



Review Article

Frequency and Prevalence of Nappy Rash in Indian Infant's Population

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A study was carried out to conduct prevalence and frequency of nappy rash in Indian infant's population. The study was centered on the role of diaper in nappy rash. The study was carried out in Udaipur city. Total 110 Infants and their parents were selected for the survey of frequency and prevalence of nappy rash. Study revealed that the frequency of moderate rash reached a maximum at age 9 to 12 months. Rash frequency and severity were significantly lower when the mean number of diaper reported changes per day was above average, regardless of the type of nappy used. Infants nappied exclusively in disposable nappies had a significantly lower mean rash grade and a significantly lower frequency of moderate and severe rash. The frequency of combined moderate and severe rash increased with increasing number of bowel movements per day. Infants partially or wholly breast-fed or those with a history of breast-feeding tended to have a lower prevalence of moderate and severe rash compared to the infants who fed on proprietary milk preparation.

Key word: Nappy Rash, Disposable Diapers , Candida Infection

INTRODUCTION

Diaper rash, or diaper dermatitis, an acute, inflammatory reaction of the skin in the diaper area, is one of the most common dermatitis in infants. Because the condition is rarely of significant health consequence and is limited to the diaper-wearing years of infancy, few investigations have been conducted to determine factors that are related to its frequency and severity in the general

population of infants. Investigations of the effects of diaper types (cloth or disposable) on diaper dermatitis yielded conflicting results (Grant *et al.*, 1973; Wiener, 1970; Stein, 1982). A similar study (Jordan *et al.*, 1982) also gathered data on the effects associated with infant age, frequency of diaper changes, and such practices as bathing frequency, extent of cleansing, and application of ointment at diaper changes. The objectives of this observational study, including both retrospective and prospective elements, were to determine the frequency and

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severity of diaper dermatitis among a randomly selected infant population and to look for relationships among the rash and a variety of factors including infant age, sex, diet, and diapering practices. (Pratt *et al.*, 1955; Sezer, 1967; Barbero *et al.*, 1952)

METHODS AND MATERIALS

Locale of Study

The study was carried out in Udaipur district of Rajasthan state. A private hospital was selected for the survey of prevalence and frequency of Nappy rashes in infants. The locale was selected purposely because the investigator is a resident of Udaipur, so there was ease in accessibility and better interaction with the respondents.

Selection of Sample

The present study required three types of subjects i.e. Infants, infant's mothers and retail shopkeepers of diaper for market survey and for the survey of prevalence and frequency of Nappy rashes in infants.

Selection of Infants

A total of 110 infants, roughly equal numbers of males and females, aged 1 to 20 months (mean age 10 months) at the time of study, were selected by purposive sampling technique. Subjects were required to be healthy infants with no atopy, unusual skin condition, or chronic illness as determined from the medical history provided by the parents. Infants

who were routinely taking medication (other than vitamins and minerals) prescribed by a physician were excluded from the study. Out of 110 infants, 50 infants comprised of experimental group who were routine user of disposable diapers, in general good health as evidenced by medical history and dermatological examination. The ages (mean \pm SD) of infants in these studies were 7.13 \pm 3.06 months. Only younger age of the infants were enrolled in this study in order to increase the probability for the occurrence of nappy rash episodes.

Selection of parents

A total of 110 parents were selected for the survey of prevalence and frequency of nappy rash. The age group of selected parents was 20-35 years.

A. Tools and Techniques

Following tools were prepared for the collection of data for the study.

Interview schedule

For the investigations of frequency and severity of nappy rashes among general Indian infant population a 20 item interview schedule was drawn up to ask the parents of children wearing nappies who attended the outpatient clinics of a private Hospital, Udaipur. Nappy rash was simply defined to parents as a rash in the Nappy region thought to be caused by the infant wearing a nappy.



Medical and Personal History

A questionnaire was completed by the parent or guardian of each study participant. It dealt with characteristics of the infant's family, habits (diet, sleep, number of bowel movements per day), and medical history (allergies, visits to physician, skin sensitivity); and the mother's habits and practices (nappy change frequency, type of nappy used, type of soap used). (Tanino *et al.*, 1959; BuUen, 1976)

Visual analog scale for the assessment of Nappy rashes

A Visual analog scale was developed for the assessment of Nappy rashes. This grading scale was developed to reflect the etiology of the diaper skin breakdown, beginning with healthy skin and no rash at grade-0. The low levels of diaper rash, represented by grades 0.5-1.0, are attributed to compromises in skin integrity as evidenced by dryness/scaling and aberrant desquamation, and skin erythema attributed to an irritant response. Specific rash features, i.e. eruptions, papules, and vesicles, are slight in severity at a grade of 1.5 and erythema increases. As the skin eruptions worsen, visual scaling disappears because the barrier has been broken and the irritant response (erythema) worsens. Ulceration, severe erythema and moderately severe eruptions are

characteristic of more significant rash and are given grades 3.0-4.0 (Borovik, 1977; Koblenzer, 1973)

Evaluation of Skin Condition of the Nappy Area

Recruited infants were examined by investigator. Each infant's skin in the nappy area was graded using the scale. Grades were based on the type and severity of lesions (erythema, skin integrity, eruptions, edema) and extent and location of the affected area. The overall grade was determined from the severity of the lesions and then adjusted one-half grade unit upward or downward depending on the size of the area affected.

RESULT AND DISCUSSION

Frequency and Severity of Observed Nappy Rash

Table 1 shows the distribution of nappy rashes. The distribution of rash severity was

Table: 1 Distribution of Nappy Rashes among Male and Female Infants

S.No.	Gender	None	Slight	Moderate	Severe	Total
1	Male	24	21	8	2	55
2	Female	30	12	11	2	55
Total		54	33	19	04	110

not symmetric on this scale showing a prevalence of higher grades. The majority



of the infants (79%) had no rash or very slight rash (< grade 1.0). 17.27 % infants had moderate grade of rash (rash of grade 1.5 to 2.5 was described as moderate). It is characterized by redness and scaling of the skin. Severe rash was associated with skin ulcerations and severe erythema. 3.63% of infants was found with severe rash grade.

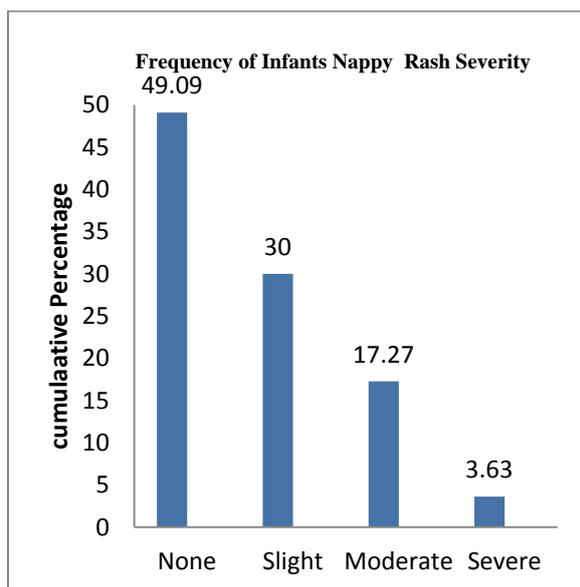


Fig. 1: Distribution for Nappy Rash Severity

The overall severity spectrum of diaper rash can be broken into three subcategories. Rash of less than grade <1.0 was random, described as slight by the parents, and, based on the frequency of physician involvement, not regarded as a threat to the infant's health or comfort. Grade 2.0 to 2.5 rash was more stable with time and perceived as more of a threat to the infant's health and comfort. When grades were plotted against cumulative percentage of cases, a segmentation of the

overall distribution was apparent with discontinuities occurring around grades 2 and 3. Fig.2 shows the frequency of rash based on the maturity of the infants. The rashes were divided into three severity categories: none to slight (grade < 1.0), moderate (grade 1.0 to 2.0), and severe (grade > 3.0).

Table 2: Nappy rash with regards to age

S. No.	Nappy Rash Grade	Age (months)				Total
		<6	6-12	12-18	18-24	
1	None	7	30	16	1	54
2	Slight	5	17	10	1	33
3	Moderate	3	10	6	-	19
4	Severe	-	3	1	-	4
5	Grand Total	13	60	33	-	110

The prevalence of each category is shown as a function of a maturity index, which is the actual age of the infant corrected for gender related deviations in weight from the norm. The frequency of moderate rash reached a maximum at age 9 to 12 months. The presence of severe rash was relatively constant at approximately a 5 per cent level across 6-15 months studied. Thus, it seems that, as the infant ages, the skin in the diaper region is subjected to fewer insults from contact with feces and urine, which would be expected to decrease the prevalence of nappy rash arising from such contact.



Relationship between Observed Rash and Nappy Type and Changing Frequency

Among the 110 infants studied, nappy usage was reported as: cloth (50%), disposable (50%). Rash was then analyzed.

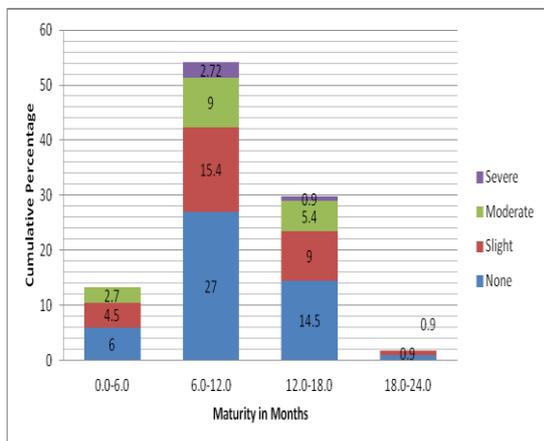


Fig. 2: Frequency and severity of observed Nappy rash based on maturity

based on nappy type for infant groups who reported a higher or lower daily nappy change rate than the average of 8. Two observations were made concerning nappy type and change frequency. First rash frequency and severity were significantly lower ($P < 0.001$) when the mean number of diaper reported changes per day was above average (i.e., over 8), regardless of the type of nappy used. There was, as expected, a strong relation between change rate and infants' age; older infants were changed less often. Second, infants nappied exclusively in disposable nappies had a significantly lower ($P < 0.001$) mean rash grade and a significantly lower frequency of moderate and severe rash.

Table. 3: Nappy rashes with regards to types of Nappy

S.No	Types of Diaper	None	Slight	Moderate	severe	Total	χ^2 -value
1	Dispos able Diaper	37	13	5	0	55	14.55
2	Cloth Diaper	17	20	14	4	55	
	Total	54	33	19	04	110	

$P < 0.001$

Relationships among other factors and rash

No significant differences were detected in the frequency or severity of rash experienced by males or females. Infants with claimed allergies did not show any more rash than the others although the number of these infants was small. There was the indication that the frequency of combined moderate and severe (greater than 3.0) rash increased with increasing

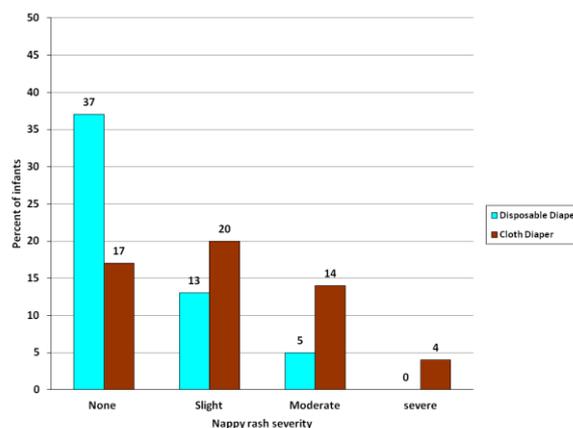


Fig.3: Relationship between Observed Rash and Nappy Type



number of bowel movements per day, suggesting that irritation from feces is a contributing factor. Infant diet may be an important factor in the etiology of nappy rash. It is commonly believed that breast-fed infants experience less rash than formula-fed infants.

Table 4: Nappy rashes with regards to frequency of Nappy changes

S. No.	Frequency of nappy changes	Severity of Nappy rashes				χ ² -value
		None	Slight	Moder	Severe	
1	2	1	-	-	-	678.0
2	4	30	11	5		
3	6	8	5		1	
4	8	6	11	7	-	
5	10	8	5	6	2	
6	12	1	1	1	1	
Total		54	33	19	04	

P<0.001

The reported beneficial effects of breast-feeding over formula feeding can be attributed to lower stool pH, differences in the intestinal microflora and components of the feces and perhaps urine.

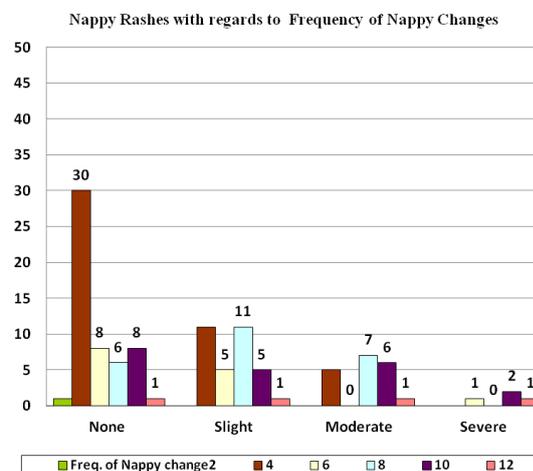


Fig. 4: Nappy Rashes with Regards to Frequency of Nappy Changes

Data on the frequency of breast-feeding among the population surveyed in our study supported the concept of dietary influence.

Table 5: Nappy Rashes with Regards to Number of Bowel Movement/Day

S. No.	No of bowel movement/day	None	Slight	Moderate	Severe	χ ² -value
1	0.5	17	8	2	0	8.43
2	1	5	3	1	0	
3	2	26	18	5	1	
4	3	5	4	8	0	
5	4	1	0	3	3	
Total		54	33	19	04	

Infants partially or wholly breast-fed (44.5 per cent) or those with a history of breast-feeding tended to have a lower prevalence of moderate and severe rash compare to the infants (55.4 per cent) who fed on proprietary milk preparation.

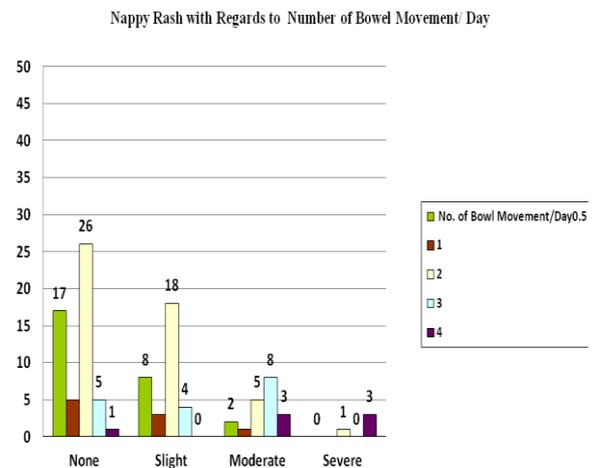


Fig. 5: Nappy rashes with regards to No. of Bowel movement/Day



The high rashes incidents can Fig 5:be attributed to the high amount of urease present in feces of infants who fed on proprietary milk

Table 4.3.5. Nappy rashes with regards types of Feeding

S.No	Type of Feeding	Nappy rash Grade				Total	χ^2 -Value
		None	Slight	Moderate	Severe		
1	Breast	26	20	3	0	49	0.557
2	Proprietary Milk	28	13	16	4	61	
Total		54	33	19	4	110	

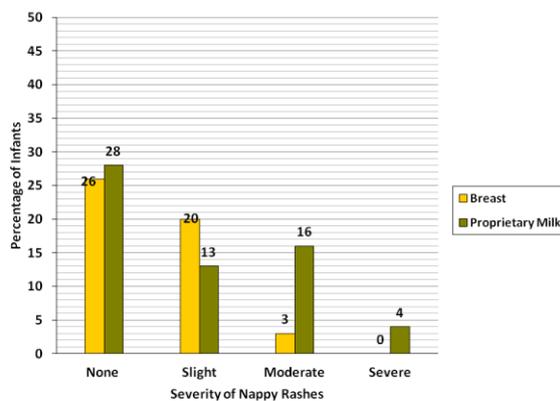


Fig. 6: Nappy rashes with regards type of feeding

The results of this study suggested that the following factors are associated with development of Nappy rash:

- Maturity of the infant (within the limits described)
- Diet
- Frequency and duration of contact between the infant's skin and excreta (based on the effects of change frequency on development of rash).

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