



## Feature Article

## Skin hydration in nursing home residents using disposable bed baths



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## ABSTRACT

The objective of this study was to evaluate a new way for applying bed baths and reducing the risk for dry skin by comparing the effect of two washing methods on skin hydration. A cluster randomized trial was conducted. Skin hydration was measured before and after implementation of disposable wash gloves, using a MoistureMeter SC at three skin sites. Total skin hydration did not differ between residents at the start of the study in both groups. After implementation, the post minus pre hydration scores were higher for the intervention group than the control group at all skin sites. However, the difference was only significant at cheek site. The use of disposable wash gloves does not increase the risk for dry skin in comparison with traditional washing methods. These results may encourage the introduction of disposable wash gloves as an innovation in daily skin care practice.

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## Introduction

According to the 2004 National Nursing Home Survey, over 1.5 million people live in nursing homes in the USA.<sup>1</sup> It is estimated that the number of people who will require nursing home care in the USA will reach 5.3 million by 2030.<sup>2</sup> Elderly people in nursing homes are often dependent on caregivers for their daily activities.

One of these activities is personal hygiene, specifically caring for the skin.

### Skin changes in older adults

The skin protects the body against external and environmental factors. Maintaining the effectiveness of the skin barrier is not only critical in preventing disruption of the skin function, it also prevents tissue breakdown and the development of chronic wounds.<sup>3</sup> Skin tears represent a significant problem affecting the elderly,

with prevalence rates between 14% and 24%.<sup>4</sup> In the United States, an estimated 1.5 million skin tears occur in institutionalized adults every year.

Another reason for modifications in barrier properties and skin hydration is natural aging, accounting for an increased risk of dry skin.<sup>5</sup> Dry skin or xerosis is commonly described as skin that lacks moisture, with dryness being characterized by fine lines, scaling and itching.<sup>3</sup> Dry skin is more vulnerable to splitting and cracking, resulting in an increased risk of infection.<sup>6</sup> Skin and soft tissue infections (SSTI) have become the second most common type of infection among persons residing in long-term facilities.<sup>7</sup>

### Impact of bathing

It has previously been shown that the prevalence of xerosis is also higher among the elderly who wash with agents containing soap.<sup>8</sup> Dryness and consequences of dryness also depend on the type of soap used. Mason (1997) demonstrated a clinical significance by a 35% reduction in skin tears with the use of emollient soap.<sup>9</sup> Washing with soap and water and drying with a towel has a significant disruptive effect on the skin's barrier function because of soap raises the skin's pH.<sup>10</sup>

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## Factors influencing skin changes

Xerosis in the elderly ranges from 30 to 75% and increases in wintertime due to cold, dry weather, resulting in reduction in stratum corneum lipid levels.<sup>6–11</sup> The same effect can occur in places with a low humidity or in places where air conditioning is used.<sup>6–12</sup> The ways to prevent skin dryness include decreasing bathing frequency and minimizing the use of soap.<sup>13</sup> According to Darjani (2013), it is recommended to avoid a combination of low air humidity with hot water and overuse of soap to prevent dryness and cracking of the skin.<sup>12</sup> However it's not clear what the influence is of the Body Mass Index (BMI) and room temperature on skin condition.

## Lack of evidence

As the population ages, an evidence-based approach to personal hygienic care in practice is urgently recommended. Cowdell (2013) showed in a systematic review that there is a significant lack of high-quality research studies to provide a framework for guiding evidence-based skin care practice.<sup>3</sup>

Current guidance is based on clinical expertise rather than on evidence from clinical trials.<sup>3–14</sup>

The use of disposable wash gloves has been proposed as a new method to replace the tradition of washing with soap and water, which causes xerosis. This new trend is difficult to implement because caregivers may be reluctant to relinquish traditional practices, and because of the lack of evidence to support washing with disposable wash gloves.<sup>3</sup>

The objective of this study was to evaluate a new way for administering bed baths by comparing the effect of two washing methods on skin hydration in nursing home residents. Therefore, the stratum corneum hydration was evaluated *in vivo* before and after a period of 12 weeks in residents who received a traditional bed bath (control group) or who received a disposable glove bed bath (intervention group).

## Material and methods

### Design, sample & setting

The study was approved by the Ethics Committee of AZ Nikolaas hospital, Sint-Niklaas, Belgium (EC14045). To measure the effect of disposable wash gloves, an interventional study was set up, including 168 nursing home residents from six wards of two nursing homes in Flanders (Northern Belgium). Allocation to control or intervention, group was done at the ward level for practical reasons. Initially seven wards were assigned at random to either control or intervention group prior to baseline data collection. Due to acute staff problems, one ward was withdrawn from the study. Finally, two wards were available in the control group, the intervention group consisted of four wards. After an information session, residents or their legal representatives completed and signed a written informed consent form. There were no exclusion criteria to participate, all residents were eligible for participation. In the end, 163 residents or their legal representatives agreed to participate (response rate = 97%). Five residents died during the intervention period, three residents had been hospitalized for a while during the study, one resident moved to another nursing home, and two residents preferred to stop participating in this study. In total, data from 150 residents in pre-test and post-test stages were included for analysis (Fig. 1).

## Observations

Three independent researchers (authors 1, 2 and 4) from Odisee University College recorded residents' characteristics (gender, age and Body Mass Index), bath practices, skin hydration scores and environmental factors (Table 1). Technical representatives from the wash gloves manufacturer were not involved in data recording and measurement. Skin hydration at the stratum corneum level is one of the most frequently measured properties of the skin. Stratum corneum hydration was measured objectively using the MoistureMeter SC (Delfin Technologies Ltd). The MoistureMeter SC is widely considered as a reliable tool for skin hydration assessment.<sup>15,16</sup> The MoistureMeter SC is an all-in-one unit that comprises a sensitive round probe head, a built-in contact pressure sensor and a graphic display screen. The display of the MoistureMeter SC colored green to indicate a correct measurement. The system was calibrated daily by the researchers. Skin hydration scores are reported in arbitrary units (AU). By selecting the MoistureMeter SC, we have opted for an objective observation tool. Skin hydration at the stratum corneum level was measured before and after 12 weeks of implementation of disposable wash gloves. Choices of skin sites were based on a study of Mayrovitz et al, (2012), where measurement of skin hydration is reliable and which were easy to access: the middle of the left cheek and the web of the right hand dorsum.<sup>16</sup> Because the most common site for dry skin is the legs, and especially the anterolateral surface, we also included this site in measurements for this study.<sup>6</sup> In addition, skin tears are often sustained on the lower limbs and the dorsal aspect of the hands, which confirmed our selection of skin sites for measurement of skin hydration. Researchers started measuring skin hydration after 12 am and before 16 pm to ensure that an interval of at least three and maximum 7 h between hygienic care (washing and administration of skin care products) and observation was guaranteed. The mean score of two measurements at each stage was used for analysis. To minimize the potential differences between environmental conditions, temperature (°C) and humidity (%) were measured with Humidity Monitor (portable model 00619, AcuRite) in the room in which the resident was staying during the observations.

## Interventions

In the control group, the traditional washing method was continued, i.e. washing the residents with the well-known standard reusable cotton wash cloths, like we all use at home, dipped in warm water combined with a bar of soap or liquid soap/oil. In the intervention group, residents' caregivers first had a technical information session, given by representatives from the manufacturing company, about instructions for the new washing method. In every session, at least one researcher had to be present. According to the instructions given in that session, the procedure was as follows: a package with 8 pre-moistened disposable wash gloves must be warmed up during 30 s at 600 W in a microwave before use. The caregiver must rinse the skin of the resident with at least 4 wash gloves. The use of a towel to dry skin was not permitted because evaporation of the lotion was recommended. The wash gloves must be thrown away after a single use. The planned moments for bathing or showering every week or two weeks must continue, using the same soap and shampoo as usual in both control and intervention group. After the information session, the implementation of washing with disposable wash gloves started for a period of 12 weeks (March 2014–May 2014). The wash gloves used in this study had a non-woven Spunlaced 3D structure and contained the following ingredients: *Aqua, Propylene Glycol, Coco-Glucoside, Phenoxyethanol, Parfum, Benzoic acid, Polyaminopropyl Biguanide, Octyldodecanol, Aloe Barbadensis Extract,*

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