



## Background

Preventing hospital-acquired pressure injuries (PIs) remained a top priority of hospitals worldwide (1). The incidence of PI is a quality-of-care indicator and a nursing sensitive outcome (2). Patients who develop PIs experience added morbidity, pain, infection, loss of function, extended hospitalization stay, and increased healthcare expenditure cost.

Heel has become the second most common site for the development of pressure ulcers in recent years. Hospitals worldwide have been implementing preventive measures to tackle pressure ulcers in patients, such as use of offloading devices and dressing

## Aims

To evaluate the effectiveness of a soft silicone multilayer heel dressing (Mepilex® Heel) in reducing the incidence of heel pressure injuries (HPI) among critical ill patients in Intensive Care Unit (ICU).

## Methodology

This study was conducted in Singapore General Hospital, equipped with three adult ICUs (Surgical, Medical, and Neuroscience) with a total capacity of 26 beds. The nurse-to-patient ratio is 1:1 for all ICUs as per staffing practice internationally (31).

A quasi-experimental, pre-, and post-intervention study design was adopted. A convenience sampling was used to recruit 326 patients (195 patients in pre-intervention, 131 patients in intervention group).

During pre-intervention period, patients who met the inclusion criteria received the standard PI preventive measures such as daily PI risk assessment, regular repositioning, pressure-redistributing overlay or alternating air mattress and skin care such as barrier or emollient cream.

During intervention period, eligible patients received the standard PI preventive measures in addition to prophylactic foam heel dressings that were applied to both heels within four hours upon admission to the ICU. The heel dressing was changed every 3 days or whenever soiled.

Patient's heels were assessed daily for development of PI to their heels and the conditions were documented by the registered nurses who cared for the patient as per standard hospital practice. Data were censored when patients were able to sit out of bed or discharged. The staging of PI was according to the National Pressure Ulcer Advisory Panel (NPUAP) and European Pressure Ulcer Advisory Panel (EPUAP)

To control for potential confounders, other data such as patient's demographic, medical and surgical information, severity of illness according to Acute Physiology and Chronic Health Evaluation II (APACHE) score, and total length of observation expressed in days were collected.

Demographics		Pre N (%)	Post N (%)	Chi square	P value
Gender	Male	113 (57.9%)	90 (68.7%)	3.897	0.048
	Female	82 (42.1%)	41 (31.3%)		
Race	Chinese	133 (68.2%)	94 (71.8%)	2.293	0.514
	Malay	35 (17.9%)	18 (13.7%)		
	Indian	14 (7.2%)	13 (9.9%)		
	Others	13 (6.7%)	6 (4.6%)		
		Pre Mean (SD)	Post Mean (SD)	T test	P value
Age		61.0 (15.60)	60.7 (15.67)	0.193	0.847
<b>Clinical factors</b>					
Length of observation		6.4 (9.63)	4.4 (4.73)	2.584	0.01
APACHE II		21.7 (7.70)	22.6 (7.10)	-1.065	0.288

Table 1: Demographic, clinical, and hospitalisation data between 2 groups

## Results

Statistical analysis was made using Fisher exact test to compare between the two groups. The results showed a reduction of 86% in the incidence of HPI between the two groups (pre-intervention: 10.8% versus 1.5%: post-intervention). Patients in the intervention group were less likely to develop HPis (p<0.007).

		Pre N (%)	Post N (%)	Fisher Exact	P value
Developed Heel PI	No	174 (89.2%)	129 (98.5%)	9.947	<0.0001
	Yes	21 (10.8%)	2 (1.5%)		

Table 2: Pre and Post intervention analysis results

Pre-intervention		
	Right Heel	Left Heel
Stage I	15	16
Stage II	1	0
Stage III	0	0
Stage IV	0	0
Unstaged	0	0
SDTI	1	1
<b>Total</b>		34

Table 3: Pressure injury developed pre- intervention

Intervention		
	Right Heel	Left Heel
Stage I	2	2
<b>Total</b>		4

Table 4: Pressure injury developed post- intervention

## Conclusion

Prophylactic multilayer foam heel dressing has shown to be effective at reducing the incidence of HPis among critically ill patients in ICU, even with the tropical climate in Singapore. Moving forward, prophylaxis dressing will be included as part of the standard PI prevention interventions for high risk patient.