Twice-Daily Moisturizer Application for Skin Tear Prevention Among Older Adults in Acute Care

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ABSTRACT

OBJECTIVE: To examine the effectiveness of twice-daily moisturizer application for patients admitted to an acute care setting on reducing the incidence of skin tear (ST) injuries.

DESIGN, SETTING, AND PARTICIPANTS: This prospective, nonrandomized, case-control study identified an experimental and control ward equivalent in demography and patient acuity in a large hospital in regional Victoria, Australia. Patients 70 years or older admitted to the wards were invited to participate.

INTERVENTION: Twice-daily application of a commercially available skin and body lotion to the arms and legs of participants.

MAIN OUTCOME MEASURES: The incidence of ST in the experimental and control settings in the pre-, intra-, and posttrial periods.

MAIN RESULTS: Despite a decrease was observed in ST incidence over the study period (n = 128), this decrease was not significant pre- (Md = 2.16, n = 73), intra- (Md = 2.16, n = 73), or postintervention (Md = 2.16, n = 69; χ [2, 152] = 0.502, *P* = .778). Similarly, there was no significant difference between wards (Md = 9.86, n = 152 versus Md = 13.14, n = 177; U = 42.50, z = -1.198, r = .358, *P* = .231).

CONCLUSIONS: The moisturizer in this study did not have a direct influence on the frequency of STs in the study population, although the data would suggest an at-times reduction in ST incidence. The authors postulate that this was correlated with behavior change effects from the study.

KEYWORDS: acute care, geriatric, incidence, moisturizer, prevention, older adult, skin tear

INTRODUCTION

Aging involves physiologic changes associated with structural and functional alterations of the skin. Age-related changes in the skin often result in dermatologic disorders and injuries[2] such as xerosis cutis and associated dry skin pruritus[3] that not only reduce skin integrity,[4] but significantly and negatively reduce quality of life in older adults.[5] Flattening of the dermoepidermal junction and resulting increased stiffness of the skin[6] is routinely seen in the older adult, which results in increased vulnerability to skin tears.[7-9]

Skin tears (STs) represent a significant health issue; they have been reported to occur at rates between 2% to 22% and are directly associated with advanced age and specific clinical setting.[10] Perhaps unsurprisingly, residential care settings have the highest reported incidence.[9] Further, STs have been associated with chronic wound development leading to increased hospital length of stay and complex pain management regimes that reduce mobility and impact quality of life.[11] These injuries are under researched, preventable, and an underestimated economic burden not only to patients, but also care providers and health services.[12]

Efforts to reduce STs are prevalent across the research literature.[13] A systematic review of the evidence for approaches to maintain skin integrity in older adults[7] concluded that the current evidence for basic skin care in older adults is limited. Despite this, a cluster randomized control trial by Carville and colleagues[14] conducted in Australia identified that twice-daily application of a commercially available pH-neutral perfume-free moisturizing lotion to the extremities of older adults reduced ST incidence by approximately 50% in residential aged care facilities.

Finch and colleagues[15] conducted a prospective interventional study in a single large (580 bed) hospital in Australia to trial the effectiveness of twice-daily moisturizer application for persons aged 65 years and older in reducing STs. The protocol was applied over 6 months on two wards (rehabilitation and acute/subacute) and evinced a statistically significant reduction in the number of STs.

As part of continuing efforts to reduce the incidence of STs, researchers at the study facility proposed a research protocol inclusive of the twice-daily moisturizer regimen[15] to ascertain any associated reduction in STs.

METHODS

A case-control design was used to examine the impact of a commercially available skin and body lotion (MoliCare; Hartmann Australia) to reduce STs among patients on two wards at St John of God Ballarat Hospital. The study facility is a private health provider with campuses across Australia. The Ballarat hospital in Victoria is a 220-bed acute care facility recognized as the largest private hospital in regional Victoria. Ballarat has a largely stable older adult population and with high admission rate and often readmission because it is the only private hospital in the region. The demography of Ballarat skews older, and more than 19% of the population is older than 65 years.[1]

The two wards identified for the study were a medical/oncology ward (control) and the rehabilitation ward (intervention). These two settings are comparable in terms of patient demography and acuity. Longitudinal data were collected for these settings both pre- and postintervention to determine the intervention's efficacy and impact.

All patients admitted to the control and intervention wards (n = 443) over 70 years of age were invited to participate. Exclusion criteria included an allergy to nuts, because the study lotion contains almond extract.

The skin and body lotion was selected for this study after consultation with wound care specialist clinicians working in public healthcare in the same town. Decisions were made on the basis of moisturizer accessibility and considering the cost-benefit ratio for the patient. The specific ingredients of the moisturizer used in this study as well as the ingredients of the cream used in two comparable skin-tear studies are provided in Table 1.

Table 1: Ingredients of skin and body lotions used in current and comparable studies

Study	Product Name	Ingredients
Finch et al,[15] 2018	Ego Pharmaceuticals, QV Skin Lotion	Aqua (water), glycerin, petroleum, C12 – 115 alkyl benzoate, cetearyl alcohol, ceteth-20, steareth-2, dimethicone, glyceryl stearate, methylparaben, propylparaben, dichlorobenzyl alcohol, polyacrylic acid, triethanolamine
Carville et al,[16] 2014	Abena, pH Neutral & Perfume Free moisturising lotion.	Aqua (water), glycerin, ethylhexyl stearate, ceteareth-12, cetearyl alcohol, ceteareth-20, cetyl palmitate, olus oil, glyceryl stearate, butyrospermum parkii butter, phenoxyethanol, benzoic acid, dehydroacetic acid, acrylates/C10–30 alkyl acrylate crosspolymer, lactic acid, sodium hydroxide
Current Study	Hartmann, Molicare	Aqua (water), glycerin, isopropryl myristate, prunus amygdalus dulcis (sweet almond) oil, caprylic/capric triglyceride, glycine, cetyl peg/ppg-10/1 dimethicone, creatine, linseed acid, sodium pca, sodium lactate, arginine, aspartic acid, pca, alanine, serine, valine, isoleucine, proline, threonine, histidine, phenylananine, rosmarinus officinalis leaf extract, cera alba (beeswax), hydrogenated castor oil, sodium chloride, citric acid, sodium hydroxide, tocopherol, sodium benzoate, potassium sorbate

Those RNs caring for patients in the intervention ward applied the moisturizer for 10 minutes to the upper and lower limbs twice per day, once in the morning and once in the evening. The intervention was not personalized, titrated, or adapted for any enrolled patient. The clinician documented each application time and date on the patient's personal care plan.

Data Collection

Moisturizer application commenced in August 2016 and lasted for 3 months. Following the 3-month study period, there was a period when moisturizer stock was limited and the efficacy and feasibility of the moisturizer modality was under consideration. In August 2017, twice daily moisturizer application was implemented for all patients admitted to the institution.

Outcome measures included age and sex, and anatomical location of ST, if any. The Skin Tear Audit Research Classification (STAR) system has been used in other published research,[14-16] but in the present study it was used to inform clinical decisions about STs; classifications were not collected as data. Instead, when an ST was identified, irrespective of STAR classification, it was mandatorily reported via the RiskMan (previously known as RiskPro) incident reporting system. These data provided the basis for the results analyzed pre- and postintervention.

Ethical Considerations

Ethical approval was provided by St John of God Health Care Human Research Ethics Committee (Approval #977) prior to the commencement of the study. Written informed consent was provided by each participant prior to inclusion in the study.

Data Analysis

Data were compiled, cross-checked, and analyzed using spreadsheet software and SPSS (v 23; IBM Corp, Armonk, New York). Descriptive statistics were generated from reported data and were used to describe clinical findings whereas inferential statistics such as Kruskal-Wallis and Mann-Whitney *U* tests were used to compare incidents within and between wards. Results are shown as medians with the level of significance determined by two-tailed $P \leq .05$.

RESULTS

Based on the inclusion criteria, 388 participants were eligible for the study. Of those, 128 (33%) consented to be part of the experimental arm of the study and a further 260 (67%) agreed to form the control group.

The data were collected from January 2014 to June 2019. There were 831 STs reported during that time, with the highest number (n = 27) occurring between January and June 2016. Both wards reported similar ST incidence over entire period, whereas Ward D had the highest incidence overall (n = 255) as outlined in Table 2.

Table 2: Incidence of skin tears January 2014 to June 2019

Time Period	Rb (Intervention)	MO (Control)	Ward C	Ward D	Ward E	ICU	ED	DS	The	Total
Jan-June 2014	17	19	16	37	7	8	0	2	3	109
Jul-Dec 2014	17	12	18	32	4	5	2	0	3	93
Jan-Jun 2015	12	17	8	19	5	4	1	2	7	75
Jul-Dec 2015	13	22	6	24	2	4	2	0	6	79
Jan-Jul 2016	14	14	6	27	4	5	0	1	5	76
Aug-Dec 2016	10	10	7	18	9	3	0	1	5	63
Jan-Jun 2017	17	22	10	16	2	4	0	0	4	75
Jul-Dec 2017	9	14	2	17		3	2	0	3	50
Jan-May 2018	9	9	2	26	0	1	0	1	3	51
Jul-Dec 2018	13	20	2	15	0	9	0	1	4	64
Jan-Jun 2019	21	18	13	24	0	6	1	1	12	96
Total	**152**	**177**	**90**	**255**	**33**	**52**	**8**	**9**	**55**	**831**

Note: Highlighted area indicates the intervention period.

Abbreviations: Rb (Intervention) = Rehabilitation; MO = Medical Oncology (Control); ICU = Intensive Care Unit; ED = Emergency Department; DS = Day Surgery; The = Theatre; Ward C = Orthopedic; Ward D = General Medical; Ward E = Surgical / Obstetrics and Gynecological

In terms of the average number of ST cases among wards over the same time period, there is a heterogeneity of ST rates, with no specific trend at the ward level. However, when examining overall number of STs, there was a downward trend prior to the intervention period (August to December 2016) with a slight rise postintervention, followed by a further lowering of incidences and a more recent rise (Figure 1).

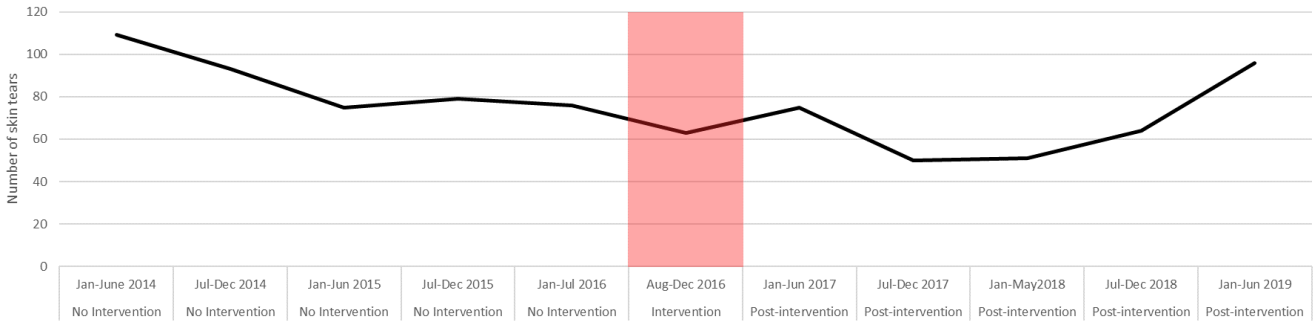

Figure 1: Total number of skin tears over time

In terms of differences between the intervention and control wards, preintervention average is high, with a leveling of average rates 6 months prior to and during intervention period, with an accompanying increase over the 6 months postintervention, again with a lower average after this time, before steadily increasing to or above pre-intervention levels (Figure 2).

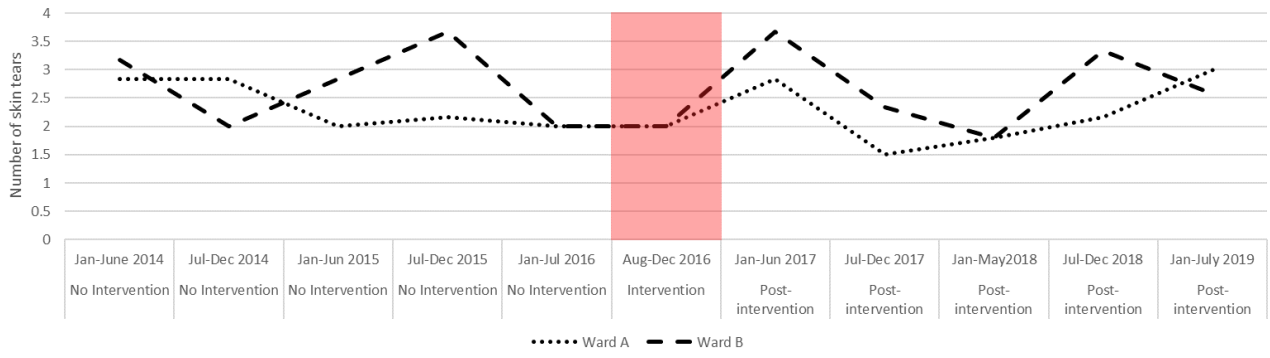

Figure 2: Average skin tears between case and control groups over time

Although a decrease was observed in the incidence of STs over the study period, a Kruskal-Wallis Test revealed this reduction was not significant for the intervention ward pre- (Md = 2.16, n = 73), intra- (Md = 2.00, n = 10), or postintervention (Md = 2.16, n = 69; $\chi(2, 152) = 0.502$, $P = .778$); median scores were similar regardless of intervention. Similarly, when examining both case and intervention wards using a Mann-Whitney *U* test, there was no significant difference at any time pre- or postintervention between the intervention (Md = 9.86, n = 152) or control ward (Md = 13.14, n = 177; U = 42.50, z = -1.198, r = .358, $P = .231$).

DISCUSSION

The findings from this single site, case-control study show no statistically significant or trending data that would suggest that the twice-daily application of moisturizer for older adults in this setting has any direct impact on reducing the overall incidence of STs. The data from the intervention ward (rehabilitation ward) suggests that median scores remained similar over the study period irrespective of the experiment. Similarly, there was no significant difference, at any time pre- or postintervention between the two wards of interest.

Prior to the intervention there was a reduction in the incidence of STs, which continued along the same downward gradient for roughly half of the intervention period, at which point it rose sharply. Interestingly, there was a remarkable downward trend in the number of STs some 3 months after the intervention period. Although the moisturizer itself was not shown to influence ST frequency, a downward trend in the data is worth considering more closely.

Overlaying the timeline with the research protocol, one can see that a series of hospital-wide information sessions had been provided and preceded the forthcoming intervention. The authors suggest that the “ripple effect” of this project raised the collective conscience about STs, ultimately leading to a reduction in these injuries. It is possible therefore that the peaks and troughs in the data are in fact the results of the natural initial fervor and later apathy that tends to follow awareness-raising activities. In essence, the moisturizer and relevant education acts as a vehicle to ensure skin care is at the forefront of providers’ minds.

CONCLUSIONS

Skin tears remain a significant concern for healthcare providers seeking to minimize their incidence and ongoing impact on the health and wellbeing of their patients. One approach previously identified as having a positive influence on reducing STs is twice-daily moisturization of the skin . However, these results did not support the growing body of evidence in support of this modality. Instead, this study showed that the median ST rates among participants remained similar regardless of intervention. Essentially, the moisturizer appeared to have had no direct effect on ST incidence.

The authors postulate that the collective flurry of activity that comes with the introduction of new practices permeated the institution, and in so doing, changed practice. Although the moisturizer itself has been shown here to have no influence on ST, there is tremendous merit in organizations capitalizing on this method of practice change. The

challenge for healthcare agencies therefore is to sustain provider attention to critical issues such as STs.

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