

Evaluating Knowledge of Mothers With 0–24 Month Babies on Management and Preventive Measures for Diaper Dermatitis in Makka Region, Saudi Arabia

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Abstract

Introduction: Diaper dermatitis (DD) or nappy rash is characterized by the presence of skin erosion and reddishness caused by the prolonged exposure of the diapered area to urine and feces, commonly observed in babies or infants. The incidence of DD is found to be higher among children between the ages of 0 and 12 months. DD can cause an alteration in eating and sleeping patterns, increased crying, anxiety, and emotional stress. **Aim:** The present study is aimed at measuring the knowledge of the mothers with infants from 0 to 24 months about the management and preventive aspects of DD in the Makka region of Saudi Arabia. **Results:** The results of the present study showed that 59% of mothers present in the Makka region had good knowledge about the prevalence and management of DD. The findings of the study suggested that the age of the baby, gender, frequency of changing diapers, use of disposable diapers, cleaning, and treatment are related to the prevalence of DD. The socio-economic and demographical characters (age of mother ($P < 0.05$) and educational of mother ($P < 0.0001$)), number of children, age of child ($P < 0.05$), use of diaper ($P < 0.05$), type of diaper ($P < 0.05$), cleaning and drying method ($P < 0.0001$), treatment aspect ($P < 0.005$) and introduction to solids ($P < 0.0001$) are found to influence the knowledge of mother. **Conclusion:** Although most mothers were educated on DD, it is important to impart knowledge to parents and caretakers about the management, hygiene practices, and preventive measures of DD.

Keywords: diaper dermatitis; children; mother's knowledge; saudi arabia

Introduction

Diaper dermatitis (DD) is termed an irritation condition caused by the various cutaneous eruptions or inflammations (pustules, erythema, and papules) in diaper areas, that is, the genitals, skin folds, lower back, inner thighs, lower back, waistline, and abdomen, in neonates and infants [1]. Non-specific terms like diaper rash, napkin dermatitis, and nappy rash are commonly used in addressing DD [2]. Diaper candidiasis, chaffing dermatitis, and irritant contact dermatitis are the three types of DD. DD imparts discomfort and pain in babies; although DD is infrequently strong enough to cause a life-threatening impact, it is challenging for parents, caretakers, and healthcare workers. It is reported that in babies, the pH of the non-napped area is lower than that of the napped area [3]. The

incidence of DD is more prevalent between newborns and 12 months old [4]. The clinical manifestations of DD include redness, dryness, flaky skin, shiny plaques, scaling, erosion, and papules, and rarely, raised nodules or papules. Sometimes, no symptoms are observed in infants with DD except the eruption [5,6]. Agitation, sleeping pattern alteration, change in eating, increased crying, and emotional distress [7].

DD is classified as primary (caused by irritants) or secondary (yeast, including wild candida). The primary cause of DD is urine, feces, moisture, and friction. The outer layer of the skin (stratum corneum) protects the skin from mechanical injury and environmental irritants. In DD, the barriers of the skin are disrupted by excessive hydration due to

moisture and friction because of its constant contact with urine and feces [8]. The secondary causes of DD are developmental abnormalities and diarrhea (gastrointestinal factors), an imbalanced gut microflora due to infection in the respiratory tract, fragrances, preservatives, and certain chemicals causing allergic reactions, an inadequate skin care routine including reduced usage of talcum powders and soap, epidermis microorganisms, and teething, which have the ability to aggravate the DD [9]. Herpes simplex, HIV infection, psoriasis, biotin and zinc deficiency, scabies, papular urticaria, congenital syphilis, enterobius infestation, Netherton syndrome, Wiskott-Aldrich syndrome, Kawasaki disease, and child abuse are very rare causes of secondary DD [10]. *Streptococcus pyogenes* and *Staphylococcus aureus* (bacterial) and mycoses and *Candida albicans* (fungal) are also causative agents of DD [11].

The trypsin, protease, urease, and lipase (digestive enzymes) present in fecal matter are serious skin irritants that favor the development of DD, and bile salt elevates the disruption caused by these enzymes. The presence of fecal urease can break down the urea in urine. These factors damage or break down the integrity of the epidermal layer, which results in inflammation and the initiation of a repair cascade. After a few days of the repair process, the irritation reduces and the regeneration of normal skin takes place slowly [12]. In the initial stages, a small portion of the diapered area appears to be pink or red with scattered papules and dryness. In the moderation stage, definite or intense redness is observed in a larger area with fewer pustules. In the advanced stage, extreme redness, desquamation, ulceration, eruption, and edema are found in larger areas with plenty of pustules or concurrent papules [7]. In the diagnosis of DD, the physical assessment of skin rashes is taken into consideration, along with the following: type of diaper, duration of the rash, hygiene practice, pain and itching, cleaning routine, and antibiotics used [12]. In the case of the presentation of additional symptoms or failure of basic treatment, a differential diagnosis should be considered. In differential diagnosis of DD, infectious (bacterial (folliculitis, perianal dermatitis, and impetigo), viral (varicella and herpes simplex), and yeast (candidiasis) infections), inflammatory (psoriasis, intertrigo, granuloma gluteale infantum, irritant contact, allergic contact, seborrheic, and atopic dermatitis), and nutritional deficiencies (multiple carboxylases, zinc, and biotin) should be assessed [13, 14].

The first line of treatment for DD is self-management by mothers and caretakers, such as cleaning routines, diapers and wipes, usage of skin care products (powders and creams), regular bathing, and frequency of changing diapers [15]. Corticosteroids, water repellents, barrier creams containing dimethicone, petrolatum, lanolins, zinc oxide, cod liver oil, calcineurin inhibitors, antifungal (miconazole, tioconazole, fluconazole, nystatin, and clotrimazole), and antibacterial (mupirocin) Prevention methods such as "ABCDE" (air: increasing diaper-free time and allowing frequent aeration, Barrier: using barrier cream, Cleaning: proper cleansing of the diaper area with water and air drying, Diaper: changing the diaper is soiled or within an interval of 1 to 3 hours. Education (targeted education about good hygiene practices and diaper usage must be given to the parents) is useful in managing the DD [12]. The present study is aimed at measuring the knowledge of mothers with children between the ages of 0 and 24 months about DD and its prevention aspects.

Methods and materials

Study area

In the present study, mothers with infants were the target group. The study samples were obtained in the Makka region of Saudi Arabia with children aged 0 to 24 months, the age range with the most exposure to diapers and

the highest prevalence of diaper dermatitis. The study was conducted from February to July 2023.

Subject recruitment

The subjects recruited in this study were scrutinized based on the questionnaire according to the inclusion and exclusion criteria. Mothers with infants from 0 to 24 months, mothers who diaper their children, and mothers who are willing to participate in the study meet the inclusion criteria. Mothers with children above the age of 24 months, other city residents who live in Saudi Arabia, mothers who can't read and understand Arabic, prior skin allergies, family history of skin disease, and parents not willing to participate in the study were excluded from the study. The consent form was obtained from the parents who were willing to participate in the study. The present study was conducted after acquiring proper approval, and the approval number is HAPO-02-K-012-2023-04-1573.

Questionnaire preparation and collection

In the present descriptive cross-sectional study, responses from the mother were obtained online (electronically) using Google Forms and other social media platforms. The questionnaire was prepared in the Arabic language. The questionnaire has been validated [16]. Totally 45, questions were posted to the mothers, questionnaire is divided of several sections such as, questions to analysis sociodemographic (mothers age, educational status of both parents, religion, nationality, age and gender of child), and economical (employment status of parents, monthly income, number of children, and average money on diaper) information, information on diaper needs (introduction of solids, reason for lack of diaper, changing of diaper, episodes of DD, and use of plastic pants), knowledge of mothers on DD was assessed using 13 yes or no questions for each correct answer one point was given and for incorrect and do not know zero point was allotted, attitudes and hygiene practice on DD (cleansing and drying after defecation, type of diaper, treatment and prevention approach), and use of cortisone for DD. Questionnaires were obtained from 749 mothers with children aged between 0 and 24 months, along with a consent form. The questionnaire were validated through a pilot study.

Study variables

In the present study, prevalence of DD and mother's knowledge were the dependent variables, and age of the mother, educational qualification, employment status, monthly income, money spent on diapers, frequency of diaper changing, recent occurrence of DD, doctor visit, plastic pant usage, use of diapers on children, type of diaper, cleaning method, and drying of the child after bowel movement, treatment, introduction to solid foods, and preventive measures on DD were independent variables.

Statistical Assessment

In the present study, statistical analysis was performed using IBM SPSS Statistics software (version 21). The frequency and percentage were calculated for the descriptive information (sociodemographic, economical, and diaper needs). The mothers were categorized into two groups based on the median value: respondents who scored above seven are placed in the above average category, and respondents who scored seven and below seven are placed in the below average category. A Pearson's Chi-squared test (bivariate test) was performed to measure the prevalence of DD and the mother's knowledge of DD. The statistical significance was set at three different levels of P values (P<0.005, P<0.001, and P<0.0001).

Results

A total of 749 responses were collected from mothers with infants between 0 to 24 months. The socio-economic and demographic characteristics of mothers were recorded. Among 749 mothers, 32.1% were between the ages of 31-40 years followed by 26-30 years with 29.9%. About 75% of mothers have graduated, and most of them have completed their bachelor's degree (63.9%). Almost all mothers were Muslim (99.5%) and from Saudi Arabia (89.5%). The unemployed (53.1%) were found to be more prevalent among mothers, even though

they had good educational qualifications. More than half of the spouses have completed their bachelor degree (59.9%), and almost all of them are employed (91.5%). About 43.6% of families had a monthly income of more than 10,000 Saudi riyals. The prevalence of female children (54.3%) was found to be higher than that of males (45.6%). The mothers of children aged between 12-24 months (22.6%) have participated in the present study (Table.1).

Variable	Criteria	Frequency	Percentage (%)
Age of mother	18-25	146	19.49
	26-30	224	29.90
	31-40	241	32.17
	41-49	102	13.61
	50 and above	36	4.80
Educational qualification	High school and below	186	24.83
	Bachelor's degree	479	63.95
	Master and doctoral degrees	84	11.21
Religion	Muslim	746	99.59
	Non-Muslim	3	0.40
Nationality	Saudi	671	89.58
	Non-Saudi	78	10.41
Employment status of the mother	Employed	351	46.86
	Unemployed	398	53.13
Educational qualification of the spouse	High school and below	183	24.43
	Bachelor's degree	449	59.94
	Master and doctoral degrees	117	15.62
Employment status of the spouse	Employed	686	91.58
	Unemployed	63	9.07
Monthly household income	5000-10000	295	39.38
	>10000	327	43.65
	<5000	127	16.95
Child gender	Male	342	45.66
	Female	407	54.33
How old is your child?	0-3 months	89	11.88
	3-6 months	141	18.82
	6-9 months	104	13.88
	9-12 months	108	14.41
	12-24 months	170	22.69
	>24 months	137	18.29

Table 1: Socio-economic and demographic characteristics of mothers

The child was introduced to solid foods more likely after eight months (36.1%). The majority of mothers (76.1%) had at least one child using a diaper. The average amount of money spent on diapers was found to be 200 Saudi riyals (31.3%). In terms of the frequency of diaper changing per day, 62.6% of mothers changed diapers 4-7 times, and mothers feel that they do not have enough diapers (81.8%). About 65.8% of children didn't experience DD in the last six months, and some children about 28.4% experienced DD once, and most of them didn't visit a doctor (73.5%). Most of the mothers (89.7%) were aware that their children

should not wear plastic pants. Only 29.3% of mothers attached their diapers loosely to allow the entry of air. The water and soap were used by 49.9% of mothers to clean the child after bowel movements. Gentle patting and drying with a towel (47.2%) were preferred by most of the mothers to dry the child after cleaning. Mothers preferred disposable diapers (94.2%) to cloth diapers. The mothers who participated in the present study used zinc oxide-containing barrier cream (34.5%) to prevent DD. Application of anti-fungal cream (47.3%) was mostly used by the mothers to treat the DD (Table.2).

Variable	Criteria	Frequency	Percentage (%)
Did you introduce your baby to solid food?	Yes	525	70.09
	No	224	29.90
When did your child start eating solid food?	>8 months	254	33.91
	<8 months	271	36.18
How many of your children are using diapers now?	1	570	76.10
	2	129	17.22
	3	32	4.27

	4	8	1.06
	5 and more	10	1.33
What is the average amount of money spent on diapers each month?	100	59	7.87
	150	145	19.35
	200	235	31.37
	250	164	21.89
	>250	146	19.49
How many times do you change diapers per day per child?	1-3	159	21.22
	4-7	469	62.61
	7-10	111	14.81
	>10	10	1.33
Do you ever feel you do not have enough?	Yes	613	81.84
	No	136	18.55
How often do you experience this?	Very often	187	24.96
	Not very often	562	75.03
Has your child been clinically diagnosed with DD in the last 6 months?	Yes	256	34.17
	No	493	65.82
If yes, how many times has this occurred in the last 6 months?	Once	213	28.43
	More than once	97	12.95
Did you visit the doctor due to this condition?	Yes	198	26.43
	No	551	73.56
Do you use plastic underpants?	Yes	77	10.28
	No	672	89.71
How do you use diapers on your child?	Attach the diaper firmly so that the feces do not leak.	529	70.62
	Attach it loosely to allow air to enter.	220	29.37
How do you clean your child after bowel movements?	Water only	169	22.56
	Water and soap	374	49.93
	Water and wet wipes	153	20.42
	Wet wipes	53	7.07
What do you use to dry after cleaning the child?	Natural air drying	99	13.21
	Gently patting with a dry towel + natural air drying	224	29.90
	Gently patting with a dry towel.	354	47.26
	Rubbing with a dry towel	70	9.34
	Drying with a hair dryer	2	0.26
What type of diapers do you use?	Disposable diaper only	703	94.25
	Cloth only	3	4.05
	Both disposable and cloth	41	5.47
What substances do you routinely put on a baby's bottom to prevent diaper dermatitis?	Baby lotion (barrier emollient)	77	10.28
	Baby Powder	182	24.29
	Zinc oxide	259	34.57
	Vaseline (petrolatum)	76	10.14
	Bepanthen moisturizer crème	3	0.40
	None	152	20.29
What do you use to treat diaper dermatitis?	Application of baby powder	68	9.07
	Application of native medication	38	5.07
	Application of medicated powder	56	7.47
	Application of Vaseline	123	16.42
	Application of anti- fungal cream	355	47.39
	Use of antibiotics	32	4.27
	Nothing	77	10.28

Table 2: Investigating diaper management and mother's attitudes towards DD

The recent occurrence of DD in the babies was correlated with various factors to determine the potential risk factor. Age of mother (P=0.01), employment status (P=0.01), child gender (P=0.001), child age

(P<0.005), use of plastic pants (P<0.05), use of diapers (P=0.05), cleaning method (P<0.05), and type of diaper (P=0.05) are found to be factors influencing the prevalence of DD. Apart from them, treatment method

and introduction to solid foods ($P < 0.0001$) showed strong significance with the prevalence of DD (Table.3).

Variables		X ² Value	Df	Prevalence of DD		P value
				Yes	No	
Age of mother	18-25	12.500	4	32 (4.3%)	114 (15.2%)	0.014 ^b
	26-30			83 (11.1%)	141 (18.8%)	
	31-40			92 (12.3%)	149 (19.9%)	
	41-49			37 (4.9%)	65 (8.7%)	
	50 and above			12 (1.6%)	24 (3.2%)	
Educational qualification of the mother	High school and below	2.516	2	64 (8.5%)	122 (16.3%)	0.284 ^f
	Bachelor's degree			157 (21.0%)	322 (43.0%)	
	Master's and doctoral degrees			35 (4.7%)	49 (6.5%)	
Employment status of the mother	Employed	6.126	1	136 (18.2%)	215 (28.7%)	0.013 ^b
	Unemployed			120 (16.0%)	278 (37.1%)	
Child gender	Male	11.463	1	246 (32.8%)	247 (33.0%)	0.001 ^d
	Female			161 (21.5%)	95 (12.7%)	
How old is your child?	0-3 months	18.387	5	15 (2.0%)	74 (9.9%)	0.002 ^c
	3-6 months			42 (5.6%)	99 (13.2%)	
	6-9 months			41 (5.5%)	63 (8.4%)	
	9-12 months			39 (5.2%)	69 (9.2%)	
	12-24 months			70 (9.3%)	100 (13.4%)	
	>24 months			49 (6.5%)	88 (11.7%)	
Monthly household income	5000-10000	3.224	3	94 (12.6%)	201 (26.8%)	0.358 ^f
	>10000			43 (5.7%)	84 (11.2%)	
	<5000			118 (15.8%)	208 (27.8%)	
What is the average amount of money spent on diapers each month?	100	2.576	4	16 (2.1%)	43 (6.7%)	0.631 ^f
	150			48 (6.4%)	97 (13.0%)	
	200			78 (10.4%)	157 (21.0%)	
	250			62 (8.3%)	102 (13.6%)	
	>250			52 (6.9%)	94 (12.6%)	
How many times do you change diapers per day per child?	1-3	0.694	3	57 (7.6%)	102 (13.65)	0.875 ^f
	4-7			160 (21.4%)	309 (41.3%)	
	7-10			35 (4.7%)	76 (10.1%)	
	>10			4 (0.5%)	6 (0.8%)	
Do you use plastic underpants?	Yes	7.342	1	37 (4.9%)	40 (5.3%)	0.006 ^a
	No			219 (29.2%)	453 (60.5%)	
How do you use diapers on your child?	Attach the diaper firmly so that the feces do not leak.	3.565	1	170 (22.7%)	360 (48.1%)	0.059 ^a
	Attach it loosely to allow air to enter.			86 (11.5%)	133 (17.8%)	
How do you clean your child after bowel movements?	Water only	8.186	3	72 (9.6%)	97 (13.0%)	0.042 ^a
	Water and soap			115 (15.4%)	259 (34.6%)	
	Water and wet wipes			54 (7.2%)	99 (13.2%)	
	Wet wipes			15 (2.0%)	38 (5.1%)	
What do you use to dry after cleaning the child?	Natural air drying	1.187	4	126 (16.8%)	228 (30.4%)	0.880 ^f
	Gently patting with a dry towel + natural air drying			34 (4.5%)	65 (8.7%)	
	Gently patting with a dry towel.			73 (9.7%)	151 (20.2%)	
	Rubbing with a dry towel			0 (0.0%)	1 (0.1%)	
	Drying with a hair dryer			23 (3.1%)	48 (6.4%)	
What type of diapers do you use?	Disposable diaper only	5.702	2	233 (31.1%)	470 (62.8%)	0.058 ^a
	Cloth only			3 (0.4%)	2 (0.3%)	

	Both disposable and cloth			20 (2.7%)	21 (2.8%)	
What substances do you routinely put on a baby's bottom to prevent diaper dermatitis?	Baby lotion (barrier emollient)	6.791	5	24 (3.2%)	53 (7.1%)	0.237 ^f
	Baby Powder			50 (6.7%)	132 (17.6%)	
	Zinc oxide			92 (12.3%)	167 (22.3%)	
	Vaseline (petrolatum)			28 (3.7%)	48 (6.4%)	
	Bepanthe moisturizer crème			1 (0.1%)	2 (0.2%)	
	None			61 (8.1%)	91 (12.1%)	
What do you use to treat diaper dermatitis?	Application of baby powder	42.632	6	21 (2.8%)	47 (6.3%)	0.000 ^e
	Application of native medication			14 (1.9%)	24 (3.2%)	
	Application of medicated powder			22 (2.9%)	34 (4.5%)	
	Application of Vaseline			55 (7.3%)	68 (9.1%)	
	Application of anti-fungal cream			129 (17.2%)	226 (30.2%)	
	Use of antibiotics			13 (1.7%)	19 (2.5%)	
	Nothing			2 (0.3%)	75 (10.0%)	
Did you introduce your baby to solid foods?	Yes	30.015	1	212 (28.3%)	44 (5.9%)	0.000 ^e
	No			313 (41.8%)	180 (24.0%)	

Sample size n=749, Significance levels at P<0.05a, P<0.01b, P<0.005c, P<0.001d, P<0.0001e, and non-significant f X2 value, Chi-squared value; df, Degrees of freedom.

Table 3: Analyzing the factors influencing the prevalence of DD

The majority of mothers (82.3%) knew that DD is a common skin condition in babies and young children. And 85.8% were aware that not changing the diaper of a baby frequently can lead to DD. About 86.6% of mothers knew that the alcohol content of the wipes could irritate the baby's skin. Zinc oxide-containing creams (68%) were mostly used by the mothers. Only 12.1% of mothers were mindful that a sprinkle of talcum powder on the diaper would not soak up the moisture. The false statement that disposable diapers have been shown to cause DD was identified by 18.4% of mothers. The thumb rule to visit a doctor if DD does not clear up was followed by 79% of mothers. Only 13.3% of mothers were familiar with the fact that attaching a diaper firmly will not prevent leakage. Informed knowledge about the false statement that to remove

odor, wipe with a wet tissue containing perfume was observed in 72.2% of mothers. Most mothers (91.5%) were conscious of the cleaning procedure to wipe out the excreta thoroughly with water and rub the area with a towel. The mothers (32.8%) were sensible to the false statement that it is effective to apply ointment and powder together when DD occurs, and 34.8% of mothers didn't encourage the fact that if you wash the area frequently with water when a baby has DD, it will worsen. About 83.8% of mothers supported the fact that poor diapering is one of the causes of DD (Table.4). In the present study, about 55.9% of mothers had good knowledge, and 44% of mothers had below-average knowledge on the management and prevention aspects of DD.

Questions	Criteria	Response	Percentage (%)
DD is the most common skin condition in babies and young children (yes).	Yes	617	82.37
	No	38	
	Do not know	94	
One of the most common causes of DD is not changing the baby diaper (yes).	Yes	643	85.84
	No	48	
	Do not know	58	
Some baby wipes that contain alcohol can irritate an infant's skin (yes).	Yes	649	86.64
	No	35	
	Do not know	65	
DD ointments that contain zinc oxide (yes).	Yes	510	68.09
	No	91	
	Do not know	148	
A sprinkle of talcum powder on a diaper will soak up moisture (no).	Yes	451	60.21
	No	141	
	Do not know	157	
Disposable diapers have been shown to cause DD (no).	Yes	247	32.97
	No	138	
	Do not know	364	

The general rule of thumb is to call the doctor if DD does not clear up (yes).	Yes	592	79.03
	No	56	
	Do not know	101	
When putting on a diaper, attach it tightly so that the excrement does not leak (no).	Yes	611	81.57
	No	100	
	Do not know	38	
To remove odor, wipe with a wet tissue containing perfume (no).	Yes	136	18.15
	No	541	
	Do not know	72	
Wipe the excreta thoroughly with water and rub the area with a towel (yes).	Yes	686	91.58
	No	38	
	Do not know	25	
When DD occurs, it is effective to apply ointment and powder together (no).	Yes	298	39.78
	No	246	
	Do not know	205	
If you wash the area frequently with water when a baby has DD, it will worsen (no).	Yes	261	27.36
	No	222	
	Do not know	266	
The poor type of diaper is one of the causes of diaper dermatitis (yes).	Yes	628	83.84
	No	28	
	Do not know	93	

Table 4: Assessment of mother's knowledge on diaper hygiene practices and preventive measures

The association between the mother's knowledge of diaper management, hygiene practices, and preventive measures is assessed using the chi-squared test. The results showed that high significance was found between a mother's knowledge and socio-economic characteristics (educational qualification), method of cleaning and drying, and introduction to solid

foods (P<0.0001). The significance was also found between mother's knowledge and age of mother (P<0.001), treatment for DD (P<0.005), age of child (P<0.05) use of diaper (P<0.05), type of diaper (P<0.05). Other parameters were found to be non-significant with the mother's knowledge (Table.5).

Variables		X ² Value	df	Knowledge of the mother		P value
				Above Average	Below Average	
Age of mother	18-25	14.424	4	63 (8.4%)	83 (11.1%)	0.006 ^c
	26-30			134 (17.9%)	90 (12.0%)	
	31-40			146 (19.5%)	95 (12.7%)	
	41-49			59 (7.9%)	43 (5.7%)	
	50 and above			17 (2.3%)	19 (2.5%)	
Educational qualification of the mother	High school and below	19.589	2	81 (10.8%)	105 (14.0%)	0.000 ^e
	Bachelor's degree			279 (37.2%)	200 (26.7%)	
	Master's and doctoral degrees			59 (7.9%)	25 (3.3%)	
Employment status of the mother	Employed	0.878	1	190 (25.4%)	161 (21.5%)	0.349 ^f
	Unemployed			229 (30.6%)	169 (22.6%)	
Child gender	Male	2.491	1	202 (27.0%)	140 (18.7%)	0.115 ^f
	Female			217 (29%)	190 (25.4%)	
How old is your child?	0-3 months	12.581	5	39 (5.2%)	50 (6.7%)	0.028 ^a
	3-6 months			70 (9.3%)	71 (9.5%)	
	6-9 months			56 (7.5%)	48 (6.4%)	
	9-12 months			65 (8.7%)	43 (5.7%)	
	12-24 months			106 (14.2%)	64 (8.5%)	
	>24 months			83 (11.1%)	54 (7.2%)	
Monthly household income Saudi riyal	5000-10000	3.718	3	162 (21.6%)	133 (17.8%)	0.294 ^f
	>10000			192 (25.6%)	134 (17.9%)	
	<5000			65 (8.7%)	62 (8.3%)	
What is the average amount of money spent on diapers each month?	100	3.356	4	30 (4.0%)	29 (3.9%)	0.500 ^f
	150			82 (10.9%)	63 (8.4%)	
	200			126 (16.8%)	109 (14.6%)	
	250			80 (10.7%)	66 (8.4%)	
	>250			101 (13.5%)	63 (8.4%)	
	1-3	4.012	3	80 (10.7%)	70 (10.5%)	0.260 ^f
	4-7			269 (35.9%)	200 (26.7%)	

How many times do you change diapers per day per child?	7-10			66 (8.8%)	45 (6.0%)	
	>10			4 (0.5%)	330 (44.1%)	
Has your child clinically diagnosed diaper dermatitis (Rash) in the last 6 months?	Yes	1.461	1	151 (20.2%)	268 (35.8%)	0.227 ^f
	No			151 (20.2%)	225 (30.0%)	
Did you have to visit the doctor due to this?	Yes	0.213	1	108 (14.4%)	311 (41.5%)	0.645 ^f
	No			90 (12.0%)	240 (32.0%)	
Do you use plastic underpants?	Yes	1.512	1	38 (5.1%)	39 (5.2%)	0.219 ^f
	No			381 (50.9%)	291 (38.9%)	
How do you use diapers on your child?	Attach the diaper firmly so that the feces do not leak.	1.468	1	289 (38.6%)	130 (17.4%)	0.020 ^a
	Attach it loosely to allow air to enter.			241 (32.2%)	89 (11.9%)	
How do you clean your child after bowel movements?	Water only	34.760	4	114 (15.2%)	54 (7.2%)	0.000 ^e
	Water and soap			204 (27.2%)	170 (22.7%)	
	Water and wet wipes			88 (11.7%)	65 (8.7%)	
	Wet wipes			12 (1.6%)	41 (5.5%)	
What do you use to dry after cleaning the child?	Natural air drying	28.921	4	229 (30.6%)	125 (16.7%)	0.000 ^e
	Gently patting with a dry towel + natural air drying			121 (16.2%)	103 (13.8%)	
	Gently patting with a dry towel.			229 (30.6%)	125 (16.7%)	
	Rubbing with a dry towel			28 (3.7%)	43 (5.7%)	
	Drying with a hair dryer			0 (0.0%)	1 (0.1%)	
What type of diapers do you use?	Disposable diaper only	7.821	2	402 (53.7%)	301 (40.2%)	0.020 ^a
	Cloth only			1 (0.1%)	4 (2.2%)	
	Both disposable and cloth			16 (2.1%)	25 (3.3%)	
What substances do you routinely put on a baby's bottom to prevent diaper dermatitis?	Baby lotion (barrier emollient)	8.767	5	38 (5.1%)	39 (5.2%)	0.119 ^f
	Baby Powder			91 (12.1%)	91 (12.1%)	
	Zinc oxide			157 (21.0%)	102 (13.6%)	
	Vaseline (petrolatum)			44 (5.9%)	32 (4.3%)	
	Bepanthe moisturizer crème			3 (0.4%)	0 (0)	
What do you use to treat diaper dermatitis?	None	21.013	6	86 (11.5%)	66 (8.8%)	0.002 ^c
	Application of baby powder			34 (4.5%)	34 (4.5%)	
	Application of native medication			19 (2.5%)	19 (2.5%)	
	Application of medicated powder			24 (3.2%)	24 (3.2%)	
	Application of Vaseline			63 (8.4%)	60 (8.0%)	
	Application of anti-fungal cream			226 (30.2%)	129 (17.2%)	
	Use of antibiotics			20 (2.7%)	12 (1.6%)	
Did you introduce your baby to solid foods?	Yes	12.860	1	316 (42.2%)	103 (13.8%)	0.000 ^e
	No			209 (27.9%)	121 (16.2%)	

Table 5: Correlating the mother's knowledge on the management of diapers, hygiene practices, and preventive measures

Sample size n=749, Significance levels at P<0.05a, P<0.01b, P<0.005c, P<0.001d, P<0.0001e, and non-significant f X2 value, Chi-squared value; df, Degrees of freedom.

Discussion

DD is defined as inflammation in the diapered area (genital, abdomen, and thighs) with varying degrees of severity on the epidermis of babies [17].

The present study is aimed at measuring the knowledge of mothers on DD with children age of 0 to 24 months in Makka region, Saudi Arabia. The outcome of the present study revealed that the age of the mother, employment status, child gender, age of the child, use of plastic pants,

method of using a diaper, cleaning method, type of diaper, and treatment were found to have a statistical association with the prevalence of DD. **Kim (2019)** [18], reported that improper hygiene practices, such as cleaning and drying methods and applying talcum powder during DD, were reported to worsen the disease. In the present study, about 60% of mothers were unaware of the conscious use of talcum powder on DD. A study conducted by **Eke and Opara (2013)** [19], in Nigeria reported that education qualification has significance for DD, and most of the mothers preferred Vaseline for the bottom and anti-fungal cream to treat DD.

Biranjia-Hurdoyal and Pandamikum (2015) [20], reported that the prevalence of DD is higher among babies who wear disposable diapers, and the results of the present study also showed that a higher prevalence of DD was observed in babies who used disposable diapers. Irregularity in changing diapers and usage of cloth diapers were found to have an influence on the prevalence of DD. The significant prevalence of DD was found to reduce with age [1]. The results of the present study also denoted the same: advancement in age reduced the incidence of DD and showed a higher significance between the age of the child and the prevalence of DD. **Jewaro et al. (2021)** [21], reported that using barrier cream, frequency of using diapers, and breast feeding are interlinked with the prevalence of DD. They also identified diarrhea as a potential risk factor for deepening the DD and suggested that educating mothers on these complications will be useful in reducing the incidence of DD. A study conducted in Saudi Arabia by **Mohamed et al. (2021)** [22], revealed that the age and gender (female) of infants has a strong influence on the prevalence of DD. In the present study, the prevalence of DD was found to be high among infants of age between 12-24 months. Similar results have been suggested by **Alghamdi et al. (2022)** [23], where infants between the ages of 19-24 months showed a higher risk of DD. **Li et al. (2012)** [3] demonstrated that introduction to solid foods, frequency of changing diapers, and home location were found to be risk factors for DD. In the present study, a higher significance was observed between the introduction of solid foods and the prevalence of DD. **Joseph and Mathew (2013)** [24], produced the contradicting result that the age of the mother or family type doesn't have any significance with the mother's knowledge.

The results of the present study showed that mothers had average knowledge of diaper management and hygiene practices. About 55.9% of mothers had good knowledge, and 44% of mothers had less knowledge on the management of diapers and hygiene practices. The percentage of good diaper management in the present study is higher than the recent studies conducted by **Prithiba et al. (2020)** [25], in Kanchipuram District, India, and **Collins et al. (2023)** [16], in Northern Ghana, West Africa (23.5%). The findings of the present study revealed that the association between socioeconomic factors (age of mother and educational qualification of mother), cleaning and drying method after bowel movement, type of diaper used, and treatment for DD were found to be correlated with the mother's knowledge.

A recent study conducted by **Collins et al. (2023)** [16], showed that employment status and cleaning and drying methods were found to have a correlation with the mother's knowledge of diaper management and hygiene practices. The results of the study conducted by **Prithiba et al. (2020)** [25], were found to contradict the outcome of the present study. The study showed that there is no significant correlation between the demographic factors (educational qualification, employment, diaper usage, and number of children) and the mother's knowledge of DD. But the study revealed that family type and mother's age showed significance with knowledge of DD. **Wanjiku et al. (2016)** [26], conducted a study to observe the relationship between sociodemographic and economic factors and DD. The results revealed the interlink between educational qualification, income of the mother, child age, and DD. In the present, maternal educational qualification was found to have a strong statistical association ($P < 0.0001$) with the mother's knowledge on diaper management and hygiene practice. The present study has only included population from Makka Saudi Arabia so the study has to be extended to confirm the results.

Conclusion

The present study highlighted that various factor like socioeconomic status (age of mother and employment status of mother), age and gender of child, plastic pant usage, use of diaper, type of diaper, cleaning method, introduction to solid foods, and treatment method are influencing the prevalence of DD, and these factors are also potentially correlated with the mother's knowledge and preventive aspects of DD. In the present study, the majority of mother respondents from the Makka region of Saudi

Arabia had good knowledge of diaper usage and management and were found to be aware of diaper dermatitis, but a higher prevalence of DD was observed among the population. So, the study strongly suggests the necessity and importance of creating awareness about DD and targeting parents and caretakers about diaper-related issues that would be helpful in containing the occurrence of DD and would possibly reduce the suffering of infants.

References:

1. Sukhneewat C, Chaiyarit J, Techasatian L. (2019). Diaper dermatitis: a survey of risk factors in Thai children aged under 24 months. *BMC Dermatol*, 19(1):7.
2. Bante A, Girma M, Ahmed M, Aschalew Z. (2023). Diaper dermatitis and associated factors among 1–24 months children visiting public health facilities of Arba Minch town, Gamo zone, southern Ethiopia. *Heliyon*, 9(10).
3. Li CH, Zhu ZH, Dai YH. (2012). Diaper dermatitis: a survey of risk factors for children aged 1-24 months in China. *Journal of international medical research*, 40(5):1752-1760.
4. Celiksoy MH, Topal E, Haziroglu Okmen Z, Alataş C, Demirtaş MS. (2019). Characteristics of persistent diaper dermatitis in children with food allergy. *Pediatric dermatology*, 36(5):602-606.
5. Gupta AK, Skinner AR. (2004). Management of diaper dermatitis. *International journal of dermatology*, 43(11):830-834.
6. Coughlin CC, Eichenfield LF, Frieden IJ. (2014). Diaper dermatitis: clinical characteristics and differential diagnosis. *Pediatric dermatology*, 31:19-24.
7. Stamatas GN, Tierney NK. (2014). Diaper dermatitis: etiology, manifestations, prevention, and management. *Pediatric dermatology*, 31(1):1-7.
8. Shin HT. (2014). Diagnosis and management of diaper dermatitis. *Pediatr Clin North Am*, 61(2):367-382.
9. Atherton DJ. (2016). Understanding irritant napkin dermatitis. *International journal of dermatology*, 7-9.
10. Scheinfeld N. (2005). Diaper dermatitis: a review and brief survey of eruptions of the diaper area. *American journal of clinical dermatology*, 6:273-281.
11. Šikić Pogačar M, Maver U, Marčun Varda N, Mičetić-Turk D. (2018). Diagnosis and management of diaper dermatitis in infants with emphasis on skin microbiota in the diaper area. *Int J Dermatol*, 57(3):265-275.
12. Merrill L. (2015). Prevention, treatment and parent education for diaper dermatitis. *Nursing for women's health*, 19(4):324-337.
13. Tüzün Y, Wolf R, Bağlam S, Engin B. (2015). Diaper (napkin) dermatitis: a fold (intertriginous) dermatosis. *Clinics in dermatology*, 33(4):477-482.
14. Cohen B. (2017). Differential Diagnosis of Diaper Dermatitis. *Clin Pediatr (Phila)*, 56:16-22.
15. Blume-Peytavi U, Hauser M, Lünemann L, Stamatas GN, Kottner J, Garcia Bartels N. (2014). Prevention of diaper dermatitis in infants—a literature review. *Pediatric dermatology*, 31(4):413-429.
16. Collins G, Inusah AW, Asumah M, Kwarteng P, Ziblim SD, Dzomeku P. (2022). Knowledge of mothers with children age 1 to 24 months on diaper dermatitis management and associated practice in a referral hospital in Northern Ghana: a cross sectional study. *PAMJ-One Health*, 1:8(5).
17. Burdall O, Willgress L, Goad N. (2019). Neonatal skin care: Developments in care to maintain neonatal barrier function and prevention of diaper dermatitis. *Pediatr Dermatol*, 36(1):31-35.
18. Kim JS, Jeong YS, Jeong EJ. (2019). Knowledge of Diaper Dermatitis and Diaper Hygiene Practices among Mothers of Diaper-wearing Children. *Child Health Nurs Res*, 25(2):112-

- 122.
19. Eke GK, Ibo Opara P. (2013). Mothers Knowledge and Home Management of Nappy Rash in Port Harcourt, Nigeria. *Nigerian health journal*, 13(4):152-157.
 20. Biranjia-Hurdoyal S, Pandamikum L. (2015). A study to investigate the prevalence of nappy rash among babies aged 0 to 36 months old in a tropical country. *Aust J Dermatol*, 2(02):1040.
 21. Jewaro S, Mariam YG, Ali B. (2021). Prevalence of diaper rash and associated factors among babies aged 0 to 24 months in Adama Administrative City, Central Ethiopia: A cross sectional study. *African journal of medical and health sciences*, 20(5):53-61.
 22. Mohamed N, Ali Alshehri H, Bahader M Z, Alghoraibi MA, Alkenany RA, Alsulaimani YT, Al Juaid SS. (2021). Prevalence and Risk Factor of Diaper Dermatitis among Saudi Children. *International Journal of Innovative Research in Medical Science*, 6(10):642-648.
 23. Alghamdi MA, AL-Ghamdi HS, AlHajji AM, Alzahrani SA, Al-Thobaiti LY, Alzahrani SA, Alzahrani MA. (2022). Prevalence and risk factors of diaper dermatitis among newborn babies to two years of age in Al-Baha region, Saudi Arabia. *Middle East Journal of family medicine*, 7(10):47.
 24. Joseph JM, Mathew S. (2013). The effectiveness of teaching programme regarding prevention and management napkin dermatitis in Allahabad. *International journal of public health science (LJPHS)*, 2(1).
 25. Prithiba G, Priya K, Rekha R, Rebekahal R, Joseph VM. (2020). Assessment of knowledge of mothers regarding diaper rashes in infants in a selected rural community, Kanchipuram District, Tamil Nadu, India. Prof. (Dr) RK Sharma, 20(2):258.
 26. Wanjiku A, Ng Z, Charels M, Charles H. (2016). Socio-demographic and economic determinants of diaper dermatitis among children aged 0–24 months at Mbaghati District Hospital, Kenya: a cross sectional study. *International journal of health sciences and research (IJHSR)*, 6(5):239-247.



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