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THE USE OF DURABLE BARRIER CREAM IN PREVENTING PRESSURE ULCER

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ABSTRACT

A pressure ulcer is a common health problem, particularly among the physically limited or bedridden individuals. The most vulnerable group to suffer this condition is the elderly. The prevalence of Geriatric inpatient with pressure ulcer stage I, II, III or even IV for a month was 35.5% of the total admission. The understanding of recovery process, prevention remains the best management strategy as it improves their quality of life. This study aims to compare PU development outcomes in geriatric patients nursed on either using the Durable barrier cream (Cavillon cream) or non-pharmacological intervention alone. Using the Quasi experimental study-design, the selected participants were subjected to Cavaillon cream as well as the intervention. The assessment used were the outcome of the pressure ulcer was assessed using the measured size of the redness area. There was the statistically significant reduction in pressure ulcer size on day three compared to the size on day one among the intervention group, z value was -5.028, $p<0.005$.A systematic assessment and intervention were found to be effective in improving the healing process of the pressure ulcers, while providing high satisfaction in the practiced setting.

Keywords: Durable barrier cream, Geriatrics, Intervention, Pressure ulcers

INTRODUCTION

Pressure Ulcer (PU) is a common health problem, particularly among the physically limited or bedridden and the group most vulnerable to suffer this condition is the frail elderly. This manifestation is fairly evident within the entire health framework for hospitals, clinics, long-term care facilities in private homes. PU is defined as any lesion involving the skin, subcutaneous tissue, muscle, and bone and usually occurs over a bony prominence (Kozier, 1998) in which this condition can develop within 24 hours or take as long as five days to appear (Krasner, 1995). There are staging criteria established by National Pressure Ulcer Advisory Panel (NPUAP) in 1989 for PU which classified the PU into four stages or grades. A large number of categories 3 and 4 PUs become unrelieved wounds and numerous cases, PUs among this group may become chronic without any observable reasons and will continue so for prolonged periods, and in some cases, continue until death due to ulcer complication (sepsis or osteomyelitis).

The presence of a PU constitutes in the Geriatric Giant consists of multi factorial pathological conditions. The Geriatric Giant is the main category of impairment that appears in the elderly, which include immobility, instability, incontinence, and impaired intellect/memory. The accumulated effects of harm due to immobility, nutritional insufficiency and chronic diseases involving multiple systems influence the aging skin of the elderly person to increase susceptibility. The problem of impaired skin integrity can be potential or is an actual disruption of skin layers, usually due to abridged or absent mobility, and immobility is one of the chief components of Geriatric Giant.

In the studied setting (ward 13U, UMMC), it was found that the prevalence of Geriatric inpatient with PU stage I, II, III or even IV for October 2011 showed that 27 sufferers out of 76 of the total admissions. It was 35.5% of the total admission. Being pressure sore as the cause for admission is 5 out of 76 admissions, means 6.5% of the total caused by admission. (Sources; wards'

census, October, 2011). Sadly some patients even die because of the PU or with the PU remain untreated. The understanding of recovery process in elderly persons, the prevention remains the best for management strategies for the vulnerable elderly as it can save cost and improve their quality of life.

As stated by Vohra & McCollum (1994), PUs are an unpleasant and costly complication of hospitalization. Although many PUs are preventable, many health care facilities lacked in a systematic approach to avoiding this hurdle (Patterson, 1995). The ability of the Braden Scale to predict the development of PUs (predictive validity) has been tested extensively. Inter-rater reliability between 0.83 and 0.99 is reported. The tool has been shown to be equally reliable with black and white skin colored patients. Sensitivity ranges from 83-100% and specificity 64-90% depending on the cut-off score used for predicting PU risk (Bergstrom, 1987; Bergstrom, 1998). Using topical agent as part of the preventive measure has not widely being measured, most of the studies found on the usage of topical agent for the pressure ulcer wound. Only one study by Reddy (2006) had revealed the application of topical agents directly to the skin as one of the preventive measures for PU.

We thus aimed our study to compare PU development outcomes in geriatric patients nursed on either using the Durable barrier cream (Cavillon cream) or non-pharmacological intervention alone for the PU.

METHODOLOGY

Study Design

Using the Quasi-experimental study design, where the participants were divided into two groups. The test group received the Durable barrier cream (Cavillon cream) plus the pressure ulcer prevention intervention as per protocols which linked to Braden risk score (AHCPR 1992 pressure ulcer protocol prevention) while the control group received the pressure ulcer prevention intervention as per the protocols linked to Braden risk score only. The test and control group, were divided according to the odd and even numbers starting the first day of the data collection. The odd number will become the test group, that will receive the Durable barrier cream (Cavillon cream) which is going to be applied on the command site of the pressure whereas the even number will be the control group that only received nursing intervention for PU prevention.

Demographic Data

We included patients with 65 years old and above, no pre-existing for pressure ulcer, Braden scale score less than 18; with stage one PU over the sacrum. Patients who had PU stage two and more, allergy to the Durable Barrier Cream (Cavillon Cream) after the 24 hours allergy skin test done were rejected from this study.

The participants' pressure areas were assessed daily by ward nurses who had received training in PU identification and grading. A research nurse was immediately notified of any significant deterioration. The research nurses had monitored participants and completed data collection for three days.

Data Collection

Three major phases involved in this study; Phase 1 was the demographic data collection, whereby the patients were assessed using Braden scale pressure ulcer risk assessment to categorize the patient level of risk to develop the pressure ulcer and also to determine intervention linked to Braden scale scores. The size of stage one PU over the sacrum was also measured.

Phase 2 was the intervention phase whereby pressure ulcer prevention was given to both groups according to the Interventions Linked to Braden Risk Scores, adopted from Ayello & Sibbald (2006). The only difference was that the test group was given additional of the Durable barrier cream (Cavillon cream). At Phase 3, the outcome of the pressure ulcer was assessed using the measured size of the redness area. Development of PU were recorded on day one and day three according to the size.

Data Analysis

All data were coded and entered into SPPS (Statistical Package Social Sciences) version 20.0 for analysis. Wilcoxon Sign Ranks Test was used to compare the reduction size of PU (day 1 and day 3). The rank test was used to find any positive or negative rank between the size of PU day 1 and day 3.

RESULTS

Of these 66 respondents, all completed the study: each respondent was monitored closely for 72 hours to

collect the data, both the intervention and control group respondents continue to receive the same PU preventive measures till they were discharged, the PU preventive intervention were not compromised.

Effect of PU prevention intervention (Control Group)

It was found that there were no statistically significant reduction in PU size on day 3 compared to PU size on day 1 among the control group, *z* value was -1.036, $p > 0.005$ (0.300), with small effect size ($r = 0.127$) (Table 1a). As for the rank test, as shown in the table 2, it was found that 17 respondents had negative rank for the PU size comparing with day 3 and day 1 (Table 1b).

We also found that positive rank between PU size on day 3 and on day 1 on 7 respondents [($\Sigma R+$) 7] despite the standard intervention of PU prevention applied. The rest (0.000), with large effect size (r = 0.618) (Table 2a). As for the rank test, as shown in the Table 2b, all respondents were found to have reduction of PU size on day one compared to day 1 [($\Sigma R-$) 33].

Table 1a: The significant test in reduction of PU size on day 3 comparing to day one among control group

	PU size on Day 3 - PU size on Day 1
Z	-1.036[b]
Asymptotic Significance (2-tailed)	0.300
a. Wilcoxon Signed Ranks Test b. Based on positive ranks.	

Table 1b: The rank test of PU size in comparing day 3 to day 1 among control group

		N	Mean Rank	Sum of Ranks
PU size on Day 3 - PU size on Day 1	Negative Ranks	17[a]	10.94	186.00
	Positive Ranks	7[b]	16.29	114.00
	Ties	9[c]		
	Total	33		
a. PU size on Day 3 < PU size on Day 1				
b. PU size on Day 3 > PU size on Day 1				
c. PU size on Day 3 = PU size on Day 1				

Effect of Cavillon plus cream plus the PU prevention intervention (Intervention Group)

We found that there were statistically significant reduction in PU size on day 3 compared to day 1 among the intervention group, *z* value was -5.028, $p<0.005$

Table 2a: The significant test in reduction of PU size on day 3 comparing to day one among intervention group

	PU size on Day 3 - PU size on Day 1
Z	-5.028[b]
Asymptotic Significance (2-tailed)	0.00
a. Wilcoxon Signed Ranks Test	
b. Based on positive ranks.	

Table 2b: The rank test of PU size in comparing day 3 to day 1 among control group

		N	Mean Rank	Sum of Ranks
PU size on Day 3 - PU size on Day 1	Negative Ranks	33[a]	17.00	561.00
	Positive Ranks	0[b]	0.00	0.00
	Ties	0[c]		
	Total	33		
a. PU size on Day 3 < PU size on Day 1				
b. PU size on Day 3 > PU size on Day 1				
c. PU size on Day 3 = PU size on Day 1				

Total Braden score Test (Control)

We had found that there were slight statistically significant difference in Total Braden score on day 3 compared to Total Braden score on day 1 among the control group, *z* value was 2.887, $p<0.005$ (0.004) (Table 3a). Twenty four of the respondents were found to have equal Braden score throughout intervention period. Nine of the respondents were found to have positive rank between day 3 and day 1 [($\Sigma R+$) 9] which translated lesser risk of having PU (Table 3b).

Table 3a: Comparison of total Braden Score test day 3 and day 1 control group

	Total Braden Day 3 - Total Braden Score D1
Z	-2.887[b]
Asymptotic Significance (2-tailed)	0.004
a. Wilcoxon Signed Ranks Test	
b. Based on negative ranks.	

Table 3b: Rank test for Total Braden Score in control group Ranks

		N	Mean Rank	Sum of Ranks
Total Braden Day 3 - Total Braden Score D1	Negative Ranks	0[a]	0.00	0.00
	Positive Ranks	9[b]	5.00	45.00
	Ties	24[c]		
	Total	33		
a. Total Braden Day 3 < Total Braden Score D1				
b. Total Braden Day 3 > Total Braden Score D1				
c. Total Braden Day 3 = Total Braden Score D1				

Total Braden Score Test (Intervention Group)

There were statistically significant difference in Total Braden score on day 3 compare to Total Braden score on day 1 among the intervention group, *z* value was -3.500, $p<0.005$ (0.000) (Table 4a). Thirteen of the respondents showed positive ranks whereas the remaining respondents did not show any improvement to total Braden score (Table 4b).

Table 4a: Comparison of total Braden Score test day 3 and day 1 intervention group

	Total Braden Day 3-Total Braden Score D1
Z	-3.500[b]
Asymptotic Significance (2-tailed)	0.000
a. Wilcoxon Signed Ranks Test	
b. Based on negative ranks.	

Table 4b: Rank test for Total Braden Score in intervention group

		N	Mean Rank	Sum of Ranks
Total Braden Day 3 - Total Braden Score D1	Negative Ranks	0[a]	0.00	0.00
	Positive Ranks	13[b]	7.00	91.00
	Ties	20[c]		
	Total	33		
a. Total Braden Day 3 < Total Braden Score D1				
b. Total Braden Day 3 > Total Braden Score D1				
c. Total Braden Day 3 = Total Braden Score D1				

DISCUSSION

Effect of Cavillon plus cream plus the PU prevention intervention vs PU prevention intervention alone

The statistically significant reduction of PU size on day three compared to day one among the intervention group had shown that the Cavillon cream did help in reducing the risk of having PU comparing with intervention alone. Chamanga, (2011) had found that if the skin is intact, a wound dressing is unlikely to be of benefit. However, a film dressing may be useful in reducing friction and protecting the skin. Cavillon cream has the dual effect on the skin that was as protects intact or at 'at-risk' skin against bodily fluids such as urine and feces, and is also an effective moisturizer for severely dry skin.

A Systematic Review on Preventing Pressure Ulcers, have found evidence that using support surfaces, repositioning the patient, optimizing nutritional status, and moisturizing sacral skin are appropriate strategies to prevent pressure ulcers (Reddy, 2006). Therefore moisturizing the sacral were recommended as one of possible measures to prevent pressure ulcers. The cream was chosen as an additional intervention given on top of the current conventional nursing intervention because it has the dual effect, the protective barrier and also the moisturizing effect to moisturize and condition very dry or chafed skin. Using topical agent as part of the preventive measure has not widely being measured, most of the studies found on the usage of topical agent for the pressure ulcer wound.

The application of topical agents directly to the skin is also suggested to protect against the adverse effects of friction (Reddy, 2006). Great emphasize was given on mobility, in fact, the friction and shear were found to contribute up to 40% of the PU development among elderly (Ayello, 2002). Both friction and shear are included as risk factors for pressure ulcer development in the Braden pressure ulcer risk assessment scale (Bergstrom, 1987).

Risk factors for PU development following PU prevention intervention in both groups

There were no significant differences between the risk factors for PU development in both groups which shows that even though there are factors for PU to develop in respondents but with the optimal care by the nurses the risk could be reduced significantly. A number

of risk factors has been listed that impede an individual's ability to self-regulate in response to pressure and shear, both externally by redistributing body weight, or internally within the tissues. The factors include impaired mobility, nutrition, sensation, cognition, multiple pathologies, older age, and acute, chronic and terminal illness, to name a few (NICE, 2005).

In 1987, Braden and Bergstrom proposed that external pressure and tissue tolerance are two elements of pressure ulcer development. The intensity and duration of external pressure that is applied to skin and causes the skin damage depends on tissue tolerance. Body weight, sensory perception, mobility status, and activity are factors of the intensity and duration of pressure whereas the nutritional status, incontinence, age, blood pressure, friction/shear and use of medication are the factors of tissue tolerance (Kwong, 2005). Thoughtful patient's care will thus reduce and would eliminate the risk of having PU. An extensive and meaningful data are, therefore, crucial in the management of the patient (Heslop, 2014) to reduce their stay in the hospitals and also the additional complications carried over by the stay itself.

CONCLUSION

By demonstrating better prevention practices, staff may be assured of protecting the elderly patient from unnecessary skin damage and promoting healthy tissues. Clinical guidelines are only clinical recommendations, each patient, presents with individual problems which need holistic assessment to design an effective care plan. A systematic assessment and intervention were found to be effective in improving the healing process of the pressure ulcers while providing high satisfaction for our patients in the practiced setting.

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