

# Pressure Ulcer Characteristics in Pediatric Patient

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**Abstract:** Pressure ulcer is a common condition in adult patient. This condition however is not well studied in pediatric patient. Pressure ulcers commonly formed on tissues located above bony prominences. Continuous pressure applied on these areas (eg. by mattress surface or medical equipment) may cause tissue damages that contribute to the ulcers formation. This is a descriptive study using culture test and sensitivity test. This study was done in the main referral hospital of Sumatera Island, RSUP H. Adam Malik Medan from June to October 2017. The minimum sample was 20. Steps done in this study include patient sampling, coding, data analysis and report writing. Subject characteristics discussed in this study include age, gender, ulcer severity grade, location, onset, and underlying disease. The most common age group found in this study was the 0-3 years old age group at 9 subjects (50%). The most common gender group found in this study was male at 15 subjects (75%). The most common ulcer grade group found in this study was grade 1 ulcer group at 9 subjects (45%). This study also found the occipital region as the most common ulcer region at 6 subjects (30%). The most common onset found in this study was after 3-5 weeks at 10 subjects (50%). The most common underlying disease found in this study was hydrocephalus at 5 subjects (25%).

## 1 INTRODUCTION

Pressure ulcer is a localized injury to the skin and/or underlying tissue usually over a bony prominence, as a result of pressure, or pressure in combination with shear and/or friction (National Pressure Ulcer, 2009). Pressure ulcer is a common clinical problem found within hospital inpatients. This problem has both physical and psychological implications that may increase morbidity, mortality, and hospital cost (Schluer, 2016).

Studies on pressure ulcer in pediatric population has not been done extensively, unlike in adult population (Baharestami and Ratcliff, 2007). The prevalence of pressure ulcer in hospital pediatric patients ranges from 3% to 35% (Kottner et al., 2010). From 2011-2016, 53 pediatric pressure ulcer cases were identified in RSUP Haji Adam Malik (Rekam Medis, 2017).

Children skins are morphologically and functionally different to adult skins. Differences in physiological demands also cause fluid and electrolyte imbalance to happen more frequently in pediatric population. Higher body surface area in children also put them in higher risk for dehydration. Hypoxia may occur in skin cells with minimal

perfusion. This may cause them to easily break even under minimal trauma (Rossie, 1996).

Some known risk factors of pressure ulcer in pediatric population include immobility and decrease of skin sensitivity (Suddaby et al., 2005). Communication skills limitations in ill pediatric population also put them at higher risk to develop pressure ulcer (Dellinger et al., 2012).

Skin discontinuity such as epidermal peeling or skin tearing (eg. caused by frictional stress) on pediatric population especially in critical conditions may increase risk for developing septicemia and death (Dellinger et al., 2012).

Secondary infection of pressure ulcer is the most commonly found complication. Resistant microorganisms may colonize the pressure ulcer thus causing local infection and severe bacteremia may also ensue thereafter (Cataldo et al., 2011). A study by Braga et al. found *S. aureus* (20.7%), negative Gram bacilli (32.5%) or both (46.8%) as the three most common etiology of pressure ulcer secondary infection (Baraga et al., 2013).

Pressure ulcer may cause unpleasant experiences in pediatric patients and their families, appearance alterations, treatment time prolongation and secondary infection. Wound caring may also prove

to be quite challenging in these patients (Bemabe et al., 2012). This study aimed to address the lack of epidemiological studies on pressure ulcer in pediatric population in Indonesia especially in North Sumatera. Parameters used in this study include frequency, microbial pattern, and sensitivity test result.

## 2 METHODS

This was a descriptive observational study using cross sectional method. The study was done from July to October 2017. The target population was pressure ulcer inpatients at RSUP H Adam Malik Medan. The accessible population was pressure ulcer inpatients at rindu B, NICU and PICU of RSUP H Adam Malik Medan. Accessible population that fulfilled the inclusion and exclusion criteria became the sample group in this study.

Inclusion criteria in this study include <18 years old pressure ulcer inpatients without topical antibiotic treatment on the pressure ulcer location. Patients without consent to this study were excluded.

20 samples were included in this study using consecutive sampling method. Variables used in this study include pressure ulcer, microbial profile and sensitivity test.

## 3 RESULT

Subject characteristics discussed in this study include age, gender, ulcer severity grade, location, onset, and underlying disease

Table 1. Subject distribution accorded to age, gender, ulcer severity grade, location, onset, and underlying disease.

Characteristics	Decubitus ulcer patients	
	n	%
Age		
0 – 3	9	45
>3 – 6	1	5
>6 – 9	0	0
>9 – 12	1	5
>12 – 15	4	20
>15 – 18	5	25
Total	20	100
Gender		
Male	15	75
Female	5	25
Total	20	100

Ulcer Grade		
Grade 1	9	45
Grade 2	6	30
Grade 3	5	25
Total	20	100
Onset (weeks)		
0 – 2	5	25
3 – 5	10	50
6 – 8	5	25
Total	20	100
Location		
Femoral	1	5
Iliac	1	5
Occipital	6	30
Feet	1	5
Sacrum	5	25
Scrotum	1	5
Temporal	1	5
Tibial	1	5
Knees	1	5
Arms	2	10
Total	20	100
Undelying disease		
Abscess	1	5
Acute lymphoblastic leukemia	1	5
Fracture	2	10
Head injury	4	20
Hydrocephalus	5	25
Burn wounds	1	5
Bacterial meningitis	1	5
Post appendicitis	1	5
Systemic lupus erythematosus	1	5
Intracranial space occupying lesion	1	5
Osteomyelitis		
Osteosarcoma		
Total	20	100

## 4 DISCUSSION

The most common age group found in this study was the 0-3 years old age group at 9 subjects (50%). A study by Schindler et al also found similar result. They concluded that pressure ulcers can be more easily formed at an age above 2 years old during admission to the hospital PICU when compared to those of older age (Schindler et al., 2011). A study by Curly et al also found the mean age of pediatric pressure ulcer inpatients was at 36 months old (Curley et al., 2003).

The most common gender group found in this study was male at 15 subjects (75%) compared to female at 5 subjects (25%). Several epidemiological studies done on children pressure ulcer patients also found similar results. Higher percentage and

distribution of adipose tissues in females were thought to be able to cushion the bony prominence areas (eg. on sacrum). However, further studies are needed (Kottner et al., 2010).

The most common ulcer grade group found in this study was grade 1 ulcer group at 9 subjects (45%). Similar results were also found on studies done by Curley et al (2013).

This study also found the occipital region as the most common ulcer region at 6 subjects (30%). Pressure ulcers on children usually formed on body areas that sustain the most pressure. Solis et al found that within all age groups, occipital region usually sustain the most pressure followed by sacrum and scapular region (Solis et al., 1988). Different patterns were found in adults where ischial tuberosity, sacrum, and heels are the most common regions (Kottner et al., 2010). These differences were thought to be caused by anatomical developmental changes. Pressure burdens tend to shift from occipital to sacrum region as people age (Solis et al., 1988).

The most common onset found in this study was after 3-5 weeks at 10 subjects (50%). Similar results can be found on a study by Manning et al. where they found 24 days as the mean inpatient treatment duration of their subjects. They also found that longer duration of inpatient treatment was associated with higher risk to develop pressure ulcers (Manning et al., 2015).

The most common underlying disease found in this study was hydrocephalus at 5 subjects (25%). Immobility and sensate loss are some of the main risk factors for pediatric pressure ulcers (Bernabe, 2012). Both conditions are known to be common in patients with hydrocephalus.

## 5 CONCLUSION

The most common age group found in this study was the 0-3 years old age group at 9 subjects (50%). The most common gender group found in this study was male at 15 subjects (75%). The most common ulcer grade group found in this study was grade 1 ulcer group at 9 subjects (45%). This study also found the occipital region as the most common ulcer region at 6 subjects (30%). The most common onset found in this study was after 3-5 weeks at 10 subjects (50%). The most common underlying disease found in this study was hydrocephalus at 5 subjects (25%).

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