

# NON-PHARMACOLOGICAL SOLUTION TO PREVENTION OF DIAPER RASH IN INFANTS

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## INTRODUCTION

The most common problem of neonatal and infant age is diaper rash. Human skin was not designed to withstand long-term contact with the diaper that contains urine and faeces. The skin is exposed to higher moisture, pH changes, maceration. Diaper rashes occur in at least 50% of infants wearing diapers. Infant prevalence estimates range from 7% to 35%. Influencing factors of sore rash include age, lack of protective creams, diarrhea, type of diapers, cosmetics used, hygiene, nutrition, and breastfeeding. Therefore, it is important to educate parents about the care of the infant's skin in the diaper area, suitable cosmetics and diapers. A practical non-pharmacological solution for both prevention and treatment can be easily summarized in the "ABCDE" approach, which includes air, barrier, cleaning, diaper and education.

## "ABCDE" approach:

**AIR:** Detecting the diaper area in the air reduces the time when the skin surface stays in contact with urine, faeces, moisture, and other irritants. Diaper removal allows the skin to dry and also reduces friction on the skin in contact with the diaper. It is a simple, safe and effective way to reduce the impact of irritants on the baby's skin (Merrill 2015, p. 331).

**BARRIER:** Barrier creams are both prevention and treatment of diaper dermatitis. Numerous barrier products for the treatment of diaper dermatitis are available in the consumer market. However, at present, most barrier formulations contain zinc oxide and petroleum jelly as an active ingredient that have been effective in the treatment and prevention of diaper dermatitis (Merrill, 2015, p. 331).

Studies have been identified (Bartels, 2010, pp. 1–8, Muggli, 2009, pp. 43–46) analyzing the impact of different diaper care regimens such as ointments, oils, and creams on the incidence and severity of diaper dermatitis and also on the skin function. The treatment period was between 8 and 12 weeks. There were no differences in the severity score of diaper dermatitis between ointments, oils and creams in the comparative tests. The application of baby cream twice a week after bathing did not change the incidence of diaper dermatitis, but slightly reduced TEWL values

during the 8 weeks. There was a decrease in the incidence of diaper dermatitis, from a baseline of 50% or more to 2% using protective creams, ointments and oils. The use of ointments containing humectants and preparations that improve skin barrier function is recommended. However, the application of antiseptic-containing agents exacerbates the natural protective bacterial flora of the skin.

**CLEANSING:** Over the past decade, a range of wet wipes with various additives has been developed as an alternative to traditional water and cloth cleaning methods for the diaper area. Systematic review of the efficacy of nonlinear skin care procedures in diapers in term newborns has shown that wet wipes or water and fabric have a comparable effect and skin barrier function. Wet skin cleansing of the diaper using wet wipes has proven equally effective in hydrating the skin, pH, erythema and microbes (Merrill, 2015, p. 332).

8 studies have been identified to compare the use of commercially available baby wet wipes with water and fabric. All wet wipes used were water based, but varied widely in additives such as plasticizers, preservatives, fragrances, and pH. Six studies analyzed healthy infants aged 1 to 24 months and two studies examined only newborns. In two studies, erythema was observed in the diaper area more frequently where water and fabric were used for hygiene. The use of a washcloth has led to increased skin friction in the diaper area

than when using baby wipes. Visscher et al. (2009, 226-234) compared wet wipes with clean water (n = 131 neonates in the neonatal intensive care unit). Perineal erythema and transepidermal water loss (TEWL) were significantly lower in wet wipes compared to pure water. Bartels et al. (2012, p. 270-276) also compared baby wipes with clean water in a study in 44 newborns. Significantly lower TEWL was found in the buttock area in a group of children using wet wipes. In both groups, the physiological course of the stratum corneum hydration and skin pH was observed; microbial colonization was also comparable. In a large randomized controlled trial in 280 newborns, Lavender et al. (2012) found no difference between the severity of diaper dermatitis and TEWL and skin pH in children treated with wet wipes or water. When comparing four different napkin brands according to additives and pH, Priestley et al. (1996) found no difference in the severity of diaper dermatitis after 8 weeks of use. Adam et al. (2009) found that both soap and wet wipes have a direct effect on the pH of the skin surface. It has been shown that the use of wet wipes for 2 weeks increases the pH of the skin surface significantly less than just cleaning with water and fabric. The resulting pH of the skin varied significantly between the markers. Total skin pH values remained within the range found in healthy infants. In neonates, the pH of the skin decreased during the first 4 weeks of life regardless of the product used. In a study (Barlets, 2012,

270-276), significantly lower TEWL levels on buttocks were found after 4 weeks of wet wipes, but in two other studies (Lavender, 2012, Odio, 2001), TEWL values were between wipes and similar to water. Cleaning with wet wipes or only with water has a comparable effect on the hydration of the stratum corneum in newborns. None of the skin cleansing regimens affected the microbiological colonization of the perianal region by coliforms or Candida (Blume et al. 2014, 413-429).

Bartels et al. (2012, 270-276) investigated the long-term effects of bathing on the skin barrier function in a prospective study with 64 newborns during the first 8 weeks of life. Children bathed twice a week with different types of treatments: only in clean water or using a washing gel, with or without a baby cream. In bath comparisons with and without wash gel, the incidence of diaper dermatitis was low during the study period (0-12.5%) and was not affected by the cleanser. After weeks 8, the skin's pH at all places, including buttocks, differed significantly with the wash gel and water, but the cleaners did not alter other influencing variables.

**DIAPER:** With the development of disposable diaper technology and advanced design features, diaper absorbability and moisture avoidance have been significantly improved. Therefore, some experts today do not recommend infant with diaper dermatitis

cloth diapers. Disposable diapers aim at limiting contact with irritants, preventing excessive skin hydration, maintaining pH levels, and preventing skin barrier interruption. Baby powder is also not recommended for use today because it promotes the growth of bacteria and yeast and may impair the course of diaper dermatitis (Merrill 2015, p. 332).

Superabsorbent polymers, such as cross-linked sodium polyacrylate, form a gel in the diaper core upon contact with urine, resulting in reduced skin hydration, friction, and normalization of skin pH. In a retrospective evaluation of clinical trials (Van Gysel, 2012, 31-34), the frequency of mild to severe diaper dermatitis was shown to decrease by 50% following the introduction of these absorbent gels.

In a research conducted in India in intensive care units, they compared disposable diapers to substance based on nosocomial infections. Research suggests that cloth diapers do not have an absorbent capacity and must be replaced soon after contamination. Great attention is also paid to washing and ironing. Disposable diapers compared to nappies have excellent ability to store urine and faeces, thereby reducing contamination and transmission of infection. They also contain superabsorbent material that successfully reduces the appearance of rash. The study evaluated the role of disposable diapers in preventing nosocomial infection.

Reducing the likelihood of nosocomial infections associated with the use of disposable diapers is attributed to less frequent neonatal contamination by faeces and urine and lower colonization of the diaper area by faecal organisms (Chowdary 2015, p. 250-254). Disposable diapers can pose significant environmental hazards, so routine use of disposable diapers at home is not recommended.

**EDUCATION:** Diaper hygiene is an important part of parent education. All parents should be familiar with common ways to reduce the likelihood of diaper rash by maintaining good hygiene and careful skin care. Measures to restore healthy skin and prevent recurrent episodes of diaper rashes can be ensured safely at home. Parents should be reminded to wash their hands before and after each diaper change. Once the diaper is contaminated with urine or faeces, the diaper should be replaced as soon as possible to minimize contact with irritants. This means that diapers need to be replaced at least every 1 to 3 hours during the day and at least once per night. It is recommended to clean with warm water and cloth or with a soft wet wipe to remove skin irritants. Parents should gently wipe the genital area from front to back. If a barrier cream is used, the stool should be carefully removed from the barrier cream on the baby's skin before trying to completely remove the skin barrier cream. Allowing the skin to vent helps to prevent and treat diaper dermatitis.

If the area is still red, parents can apply an additional layer of barrier cream to the remaining barrier cream to strengthen it. Parents are encouraged to continue these steps until the nappies are gone and seek advice from the health care provider if the nappies do not respond to these strategies or worsen after a few days (Merrill 2015, p. 332-333).

**Conclusion:** Diaper rash is one of the most common skin problems in infants wearing diapers. Although not a serious disease, they cause discomfort to the child and stress to the parents. Thus, when caring for an infant, it is important to know the influencing factors of diaper rash and preventive strategies that can be of great importance in the care of the infant's skin.

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