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PREVALENCE AND RISK FACTORS FOR NAPKIN RASH AMONG INFANT IN AL HAMDANYIA CITY

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ABSTRACT

Background: Diaper dermatitis, often known as diaper rash, is a very common condition among infants. Diaper rash affects the majority of newborns at some point. It can happen at any time when the child is wearing a diaper. The same issue has been observed in older children who are incontinent of urine. It is more frequent in newborns throughout their first 15 months of life, particularly between the 7th and 12th months. **Objectives:** To find out the prevalence of napkin rash in 6-9 months old infants, to determine clinical types and pattern of management of napkin rash and to identify the factors that might be associated with napkin rash. **Methods:** A cross-sectional study was conducted at Al Hamdanyia primary health care center from January 2023 to the end of December 2023. The questionnaire includes three parts; first part: includes general information about the age of infants in months, sex, weight in kg, length in cm. Second part: involves socio-demographic and economic factor of infant's mothers and fathers which included age of mothers in years, nationality, educational level of mothers and fathers, occupation of mothers and fathers. Third part: includes specific information of infants like type of feeding, presence of chronic disease, presence of other dermatological disorders, presence of oral thrush, use of systemic antibiotics, frequency of bowel motion (times/day), using wet wipes or not, type of soap used in washing and using of adding material. Then the infant is going to be examined for the presence of napkin rash and type of napkin dermatitis. **Results:** Two hundred fifty infants participated in the study. More than half (53.6%) were females. Sixty eight out of 250 infants (27.2%) had diaper dermatitis. Irritant contact dermatitis represented 50.0% of cases, candida diaper dermatosis in 42.6%, seborrhoeic dermatitis in 5.9%, Jacquest's erythema in 1.5%. Detailed analysis of risk factors revealed the following significant risk factors: Weight for age > 2Z (P =0.04), diarrhea (P>0.001), oral thrush (P =0.01), other dermatoses (P =0.01), using systemic antibiotics (P =0.02) and unproper use of care additives (P >0.001). **Conclusion:** Napkin rash is common in 6-9 months old infants. Giving educational lectures and teaching brochures to mothers particularly of those at high risk of napkin dermatitis about better practice and care of nappy skin.

KEYWORDS: Diaper, Infants, Iraq, Nineveh, Rash.

1- INTRODUCTION

Diaper dermatitis, often known as diaper rash, is a very common condition among infants.[1] While it seldom results in a life-threatening condition, it can create discomfort for kids, irritability, crying especially when the child have to urinate or during diaper change in addition to stress for parents, and difficulties for health care providers.[2-3] Napkin rash accounts for 20% of all skin consultations in children under the age of five.[4] According to a different research, more than half of kids between the ages of one and twenty months suffered diaper rash.[5-6] Nappy rash prevalence varies by country, with rates of 16% in the UK, 25% in Japan, 15% in Italy, and 43.8% in China. These disparities in prevalence might be attributed to distinctions between ethnic groups, each of which has its own unique risk factors for diaper dermatitis due to differences in skin sensitivity, resulting in varied prevalence.[7]

Diaper rash affects the majority of newborns at some point. It can happen at any time when the child is wearing a diaper. The same issue has been observed in older children who are incontinent of urine. It is more frequent in newborns throughout their first 15 months of life, particularly between the 7th and 12th months. Both sexes look equally impacted.[8-9]

Diaper dermatitis is caused by a compromised barrier, resulting in dryness, scaling, abnormal desquamation, and erythema.[10] Exposing the stratum corneum to prolonged wetness in an occlusive diaper environment increases the risk of mechanical damage and penetration by microorganisms. Nappy skin has a higher pH than non-nappied skin in newborns and older babies.[11] Increased skin pH makes the skin more vulnerable to mechanical injury and sensitive to the action of fecal enzymes like lipases and proteases.[12] Fecal enzymes can hydrate and irritate the skin due to their low molecular weight.[13] Diet can impact fecal enzymes, pH, and microbiota, potentially contributing to diaper dermatitis.[14] Diaper dermatitis is caused by the combination of these factors, which breaks down the stratum corneum and makes the skin more vulnerable to fecal bacteria including Staphylococcus aureus and Candida albicans.[15]

This study aimed to identify the to find out the prevalence (point) of napkin rash in a group of children aged 6-9 months, to identify the factors that might be associated with napkin rash and to identify the clinical types and pattern of management of napkin rash.

2-PATIENTS AND METHODS

After obtaining ethical approval from the ethical committee of Nineveh Health directorate. A cross-sectional study was conducted, from January 2023 to the end of December 2023.

Convenience sampling method was used to collect 250 infants. Infants aged 6-9 months who attended Al Hamdanyia primary health care center, had been examined for napkin rash and included in this study. The number of infants examined per week was around 20 infants. Especially designed questionnaire was constructed by the researcher for the purpose of data collection depending on extensive review of relevant literature, including three parts; first part: includes general information about the age of infants in months, sex, weight in kg, length in cm. Second part: involves socio-demographic and economic factor of infant's mothers and fathers which included age of mothers in years, nationality, educational level of mothers and fathers, occupation of mothers and fathers. Third part: includes specific information of infants like type of feeding (breast, bottle, mixed plus adding food), presence of chronic disease like (cystic fibrosis, Kawasaki's disease, anomaly in the renal system), presence of other dermatological disorders like (seborrhea, atopic dermatitis, psoriasis), presence of oral thrush, use of systemic antibiotics, frequency of bowel motion (times/day), using wet wipes or not, type of soap used in washing and using of adding material. Then asked the mothers about presence of napkin rash, if she said yes; the infant is going to be examined for the presence of napkin rash and type of napkin dermatitis (irritant contact dermatitis, candida diaper dermatitis, seborrheic diaper dermatitis, Jacquet's erythema and others), also asked about treatment received and history of previous attacks of napkin rash since birth.

Data were analyzed using the statistical package for social sciences (SPSS, version 29). Chi-square test of association was used to compare proportions. When the expected count of more than 20% of cells or the table was less than 5, Fisher's exact test was used. P value ≤ 0.05 would be considered statistically significant.

3. RESULTS

Examination of nappy area of the infants revealed that 68 out of 250 infants showed signs of napkin rash. This yield a point prevalence of 27.2% (Fig 3.1).

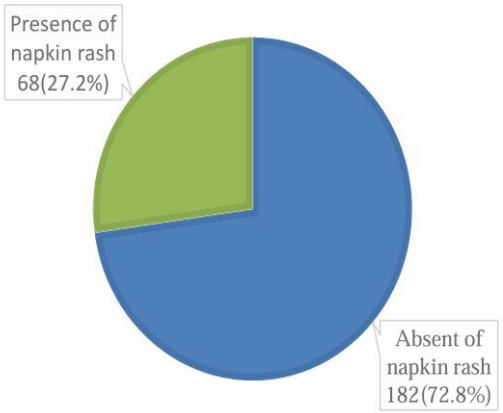

Figure 3.1: Point prevalence of napkin rash among 250 infants.

Moreover; inquiring mothers about previous episode of napkin rash revealed that 215 out of 250 (86.8%) infants suffered from at least one attack of nappy rash.

Two hundred fifty infants were included and studied in the current study. Their mean age ± SD was 7.53 ± 1.11 months. Table 3.1 shows no significant association between age and development of napkin rash (p = 0.40). The highest prevalence (33.3%) was detected among infants aged seven months. Regarding gender of infants, results revealed around 1% higher percentage in female (27.6%) than male (26.7%) and the difference was statistically not significant (P=0.40). Classifying weight of infants according to age revealed a significant difference with napkin rash (P=0.04) in which 3 out of 4 (75.0%) infants from group >2 Z has napkin rash. Followed by 36.4% among infant of -2 to -1.1Z subgroup. A non-significant difference was observed between weight for height and napkin rash (P=0.20).

Table 3.1: Prevalence of napkin rash by demographic characteristics of infants.

Variables	Categories	Napkin area affected		Napkin area spare		Total		P-value
		No.	%	No.	%	No.	%	
Age group (months)	Six	18	22.8	61	77.2	79	100.0	0.40
	Seven	22	33.3	44	66.7	66	100.0	
	Eight	11	23.4	36	76.6	47	100.0	
	Nine	17	29.3	41	70.77	58	100.0	
Gender	Male	31	26.7	85	73.3	116	100.0	0.80
	Female	37	27.6	97	72.4	134	100.0	
Weight for age	<-2 Z	0	0	4	100.0	4	100.0	0.04*
	-2 to -1.1 Z	12	36.4	21	63.6	33	100.0	
	-1 to 2 Z	53	25.4	156	74.6	209	100.0	
	>2 Z	3	75.0	1	25.0	4	100.0	
Weight for length	<-2 Z	3	42.9	4	57.1	7	100.0	0.20*
	-2 to -1.1 Z	6	26.1	17	73.9	23	100.0	
	-1 to 2 Z	52	25.5	152	74.5	204	100.0	
	>2 Z	7	43.8	9	56.3	16	100.0	
Total		68	27.2	182	72.8	250	100.0	

*Calculated by Fisher Exact Test.

Table 3.2 revealed shows that mother's variables (i.e., age, ethnicity and socio-economic status) were not-significantly different between categories.

Table 3.2: Prevalence of napkin rash by mother demographic characteristics.

Variables	Categories	Napkin area affected		Napkin area spare		Total		P-value
		No.	%	No.	%	No.	%	
Mother's age	<25	6	40.0	9	60.0	15	100.0	0.60
	25-29	26	28.0	67	72.0	93	100.0	
	30-34	19	26.4	53	73.6	72	100.0	
	≥35	17	24.3	53	75.7	70	100.0	
Ethnicity	Kurd	41	26.3	115	73.7	156	100.0	0.80*
	Arab	26	29.2	63	70.8	89	100.0	
	Turkoman	0	0.0	1	100.0	1	100.0	
	Other	1	25.0	3	75.0	4	100.0	
Socio-economic status	Medium●	49	28.8	121	71.2	170	100.0	0.40
	High	19	23.8	61	76.3	80	100.0	
Total		68	27.2	182	72.8	250	100.0	

*Calculated by fisher's Exact Test.

● low socio-economic status equal 10 cases combined with medium status.

Table 3.3 summarizes feeding factors and its association with prevalence of napkin rash. Results revealed a non-significant difference in frequency of napkin rash in between different categories of feeding variables as follows: type of feeding (P = 0.40), presence of breast infection (P = 0.40), use of medications (P = 0.30), sterilization of bottles (P = 0.10).

Table 3.3: Prevalence of napkin rash by feeding factors.

Variables	Categories	Napkin area affected		Napkin area spare		Total		P-value
		No.	%	No.	%	No.	%	
Type of Feeding	Breast	24	23.8	77	76.2	101	100.0	0.40
	Bottle	25	27.5	66	72.5	91	100.0	
	Mixed ●	19	32.8	39	67.2	58	100.0	
Breast infection	Present	42	26.8	115	73.2	157	100.0	0.40*
	Absent	1	50.0	1	50.0	2	100.0	
Mother use of medication	Present	42	27.6	110	72.4	152	100.0	0.60*
	Absent	1	14.3	6	85.7	7	100.0	
Sterilization of bottle	Adequate	22	25.9	63	74.1	85	100.0	0.20
	Inadequate	22	34.4	42	65.6	64	100.0	
Total		68	27.2	182	72.8	250	100.0	

*Calculated by fisher's Exact Test.

● Mixed feeding includes (breast, bottle and add food).

Table 3.4 illustrates concomitant diseases associated with napkin rash. It's evident that the prevalence of napkin rash among infants with diarrhea (96.6%) was significantly higher than the prevalence (18.1%) among infants with no diarrhea (P < 0.001). Oral thrush was significantly associated with napkin rash and the result revealed that all the three patients with thrush had napkin rash (P = 0.01). Table 3.4 also shows significantly higher prevalence of napkin rash among those with dermatological diseases (P = 0.01). The prevalence of napkin rash was significantly higher (p = 0.02) among those taking systemic antibiotics (60%) than those not taking antibiotics (25.8%).

Table 3.4: Concomitant diseases associated with napkin rashes.

Variables	Categories	Napkin area affected		Napkin area spare		Total		P-value
		No.	%	No.	%	No.	%	
Diarrhea	Present	28	96.6	1	3.4	29	100.0	<0.001*
	Absent	40	18.1	181	81.9	221	100.0	
Oral thrush	Present	3	100.0	0	0.0	3	100.0	0.01*
	Absent	65	26.3	182	73.7	247	100.0	
Chronic illnesses	Present	3	60.0	2	40.0	5	100.0	0.10*
	Absent	65	26.5	180	73.5	245	100.0	
Dermatological diseases	Present	9	56.3	7	43.8	16	100.0	0.01*
	Absent	59	25.2	175	74.8	234	100.0	
Using systemic antibiotic	Present	6	60.0	4	40.0	10	100.0	0.02*
	Absent	62	25.8	178	74.2	240	100.0	
Total		68	27.2	182	72.8	250	100.0	

*Calculated by Fisher Exact test

The hygienic factors and mother care of nappy area of their babies is summarized in Table 3.5. The result revealed that there is no significant association between type of soap used, wet wipes using, and the process of drying skin before applying diaper with the presence of napkin rash. While using of adding materials show significant association with napkin rash (P=0.001), the results revealed that 12.8%, 19%, 23% of infants whose mothers use adding materials like herbal, moistening cream, and powder respectively have napkin rash compared with 40.1% of babies whose mothers do not use adding materials before applying diaper.

Table 3.5: Prevalence of napkin rash by hygiene factors.

Variables	Categories	Napkin area affected		Napkin area spare		Total		P-value
		No.	%	No.	%	No.	%	
Using wet wipes	Present	36	32.4	75	67.6	111	100.0	0.09
	Absent	32	23.0	107	77.0	139	100.0	
Soap used	Ordinary	38	29.0	93	71.0	131	100.0	0.50
	Baby soap	30	25.2	89	74.8	119	100.0	
Drying skin	Always	66	27.2	177	72.8	243	100.0	1.00*
	Rarely	2	28.6	5	71.4	7	100.0	
Using adding materials	Herbs	10	12.8	68	87.2	78	100.0	<0.001
	Moistening cream	8	19.0	34	81.0	42	100.0	
	Powder	3	23.1	10	76.9	13	100	
	Nothing	47	40.1	70	59.8	117	100.0	
Total		68	27.2	182	72.8	250	100.0	

*Calculated by Fisher's Exact Test.

Examination of napkin rash to determine its type revealed that: 34 out of 68 infants (50.0%) have irritant contact dermatitis, 29 infants (42.6%) had candida diaper dermatosis, 4 infants (5.9%) had seborrheic diaper dermatitis, and only one infant (1.5%) had Jacquest's erythema (Fig 3.2). Local steroid was prescribed to 27 infants, local steroid and antifungal medication was prescribed to 4 infants, a combination of (local steroid, local antifungal and local antibiotic) was prescribed to 33 infants, lastly other medications were prescribed to 4 infants.

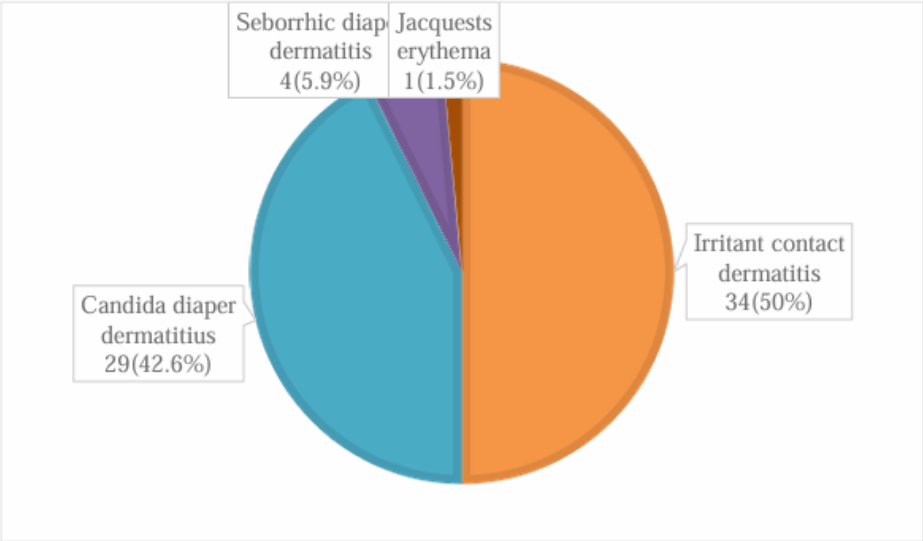

Figure 3.2: Type of dermatoses detected in 68 infants with napkin rash.

4. DISCUSSION

In this study, the estimated prevalence of napkin dermatitis is 27.2%. This point prevalence is in agreement with Ann Wanjiku et al who found it 27.3%[16] and Abdul-Wahab Inusah et al 27.4%.[17] Moreover; in the current study, 86.8% of studied infants have previous episode of napkin rash. This figure is 10% higher than the figure reported in tropical country of Mauritius in 2015 which revealed that 79.7% of babies were found to have a history of at least one episode of nappy rash.[18] The lower figure may be attributed to the wide age span and recruiting older babies in their study as the frequency of using diapers is expected to decrease gradually with ageing and subsequently lead to decrease frequency of napkin rash.

Regarding weight of infants, in this study observations were noticed that there is a statistical difference between weight of infants and diaper dermatitis, this could be due to increase friction, and humidity. Popy Aulia Safitri et al showed comparable finding.[19] Diarrhea is the most important risk factor for napkin rash. In this study, 28 out of 29 infants with diarrhea have napkin rash. A similar observation was reported by a study done in Indonesia.[20] and Ethiopia.[21] Furthermore; oral thrush found in this study to be a significant factor affecting napkin rash, which is going with Mehmet Semih Demirtaş et al[22] and Vian B. Nehmatulla et al studies' findings.[23] In the same way; the presence of dermatological diseases found in this study to be significant factor affecting the appearance of napkin dermatitis, which consistent to Sarin et al finding.[24] Using of systemic antibiotic is another factor found in this study to be significantly affecting napkin dermatitis, this may partially attributed to using it for the management of their concomitant diarrhea. Using broad-spectrum systemic antibiotics will alter cutaneous microflora which lead to flourishing of opportunistic infections and one of them is Candida albicans which is parallel to Mehmet Semih Demirtaş et al.[22] In the current study only 8 (19%) of infant with napkin rash used moisture which lead to wetness of skin and decrease risk of irritation. A similar observation was reported by Jennifer Counts et al.[25]

In this study, 68 infants suffered from napkin rash. Detailed examination revealed that half of them were irritant contact dermatitis. This is means that irritation from urine and feces in the diaper area is the primary cause of the rash in those individuals. Irritant contact dermatitis happens when the skin comes into contact with substances that directly irritate it, leading to inflammation. In napkin rash, this irritation is often caused by prolonged exposure to urine and feces, especially in the occlusive environment of a diaper. Similar finding was obtained from Anthonella B et al.[26]

5. CONCLUSION

Napkin dermatitis is a common dermatosis among 6-9 months old infant. Irritant contact dermatitis is the most common type of napkin dermatitis. Napkin dermatitis was significantly associated with obesity, diarrhea, oral thrush, using systemic antibiotic, other dermatoses and lack of use of care product. Giving educational lectures and teaching brochures to mothers particularly of those at high risk of napkin dermatitis about better practice and care of nappy skin.

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Conflict of intertest

About this study, the authors disclose no conflicts of interest.

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