount of exudate, and skin layer type, indicate that the wound condition has not shown significant improvement. In terms of wound size, the score remained at 10, with the wound area increasing from 121.5 $cm^2$ to 150 $cm^2$. The amount of exudate decreased slightly from the "heavy" category in the first two days to "moderate" in the next two days. However, the type of skin layer showed a change indicating worsening, from granulation tissue to spreading necrotic tissue. The PUSH score on the fourth day of treatment was 16, indicating that the wound was in a relatively severe condition with fluctuations and no significant signs of improvement. Based on the PUSH score in this case, it is recommended to re-evaluate the wound care interventions provided to prevent further progression of tissue damage.




**Graph 1. Changes in PUSH Scores**

The graph shows fluctuating changes in the total PUSH score from 15 on the first day to 16 on the fourth day of treatment. These fluctuations indicate that the patient's wound has not shown significant healing. These changes in scores may indicate the presence of healing barriers, such as uncontrolled medical conditions, infection, or limitations in the interventions provided. Therefore, a comprehensive evaluation of the care plan is necessary, including the selection of

wound care methods, management of comorbidities, and optimization of nutrition and patient mobilization to support optimal healing.

**Figure 1. Condition of Pressure Ulcer After Second Day of Treatment**

**Figure 2. Condition of Pressure Ulcer After Fourth Day of Treatment**

On the fourth day, the PUSH score increased to 16, indicating grade IV with extensive necrotic tissue, yellowish slough, and bright red areas indicating inflammation or open granulation tissue. The wound edges appeared irregular and began showing signs of undermining. The wound was moist, had a characteristic odor, and demonstrated progressive destructive processes requiring debridement and intensive multidisciplinary management. Patients in this case study often do not realize when they defecate, leading to poor wound hygiene due to contamination from feces. Therefore, monitoring of wound dressings was increased to ensure prompt wound care if dressings appear soiled, thereby preventing more severe infections.

## Discussion

The Pressure Ulcer Scale for Healing is a wound assessment tool developed by the National Pressure Ulcer Advisory Panel (NPUAP) and used to monitor the healing process of pressure ulcers. This tool has been proven valid and reliable in various studies and has become part of routine protocols in healthcare facilities. This instrument assesses three key elements of pressure ulcers: wound size, exudate amount, and tissue type at the wound base. Each component is assigned a numerical score, which is then summed to produce a total (Zeigler et al., 2016). Its simple and systematic components allow healthcare professionals of varying experience levels to use it quickly and consistently without requiring complex additional tools. A study of the RMU, (2022) showed that after training in the use of PUSH, the consistency of its use by nurses reached 92.19%, and all nurses (38 individuals) felt confident in using the instrument. Therefore, PUSH is an appropriate choice for routine monitoring of the healing process of pressure ulcers.

Pressure ulcers are localized tissue damage to the skin and underlying soft tissues that typically occur in areas of the body that are prominent due to prolonged or continuous pressure, such as from hard surfaces like bones, medical devices, or certain objects. Pressure ulcers can present as intact skin or open wounds causing pain (Perdanakusuma, 2017). In this case, the pressure ulcer presents as an open wound on the buttocks, classified as Grade III with an area of 121.5 cm2, showing granulation tissue, minimal necrosis, pus, and active bleeding. Grade III pressure ulcers carry a high risk of local and systemic infections, including osteomyelitis and sepsis, as the wound facilitates bacterial entry into the bloodstream, particularly in patients with multimorbidity such as CHF, CKD, and thrombocytopenia (Espejo et al., 2018).

The PUSH instrument is used periodically to assess wound development, enabling

consistent and continuous monitoring of even minor changes in wound condition (Zeigler et al., 2016). In this case, wound healing monitoring using PUSH was conducted over 4 days. The total PUSH score showed fluctuating values, with a score of 16 on the fourth day of care, a wound size of 150 cm2, moderate exudate, and extensive necrosis. These fluctuating scores indicate that the patient's wound condition has not shown significant healing. The increase in PUSH scores may indicate the presence of healing barriers, such as multimorbidity, infection, or limitations in the interventions provided (Seo et al., 2022).

Factors that exacerbate the condition of pressure ulcers include intrinsic and extrinsic factors. Intrinsic factors that influence pressure ulcers include the aging process, poor or excessive nutritional status (underweight or overweight), medical conditions that damage blood vessels, and body hydration status. In this case study, aging influenced the wound healing process because the patient was 53 years old. With increasing age, physiological changes occur in the skin, such as prolonged epidermal cell regeneration cycles, decreased elasticity and vascularization, weakened inflammatory responses, and decreased serum albumin levels (Chanif & Yuniasari, 2024). Obesity in patients also leads to excessive body fat, increasing the risk of infection in wounds due to inadequate blood supply to adipose tissue (Siswandi et al., 2020). Patients also have a history of conditions that damage blood vessels, such as hypertension, diabetes, CHF, and CKD, which impair tissue perfusion and result in inadequate oxygen and nutrient supply to the wound area (Ridwan et al., 2017). Meanwhile, extrinsic factors influencing pressure ulcers include non-ergonomic sitting positions, poor bed hygiene, insufficient frequency of position changes, improper body positioning, and the presence of a urinary catheter (Anugrahwati, 2019; Geelen et al., 2021). Patients often do not realize when they have a bowel movement, leading to poor hygiene in the wound area due to contamination from feces. During hospitalization, patients are also fitted with urinary catheters, further limiting their mobility.

The PUSH instrument contributes to patient care decision-making. A decreasing PUSH score over time is a positive indicator of wound healing, while an increase in the score indicates the need for re-evaluation of ongoing interventions (Zeigler et al., 2016). Therefore, wound care was increased to 1-2 times per day to maintain wound dressing cleanliness and prevent contamination from feces, which could worsen infection. Additionally, the presence of extensive necrosis indicated the need for debridement; however, thrombocytopenia increased the risk of significant bleeding, so surgical procedures were postponed and replaced with an alternative method, conservative debridement. The patient also required hemodialysis as the primary therapy for CKD; however, this procedure was also hindered due to the risk of bleeding from heparin use and the potential for intradialytic hypotension, which could lead to more serious complications (Futri et al., 2024). Therefore, CKD management was conducted with a safer approach until the patient's condition stabilized, including pharmacological therapy such as diuretics, beta-blockers, and albumin. Additionally, laboratory results and clinical signs are monitored, including urine output, edema, and GFR. Urine output increased from 230 ml on the first day to 300 ml on the fourth day, while edema remained at grade 3 with GFR decreasing from 25.5 to 12.4 mL/min/1.73 $m^2$.

The consistency between the total PUSH scores and the interventions provided indicates the ease of application of PUSH in monitoring the progression of pressure ulcers. Its use is practical and efficient in daily nursing practice, and facilitates documentation and communication among healthcare professionals. The study Zeigler et al., (2016) explains that systematic measurement of PUSH in pressure ulcers has the potential to indicate changes in wound condition as a result of clinical interventions. This study provides an overview that clinical assessment results using PUSH can guide effective decision-making. This study aligns with Park, (2014), which analyzed 309 cases of stage II pressure ulcers, finding that PUSH provides consistent scores, enabling comparisons between patients and assessing the effectiveness of interventions. PUSH

helps determine care priorities and modify interventions based on wound healing. Furthermore, PUSH is not only effective for evaluating pressure ulcers; research by Hon et al., (2010) demonstrates that PUSH is a valid and responsive evaluation tool for monitoring and documenting the progression of diabetic ulcers and venous ulcers.

This case study demonstrates that PUSH is an easy and efficient tool for monitoring the healing of pressure ulcers and has the potential to indicate changes in wound condition as a result of an intervention, thereby aiding clinical decision-making. However, PUSH does not evaluate wound depth because it consists of only three components: wound size, amount of exudate, and wound bed condition. PUSH also cannot assess pain complaints and the patient's systemic condition comprehensively. Although there was a significant reduction in pain from 6/10 on the first day to 4/10 on the fourth day, the PUSH score on that day did not change because the pain component was not included in the assessment parameters. Therefore, PUSH should be used as a supplementary tool, and a comprehensive evaluation of the patient's condition should be conducted, including physical examination and monitoring of laboratory results, to ensure appropriate and comprehensive wound management.

## Limitations

This study only involved one patient with a limited time frame of 4 days, so the results cannot be generalized to a larger population of patients with similar conditions. Therefore, further research with a stronger design and a larger sample size is needed to assess the effectiveness of PUSH use in patients with pressure ulcers and multimorbidity. Additionally, this case study did not evaluate the depth of the wound or the patient's systemic condition comprehensively due to the limitations of the PUSH instrument, which only assesses three components: wound size, amount of exudate, and wound tissue.

## Conclusion

PUSH is a simple and efficient tool for monitoring the healing of pressure ulcers because it consists of only three components: wound area, exudate volume, and tissue type at the wound bed. PUSH has the potential to indicate changes in wound condition as a result of an intervention, thereby aiding clinical decision making in the care of patients with pressure ulcers and multimorbidity. The PUSH score in this case study increased to 16 with a wound size of 150 cm2, moderate exudate, and extensive necrosis. This indicates that the wound condition has not improved significantly, prompting an evaluation of the intervention and factors hindering wound healing. Although the PUSH score was considered practical and easy to use, it has several limitations that healthcare professionals should note. The PUSH score does not assess wound depth or systemic conditions comprehensively. Therefore, the PUSH instrument can be used routinely in clinical practice as a supplementary tool, but it is essential to continue evaluating systemic conditions comprehensively and involve a multidisciplinary team.

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