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Bliss D[1], Zehrer C[2], Savik K[3], Ding L[2], Hedblom E[2]
1. University of Minnesota School of Nursing, 2. 3M HealthCAre, 3. University of Minnesota

# ECONOMIC EVALUATION OF INCONTINENCE-ASSOCIATED DERMATITIS PREVENTION REGIMENS IN NURSING HOME RESIDENTS.

Hypothesis / aims of study

Study aims were to compare the cost and efficacy of four regimens for preventing incontinence-associated dermatitis in nursing home residents.

Study design, materials and methods

A quasi-experimental design was used. There were 4 regimen groups consisting of 4 nursing homes each (n=16). Groups were determined by geographic quadrant (Northeast, Southeast, Midwest and West) and type of skin moisture barrier used in the incontinence dermatitis prevention regimen (regimen W used an acrylate polymer-based barrier film, X used an ointment with 43% petrolatum, Y used an ointment with 98% petrolatum, Z used a cream with 12% zinc oxide + 1% dimethicone). The moisture barrier was applied 3 times weekly in regimen W and after each episode of incontinence in regimens X, Y, and Z per manufacturers' recommendations.

Nursing homes were randomly selected from the national registry then evaluated for the following criteria: geographic location, exclusive use of one of the skin moisture barriers and a compatible cleanser of the same manufacturer (or in the case of Group W, agreement to exclusively use this barrier for incontinence dermatitis prevention), $\geq$ 90 beds, and $\geq$40 residents who were incontinent of urine and/or feces per the Minimum Data Set.

Total cost of incontinence dermatitis prevention was determined using prospective time and motion measures (staff time and number, amount of skin care products used, number of supplies), national occupational wage statistics, and costs of skin care products (skin cleanser and barrier) and supplies (disposable absorbent products, gloves, and wipes, and wash cloth laundering) published in distributor's lists, catalogs, and scientific literature. For 6 weeks, staff assessed residents' skin condition, and incontinence dermatitis was confirmed by the nurse study coordinator. Staffing was reported daily. Rates of incontinence in each home were determined in a 3-day prospective surveillance. The University's ethics committee approved the study.

Results

The 16 homes were in 15 states; 37.5% were urban, 25% suburban and 37.5% rural; 69% were for-profit. The average census (mean$\pm$SD) in the homes was 126$\pm$ 35 residents. Nursing assistant staffing (nursing assistant hours per resident per day) was greater in group X (2.6$\pm$ .3, mean$\pm$SD hours) than in W (2.4$\pm$ .9, p=.0001), Y (2.4$\pm$ .4, p=.001), and Z (2.4$\pm$ .3, p=.0001 per Tukey HSD). Of the 1,918 nursing home residents screened, 51% (n=981) qualified for surveillance of incontinence dermatitis development, i.e., were incontinent and free of any perineal skin damage. Residents' age and sex were similar among groups (p>.05). Incontinence dermatitis occurred in 3.4% of residents and did not differ among groups (W=3.5%, X=2.1%, Y=4.0%, Z=4.1%, p=.55); Nearly half (48%) of those developing incontinence dermatitis were incontinent of both urine and stool during time and motion measures.

The median number of incontinent episodes/day differed among groups (W=6.2, X=6.3, Y=6.7, Z=7.0) p=.005. Numbers of staff (99% were nursing assistants) providing incontinence dermatitis prevention care differed among groups (range=1 to 4) p<.001. Due to these differences, the economic analysis standardized the costs of incontinence dermatitis prevention per 1 episode of incontinence provided by 1 nursing assistant. The cost of the moisture barrier and labor associated with barrier use in regimen W was less than in regimens X, Y, and Z (Table 1). Total cost of incontinence dermatitis prevention was also less in regimen W than in X, Y, and Z (Table 1).

Table 1. Costs of Preventing Incontinence-Associated Dermatitis

| **Regimen** | **W** | **X** | **Y** | **Z** | **p-value[1]** | **Post-hoc significant differences[2]** |
|---|---|---|---|---|---|---|
| Barrier cost[3] | .04(.02-.67) | .22(.17-.24) | .21(.18-.24) | .25(.16-.39) | <.001 | W vs. X, Y, Z<br>X vs. Z<br>Y vs. Z |
| Barrier labor cost[3] | .007(.002-.12) | .12(.04-.23) | .13(.12-.19) | .08(.06-.15) | <.001 | W vs. X, Y, Z<br>Y vs. X, Z |
| Supply Costs[3] | .51(.48-.72) | .60(.51-.67) | .48(.48-.77) | .51(.46-.86) | <.001 | W vs. X, Y<br>X vs. Y<br>Y vs. Z |
| Total costs[3] | .83(.69-1.82) | 1.35(1.25-1.87) | 1.16(1.03-1.59) | 1.10(.96-1.44) | <.001 | W vs. X, Y, Z<br>X vs. Y, Z<br>Y vs. Z |

[1]Kruskal-Wallis ANOVA
[2]Mann-Whitney U test, $p < .008$ to adjust for multiple comparisons
[3]Data are median(range) currency in U.S. dollars per one episode of incontinence

Interpretation of results

A regimen for preventing incontinence dermatitis that uses a polymer skin barrier film three times weekly is as effective and has a significantly lower total cost per episode of incontinence than regimens in which a skin barrier ointment must be applied after each episode of incontinence. Nursing assistant staffing in the group using the barrier film was similar to or less than the other groups.

Concluding message

Prevention of incontinence dermatitis is a major focus of care for nursing home residents. Skin exposure to moisture from leaked urine or stool is considered a key factor for incontinence dermatitis development [1]. Prevention regimens that included use of a moisture barrier had a low incidence of incontinence dermatitis supporting current recommendations for barrier use [2]. Use of a polymer skin barrier film three times weekly resulted in a lower total cost per episode of incontinence. Rising health care costs, an aging population and shortages of nursing home staff [3] mandate cost effective incontinence dermatitis prevention regimens to promote the health and well-being of nursing home residents.

[1] Association of skin wetness and pH with diaper dermatitis. *Pediatric Dermatology* 1994; 11:1118-20.
[2] A review of perineal skin care protocols and skin barrier product use. *Ostomy/Wound Management* 2004; 50(12):59-67.
[3] Nurse staffing in nursing homes in the United States. *Journal of Gerontological Nursing* 2005; 31(2):18-23.

**FUNDING: 3M HealthCare**