

### Original Investigation

## Comparison of Aloe Vera versus Petroleum Jelly in Reduction of Diaper Dermatitis among Infants admitted in BPKIHS

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#### ABSTRACT

**INTRODUCTION:** Diaper dermatitis is one of the most common inflammatory skin reactions during infancy caused by high humidity, maceration and friction due to contact with urine and faeces. Application of a suitable barrier preparation can easily treat diaper dermatitis. This study aims to compare effectiveness of Aloe Vera and Petroleum Jelly in reduction of diaper dermatitis among infants admitted in BPKIHS. **MATERIALS AND METHODS:** A quasi-experimental study design was adopted. Fifty infants meeting eligible criteria were selected by consecutive sampling technique. Data was collected using semi structured interview questionnaire and observation Proforma for skin grading. Descriptive and inferential statistic (Chi square test) was used to analyse the data. **RESULTS:** The severity of diaper dermatitis was reduced in both groups although the reduction rate was not statistically significant. After application of aloe vera jelly the mean intensity of Diaper Dermatitis was reduced from 2.04 to 1.4 and after application of petroleum jelly it was reduced from 2.21 to 1.2. Frequency of diaper change has significant association with development of Diaper Dermatitis ( $p=0.04$ ). **CONCLUSIONS:** The study concludes petroleum jelly to be more effective than Aloe Vera Jelly for reduction of infantile diaper dermatitis.

**Keywords:** Aloe vera jelly; Diaper dermatitis; Infants; Petroleum jelly.



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#### INTRODUCTION

Diaper dermatitis, also known as nappy rash, is an inflammation of the skin covered by nappy [1]. Diaper dermatitis occurs in 25% infants during first 4 weeks of life, and about 7% to 35% of the infant population is affected, with the highest prevalence in 9 to 12 months old infants [2,3].

Diaper dermatitis is a frequent concern that is raised by parents with the health care provider. Most cases of diaper dermatitis are mild and can be managed through appropriate skincare advice and suitable barrier products. Severe cases may be complicated by infection and may require antifungal and/or antibiotic treatment [4].

Diaper dermatitis occurs regularly in young children with a 1 in 4 likelihood [5]. Despite the ubiquity of this condition, there is a lack of unequivocal empirical data about best care practices; this situation leaves health professionals and parents in a quandary [6]. Therefore, the present study was aimed to compare the effectiveness of Aloe Vera and Petroleum Jelly in reduction of diaper dermatitis among infants.

#### MATERIALS AND METHODS

##### Study design and setting

A quasi-experimental research design was adopted. Study was conducted among infants admitted in Paediatric Units of BPKIHS. BPKIHS is a tertiary level medical care centre in Province 1, established in 1993 AD, it has capacity of 750 beds along with 24 hours emergency services on Paediatric, Obstetrics and General Medicine.

##### Participants, sample size and sampling technique:

Infants from birth to 1 year with diaper dermatitis were selected by using non probability consecutive sampling technique. Random allocation of two groups i.e., application of Aloe Vera Gel (Group A) and petroleum jelly (Group B) were done by lottery method with non-replacement. The sample was calculated using 2 proportion formula and the sample size was 25 in each group taking consideration of 95% Confidence Interval, 5% error [7,8].

##### Data collection procedure and study variables:

A Semi-structured interview questionnaire was used to collect information regarding socio-demographic data as well as medical history of the participants. An observational proforma, 4- point scale modified by Kohlendorfer, Berger

and Inzinger was used for grading skin condition. In the scale, a score of 1 denotes the best condition that is 'no Diaper Dermatitis', 2 denotes mild Diaper Dermatitis (feature: Dry skin with few to moderate visible scaling), 3 denoting moderate Diaper Dermatitis (feature: Dry skin with darker scales, increased area of mild erythema, skin has a rough texture with superficial fissures) and a score of 4 denotes severe Diaper Dermatitis (features: Dry, crusted skin on erythematous base with dark scales and fissures) [9].

Data collection tool was pre-tested in 10% of the total sample in Paediatric Unit of BPKIHS. Data was collected after Institutional Review Committee approval was obtained. Infants admitted in Paediatric Wards (Unit I and II) of BPKIHS meeting selection criteria were enrolled in the study. An interview questionnaire was filled after obtaining informed consent. Data was collected by researcher herself in the identified setting using pre-designed instrument for 3 months duration (April 2021-June 2021)

### Intervention

Procedure for application of jellies has 4 steps. Step I include grading of infant's skin condition by using Modified Lane and Drost Scale by 2 observers (researcher and paediatrician). Step II include skin sensitivity test, where fingertip of Aloe Vera gel or Petroleum Jelly was applied on infant's arm for 20 minutes, if there was no allergic reaction infant were enrolled in the study. Step III consists application of jellies after cleaning diapered area with luke warm. Infant in each group was treated only with the respective topical jellies three times a day for a period of 3 days. The amount of jelly to use is between 1 - 2 ml and was run for the perianal area and perineum, covered with diaper.

Step IV include evaluation of reduction of Diaper Dermatitis. Infant's skin was assessed by researcher on three consecutive mornings and by the paediatrician in 1<sup>st</sup> and 3<sup>rd</sup> day of enrolment. After the 3<sup>rd</sup> day of examination, the treatment was stopped for participants who recovered

to normal condition and was continued to those who won't recovered by that time.

Study variables were age of child, gender of child, weight of child, type of nutrition, type of diaper used and frequency of diaper changed.

### Statistical analysis and data management:

Data were analysed in SPSS using descriptive and inferential statistic. Descriptive statistics was used to describe data, utilizing percentage, mean and standard deviation as appropriate. Chi-square test (Person's chi-square, linear-by-linear test and Fisher's exact tests) was performed to compare the difference between two treatment Aloe Vera application and petroleum application at 95% confidence Interval and 5% level of significance.

### Ethical consideration:

Ethical principles were followed throughout the study. The ethical approval was obtained from NHRC (*Ref. No. 2607*) and IRC (IRC no. *IRC/1822/020*) of BPKIHS. A verbal as well as written consent was taken from parents after explaining the procedure.

## RESULTS

As depicted in Table 1, the demographic characteristics of both the study groups were almost similar. The mean age of infant was 5.91±4.01 month. Majority of infant in both groups were male (56%) and (58%) in Aloe vera and Petroleum group respectively.

The mean weight of infant was 6.94 ±2.30 kg. Most of the infant (48%) in aloevera group and (44%) in Petroleum group were breastfeed exclusively. Cent percent infant used disposable diaper in both groups. Most of the infant, 60 percent in aloe vera group used to change diaper ≤3 times a day whereas only (40%) in petroleum group used to change diaper ≥ 4 times a day.

Frequency of diaper change has significant association with development of diaper dermatitis (p= 0.04).

**Table 1 | Association of diaper dermatitis with demographic variables among study groups (n=50)**

Variables	Characteristics	Jelly applied		P value
		Aloe vera (n=25)	Petroleum (n=25)	
Age of child Mean ±SD (5.91±4.01)	1-6 months	16 (64)	15 (62)	0.77
	7-12 months	09 (36)	10 (38)	
Gender of child	Male	14 (56)	15 (58)	0.77
	Female	11 (44)	10 (42)	
Weight of child Mean ±SD (6.94 ±2.30)	3-5 kg	08 (32)	08 (32)	1.00
	6-10 kg	17 (68)	17 (68)	
Type of Nutrition	Exclusive Breastfeeding	12 (48)	11 (44)	0.837*
	Complementary feeding	10 (40)	11 (44)	
	Formula feeding	03 (12)	03 (12)	
Type of Diaper used	Disposable	25 (100)	25 (100)	
Frequency of Diaper change	≤3 times/day	15 (60)	15 (60)	0.04
	≥ 4 times/day	10 (40)	10 (40)	

Values are expressed as number (%). Comparisons have been made using Pearson Chi-square. \*Linear-by-linear

Table 2 | Severity of Diaper Dermatitis in the study groups before and after jelly application (n=50)

Parameters		Jelly applied		P value
		Aloe vera (n=25)	Petroleum (n=25)	
Before	Mild	24 (96)	22 (88)	0.60
	Moderate	01 (4)	03 (12)	
After	None	16 (64)	20 (80)	0.16
	Mild	08 (32)	05 (20)	
	Moderate	01 (4)	00 (0)	

Values are expressed as number (%). Comparisons have been made using Fisher's Exact Test.

Table 3 | Rate of diaper dermatitis reduction in the study groups (n=50)

Characteristics	Mean intensity of DD before treatment	Mean intensity of DD after treatment
Aloe vera (n=25)	2.04	1.4
Petroleum (n=25)	2.21	1.2

The severity of diaper dermatitis was decreased in both groups by the end of study although the reduction rate was not statistically significant ( $p=0.16$ ).

The mean intensity of Diaper Dermatitis before treatment was 2.04 in aloe vera jelly application group and 2.21 in petroleum jelly application group, which reduced after treatment to 1.4 and 1.2 in aloe vera jelly application group and petroleum jelly application group respectively.

Improvement in severity of Diaper dermatitis was greater in petroleum group than that of aloe vera group.

drugs [7].

The observed improvement in severity of Diaper dermatitis in our study was greater in petroleum group than aloe Vera group, which is consistent with the result that reported lower incidence of diaper rash in the experimental group with petrolatum jelly (17.1%) than the control group (22.2%) [8].

The present study shows that frequency of diaper change is significantly associated with development of diaper dermatitis. A study by Visscher *et al.* also noted similar finding that frequent diaper changes are required in any patient without a history of diaper dermatitis [9].

## DISCUSSION

This study aimed to compare the effects of Aloe vera and Petroleum jelly to improve infantile diaper rash. Our findings revealed no significant difference between the severity of dermatitis rash score with topical use of aloe vera and petroleum ( $p=0.16$ ). In one of the studies by Panahi, the reduction rate was found to be significantly greater in the *Calendula* group than aloe vera group. There was not any adverse effect from either of the study

## CONCLUSION

Our results show a clinical improvement of the skin condition after use of both Petroleum and Aloe vera jelly. The mean intensity of diaper dermatitis was reduced from 2.21 to 1.2 in petroleum group; thus, petroleum can be considered as effective barrier product for management of infantile diaper dermatitis.

## ADDITIONAL INFORMATION AND DECLARATIONS

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**Data Availability:** Data will be available upon request to corresponding authors after valid reason.

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