



Disposable Diapers and Incidence of Diaper Rash In Infants

Damai Antar Suku Pakaya^{1*}, Sri Andriani Ibrahim², Rini Wahyuni Mohamad³

¹Faculty of Sport and Health, Universitas Negeri Gorontalo, Indonesia

²Faculty of Medicine, Universitas Negeri Gorontalo, Gorontalo, Indonesia

³Nursing Departement, Faculty of Sport and Health, Universitas Negeri Gorontalo, Indonesia

ARTICLE INFO

Article history:

Received January 09, 2026

Revised February 01, 2026

Accepted August 24, 2026

Available online August 30, 2026

Keywords:

Infants, Disposable diapers, Diaper rash.

ABSTRACT

A baby's sensitive skin is highly susceptible to problems due to its structurally immature development. Diaper rash is a common skin problem in infants, particularly those under one year of age. This condition is characterized by redness, irritation, and even inflammation in the skin area covered by a diaper. Prolonged or frequent use of disposable diapers without proper changes can increase moisture and skin contact with urine or feces. This study aimed to determine the relationship between the use of disposable diapers and the incidence of diaper rash in infants at RSIA Sitti Khadijah Kota Gorontalo. This study employed a quantitative research design using an analytical survey method and a cross-sectional approach. The study population consisted of mothers with infants aged 0–12 months at RSIA Sitti Khadijah Kota Gorontalo who had diaper rash. The sample size was 40 respondents, and a non-probability sampling technique using total sampling was employed, meaning the entire population meeting the inclusion criteria was included in the study. Disposable diaper use was measured using a questionnaire, while the occurrence of diaper rash was assessed using an observation sheet. Data analysis was performed using the Chi-Square test, yielding a p-value of $0.001 < 0.05$. These results indicate a significant association between the use of disposable diapers and the incidence of diaper rash in infants at RSIA Sitti Khadijah Kota Gorontalo. Parents need education through health education sessions led by healthcare workers particularly nurses conducted at the hospital regarding the prudent use of disposable diapers and the importance of proper infant skin care practices.

1. INTRODUCTION

A baby's skin is very sensitive during the first year of life. This is due to the incomplete structural development of a baby's skin. The epidermis and dermis are still very thin, making a baby's skin more prone to irritation (Almukarramah *et al.*, 2024). One of the most common skin problems in infants is *diaper rash*. In this study, the focus is not only on the characteristics of *diaper rash* but also on the relationship between the use of *disposable diapers* particularly in terms of frequency and duration of use and the incidence of *diaper rash* in infants. *Diaper rash* is a skin condition that causes redness and swelling on a baby's buttocks and thighs (Ariyani *et al.*, 2024). This problem is often considered minor, but the increasingly common use of *disposable diapers* can become a concern if not accompanied by proper usage practices. Prolonged skin contact with urine or feces, high moisture levels, friction, and exposure to certain materials in the *diaper* can disrupt the skin's protective barrier, cause irritation, and facilitate the growth of *microorganisms*. With *disposable diapers*, these conditions are primarily related to the length of time a wet *diaper* remains in contact with the skin. (Sugiyanto *et al.*, 2023).

According to 2022 data from the World Health Organization (WHO), *diaper rash* most commonly occurs in infants under 1 year of age, with prevalence rates varying by country: 75% in the United States, 87% in Japan, 15% in Italy, and 34.9% in Iran. In Indonesia in 2021, approximately 7–35% of infants experienced *diaper rash*, with prevalence rates reaching 65% in South Sulawesi Province, approximately 85% in Konawe Regency, Southeast Sulawesi, and 6.5% in Jepara Regency, Central Java. In Gorontalo Province, a study by Dalanggo (2017) found that 18 out of 49 pediatric patients suffered from diaper dermatitis at Prof. Dr. H. Aloei Saboe Regional

*Corresponding author

E-mail addresses: damaiantarsukupakaya@gmail.com (Damai Antar Suku Pakaya)

General Hospital. Data from *the medical records at RSIA Sitti Khadijah Kota Gorontalo* also showed that 40 infants experienced *diaper rash* between October and December 2024—15 in October, 13 in November, and 12 in December.

Factors contributing to *diaper rash* include infrequent *diaper* changes, poor skin hygiene, and exposure to excessively hot and humid environmental conditions. Additionally, other causes of *diaper rash* include fungal infections such as *Candida albicans* and *Staphylococcus* bacteria, irritation caused by *diapers*, and diarrhea, which can trigger skin irritation (Fitri et al., 2024). Therefore, *diaper* use requires careful attention, as continuous contact between the baby's skin, urine, feces, moisture, and the *diaper* material can increase the risk of skin irritation. The use of *diapers* is now very common because they are easy to find, practical, and available in various types and price ranges. Many mothers prefer *disposable diapers* over cloth *diapers* because they help keep babies clean and comfortable while sleeping or traveling. (Ilyas et al., 2022)). In this study, the use of *disposable diapers* encompasses two indicators: frequency of use and duration of use. Frequency describes how often *disposable diapers* need to be used, along with education on the appropriate timing for *diaper* use and changes, so that the convenience does not increase the risk of skin irritation.

Disposable diapers can provide convenience for parents, but improper use may be associated with *diaper rash*. Symptoms of *diaper rash* may include redness, blisters or small sores, shiny skin, red spots, and swelling in areas that have been in prolonged contact with *disposable diapers* (et al., 2021). Infants with *diaper rash* become fussy and have trouble sleeping due to discomfort, which can subsequently disrupt breastfeeding and potentially affect growth if the condition persists (Abubakar et al., 2024). In more severe cases, damage to the skin's protective barrier can also increase the risk of secondary infections. Therefore, changing *disposable diapers* regularly and providing proper skin care for the infant are essential.

Suboptimal use of *disposable diapers* is not only related to skin problems. In a study titled "et al. (2024) on the use of *disposable diapers* and urinary tract infections (UTIs) in children under 2 years of age. Wearing *disposable diapers* for more than 4 hours was reported to be associated with a higher risk of UTIs compared to wearing them for less than 4 hours. These findings reinforce the importance of parents paying attention to the duration of *disposable diaper* use, even though this study specifically assessed the incidence of *diaper rash*. A study by Ertiana & Sari (2021) from on the relationship between *diaper* wear duration and the incidence of *diaper rash* in infants aged 9–12 months showed that out of 47 respondents, 24 respondents (51.1%) used *disposable diapers* and experienced *diaper rash* associated with usage lasting more than 3 hours. Furthermore, a study conducted by Asyaul Wasiah et al.(2021) involving 29 respondents, found that 18 infants (62.1%) experienced *diaper rash* associated with the use of disposable diapers. A study conducted by Naimah (2019) involving 29 participants found that 16 participants (55.2%) used disposable diapers for extended periods, and 20 participants (69.0%) experienced severe diaper dermatitis. Although previous studies have addressed the use or duration of diaper use, research on the relationship between the use of *disposable diapers* and the incidence of *diaper rash* in the context of local healthcare facilities specifically RSIA Sitti Khadijah Kota Gorontalo remains limited. This gap served as the basis for this study.

Based on initial observations conducted by the researchers at RSIA Sitti Khadijah Kota Gorontalo involving 15 mothers, all mothers reported that their infants used *disposable diapers*. A total of 14 infants used *disposable diapers* daily in the morning and at night, including while traveling, while one infant spent approximately 2 hours without a *disposable diaper* after waking up before putting one back on after their morning bath. Of the 15 infants, 13 had *diaper rash*; 12 showed redness in the areas covered by *disposable diapers*, and 1 infant exhibited redness and swelling in the genital area. Redness was found on the genital area, buttocks, thighs, and other areas covered by *disposable diapers*. These preliminary findings indicate a high rate of *disposable diaper* use alongside the occurrence of *diaper rash*, raising the suspicion of a potential association that requires scientific testing.

2. METHOD

This study was conducted at RSIA Sitti Khadijah Kota Gorontalo from January 22 to March 24, 2025. The study employed a quantitative approach using an analytical survey method, with a *cross-sectional* design to assess the association between the use of *disposable diapers* and the incidence of *diaper rash* during a single observation period; it was not intended to establish a cause-and-effect relationship. The study population consisted of all mothers with infants aged 0–12 months who experienced *diaper rash* and were treated at RSIA Sitti Khadijah Kota Gorontalo. Based on *medical record* data from October–December 2024, there were 40 infants with *diaper rash*, which formed the basis for determining the study population. The study sample consisted of 40 respondents. The sampling technique used was *non-probability sampling* via *total sampling*, in which the entire population meeting the study criteria was included as the sample.

Inclusion criteria included parents of infants who used disposable diapers, infants admitted to RSIA Sitti Khadijah Kota Gorontalo, and those willing to participate as respondents. Exclusion criteria included respondents who were not present at the study site and infants with skin diseases or conditions other than *diaper rash*. The subjects of the study were the infants, while the mothers served as respondents who provided information regarding the use of *disposable diapers* via a questionnaire. The occurrence of *diaper rash* was assessed in the infants through observation. The independent variable was the use of *disposable diapers*, measured based on two indicators: frequency of use and duration of use. The dependent variable was the occurrence of *diaper rash*. The occurrence of *diaper rash* was assessed based on signs and symptoms in the diaper contact area primarily erythema and eruptions and was categorized as “not present” if no signs of *diaper rash* were found and “present” if one or more signs were found. This study did not use the mild–severe severity categories as the final outcome.

Data were collected using a questionnaire on *disposable diaper* use and an observation sheet for *diaper rash* incidence. The questionnaire consisted of 10 questions with response options of “very often,” “often,” “rarely,” and “never.” All 10 items were deemed valid because the calculated *r*-value was greater than the table *r*-value of 0.288, and the instrument was reliable with a *Cronbach’s alpha* of 0.820. Primary data were obtained from the questionnaire, observation sheets, and demographic data, while secondary data were obtained from the *medical records* of RSIA Sitti Khadijah Kota Gorontalo. Data processing techniques included *editing, coding, entry, and cleaning*.

Data analysis was conducted using univariate methods to present the frequency distributions of respondent characteristics, *disposable diaper* use, and the incidence of *diaper rash*. Bivariate analysis was performed using the *chi-square* test to assess the association between *disposable diaper* use and the incidence of *diaper rash* at a significance level of $\alpha = 0.05$. The *p*-value from this study was 0.001. Ethical considerations in this study included explaining the study’s objectives and procedures to respondents, obtaining *informed consent*, ensuring respondents’ freedom to participate or decline participation, and maintaining the confidentiality of respondents’ identities and data. The data collected were used solely for research purposes.

3. RESULT AND DISCUSSION

Result

Table 1. *Frequency Distribution Based on Maternal Age*

No.	Age	Number (n)	Percentage (%)
1	Late Adolescence (17–25)	12	30.0
2	Early Adults (26–35)	20	50.0
3	Late Adulthood (36–45)	8	20.0
	Total	40	100

Source: Primary Data, 2025

Table 1 shows that the majority of the mothers in the study fall into the early adulthood age category, totaling 20 respondents (50.0%). A small portion falls into the late adulthood age category, totaling 8 respondents (20.0%).

Table 2. *Frequency Distribution Based on Mothers' Education*

No.	Mothers' Education	Number (n)	Percentage (%)
1	Elementary School	6	15.0
2	Junior High School	7	17.5
3	High School	18	45.0
4	College	9	22.5
Total		40	100

Source: Primary Data, 2025

Table 2 shows that the majority of the respondent mothers had a high school education, totaling 18 respondents (45.0%). A small portion had an elementary school education, totaling 6 respondents (15.0%).

Table 3. *Frequency Distribution Based on Mothers' Employment Status*

No.	Employment Status	Number (n)	Percentage (%)
1	Not working	30	75.0
2	Employed	10	25.0
Total		40	100

Source: Primary Data, 2025

Table 3 shows that the majority of the mothers surveyed were not employed, totaling 30 respondents (75.0%). A small portion, totaling 10 respondents (25.0%), were employed.

Table 4. *Frequency Distribution Based on Infant Age*

No.	Age	Number (n)	Percentage (%)
1	≤ 6 months	21	52.5
2	> 6 months	19	47.5
Total		40	100

Source: Primary Data, 2025

Table 4 shows that the majority of respondents were ≤ 6 months old, totaling 21 respondents (52.5%). A smaller portion were > 6 months old, totaling 19 respondents (47.5%).

Table 5. *Frequency Distribution by Infant Gender*

No.	Gender	Number (n)	Percentage (%)
1	Male	19	47.5
2	Females	21	52.5
Total		40	100

Source: Primary Data, 2025

Table 5 shows that the majority of respondents were female, totaling 21 people (52.5%). A smaller portion were male, totaling 19 people (47.5%).

Table 6. *Frequency Distribution Based on the Use of Disposable Diapers*

No.	Use of Disposable Diapers	Number (n)	Percentage (%)
1	Rarely	18	45.0
2	Often	22	55.0
Total		40	100

Source: Primary Data, 2025

Table 6 shows that the majority of respondents frequently use *disposable diapers*, totaling 22 respondents (55.0%). A small portion rarely uses *disposable diapers*, totaling 18 respondents (45.0%).

Table 7. *Frequency Distribution Based on the Incidence of Diaper Rash in Infants*

No.	Occurrence of <i>Diaper Rash</i>	Number (n)	Percentage (%)
1	No <i>diaper rash</i> occurred	17	42.5
2	<i>Diaper rash</i> occurred	23	57.5
Total		40	100

Source: Primary Data, 2025

Table 7 shows that the majority of respondents experienced *diaper rash*, specifically 23 respondents (57.5%). A small portion did not experience *diaper rash*, specifically 17 respondents (42.5%).

Table 8. *Relationship Between the Use of Disposable Diapers and the Incidence of Diaper Rash*

Use of <i>Disposable Diapers</i>	Occurrence of <i>Diaper Rash</i>						P- <i>value</i>
	<i>No diaper rash</i>		<i>Diaper rash occurred</i>		Total		
	N	%	N	%	N	%	
Rare	13	32.5	5	12.5	18	45.0	0.001
Frequent	4	10.0	18	45.0	22	55.0	
Total	17	42.5	23	57.5	40	100	

Source: Primary Data 2025

Table 8 shows that of the 18 respondents (45.0%) who rarely use *disposable diapers*, 13 respondents (32.5%) did not experience *diaper rash*, while 5 respondents (12.5%) did experience *diaper rash*. Meanwhile, of the 22 respondents (55.0%) who frequently use *disposable diapers*, 4 respondents (10.0%) did not experience *diaper rash*, while 18 respondents (45.0%) did experience *diaper rash*.

Discussion

Based on the results of data analysis using the chi-square statistical test with a significance level of $\alpha = 0.05$, a *p-value* of 0.001 ($p < 0.05$) was obtained. These results indicate that there is a significant association between the use of *disposable diapers* and the incidence of *diaper rash* in infants at RSIA Sitti Khadijah Kota Gorontalo. Thus, the research hypothesis stating that "there is an association between the use of *disposable diapers* and the incidence of *diaper rash* in infants" is accepted (H_1 accepted and H_0 rejected). In this study, it was found that among the 18 respondents (45.0%) who rarely used *disposable diapers*, 13 infants (32.5%) did not develop *diaper rash*, while 5 infants (12.5%) did develop *diaper rash*. Conversely, among the 22 respondents (55.0%) who frequently used *disposable diapers*, 18 infants (45.0%) developed *diaper rash*, and only 4 infants (10.0%) did not develop *diaper rash*. These data indicate that infants who are frequently dressed in *disposable diapers* have a significantly higher risk of developing *diaper rash* compared to those who are rarely dressed in *disposable diapers*. Proportionally, the incidence of *diaper rash* in the group that frequently uses *disposable diapers* reached 81.8%, whereas in the group that rarely uses *disposable diapers*, it was only 27.8%. This difference in proportions confirms that the intensity and pattern of *disposable diaper* use play a significant role in the occurrence of *diaper rash* in infants.

This study found that 13 infants (32.5%) who rarely used *disposable diapers* did not develop *diaper rash*. Based on the results of the questionnaire and observations, it was found

that the majority of mothers in this group practiced good infant skin care. They limited the use of *disposable diapers* to specific times, such as during long trips or at night, with a usage duration of less than 12 hours per day. During the day, mothers preferred to use cloth diapers or leave *their babies diaper-free* to allow the baby's skin to be exposed to the air. In addition, mothers routinely changed *disposable diapers* every 2–3 hours or immediately after the baby urinated, and cleaned the genital area with warm water and gently dried it before putting on a new *diaper*. Some mothers also used protective creams containing *zinc oxide* to maintain the baby's skin barrier. Based on the observations, the babies' skin in this group appeared clean, with no redness, rashes, or other signs of irritation.

According to the theory of *diaper rash* prevention, keeping the baby's skin clean and dry is the key to preventing irritation (Aryunani, 2022). Dry, clean skin has better resistance to exposure to irritants. Additionally, allowing the baby's genital area to air out by giving *the baby diaper-free* time has been shown to help restore *the skin barrier* and prevent recurrent irritation. Irfanti et al. (2020) also noted that exposing the baby's skin to air is one of the "ABCDE" therapies for the prevention and treatment of *diaper rash*, where the area covered by the diaper should be exposed to air as much as possible. These findings align with the study by Aldian and Susilawati (2021), which states that good infant skin care practices such as regularly changing *disposable diapers*, gently cleaning the genital area, and using protective creams can significantly reduce the risk of *diaper rash*. The study confirms that *diaper rash* is not solely caused by the use of *disposable diapers*, but by a combination of duration of use and the quality of infant skin care.

One factor that influenced the results of this study was the mothers' educational level. It was found that the majority of mothers who rarely used *disposable diapers* and whose babies did not experience *diaper rash* were those with a high school education or higher. According to Kameliawati et al. (2020), mothers with higher levels of education tend to have better health knowledge regarding infant skin care. This knowledge enables them to understand the risks of excessive *disposable diaper* use, recognize early signs of skin irritation, and consistently apply appropriate preventive practices. These findings are also consistent with those of Handayani and Yusuf (2020), who showed that mothers with good knowledge of infant skin care are more likely to limit the duration of *disposable diaper* use and practice optimal hygiene.

Furthermore, the study found that 5 infants (12.5%) rarely used *disposable diapers* but still developed *diaper rash*. Based on observations and supporting interviews, it was found that although the frequency of *disposable diaper* use was relatively low, the majority of mothers in this group put *disposable diapers* on their infants at night for a fairly long duration up to 8–10 hours without a change. This situation caused the infants' skin to remain exposed to moisture for extended periods, even though the frequency of use was low. Additionally, some mothers admitted that they did not always clean the infants' genital area properly before putting on *disposable diapers* and rarely used protective cream. Based on the observations, infants in this group exhibited clinical manifestations or signs and symptoms in the form of mild erythema (redness) in the genital and buttock areas. This indicates that although *disposable diapers* are used infrequently, the prolonged duration of use and suboptimal care practices can still trigger *diaper rash*.

According to the theory proposed by Nuryati, Alfiyanti, and Mariyam (2024), prolonged use of *disposable diapers* causes the baby's skin to be continuously exposed to moisture due to urine and feces trapped inside *the diaper*. High moisture levels weaken *the skin's* protective *barrier*, making the infant's skin more susceptible to irritation and inflammation. This condition is exacerbated when *disposable diapers* are not changed immediately after becoming soiled, as the infant's skin remains exposed to irritants for a longer period. These findings align with research conducted by Ertiana and Sari (2021), which showed that the duration of *disposable diaper* use is significantly associated with the occurrence of *diaper rash*; infants who wore *diapers* for more than 3 hours had a higher risk of developing skin irritation. These results indicate that duration of use is a key factor that can trigger *diaper rash*, even when the frequency of use is relatively low. According to the researchers, one factor contributing to these results is the infants' age. In this study, the majority of infants who developed *diaper rash* even though they rarely wore *disposable diapers* were found to be ≤ 6 months old. According to Dini,

Nurhudhariani, and Royani (2024), infants aged ≤ 6 months have skin that is still very thin and sensitive, with a *skin barrier* function that has not yet developed optimally. Therefore, infants in this age group are at a higher risk of developing *diaper rash* compared to older infants, even when the frequency of *disposable diaper* use is relatively low. This aligns with a study conducted by Maulida and Sari (2020), which also explained that the infant's age is a significant risk factor for *diaper rash*.

Furthermore, based on respondent characteristic data, the majority of infants with *diaper rash* in this group were female. Consequently, the researchers hypothesize that gender is also a factor influencing these results. According to Maulida and Sari (2020), female infants face a higher risk of *diaper rash* due to a more enclosed genital anatomy, causing the genital area to remain more moist and prone to microbial growth. The combination of young age, female gender, and prolonged use of *disposable diapers* at night creates conditions that are highly conducive to the development of *diaper rash*, even though the frequency of use is relatively low.

This study found that 18 infants (45.0%) who frequently wore *disposable diapers* developed *diaper rash*. Based on the questionnaire results and observations, the majority of respondents in this group put *disposable diapers* on their infants almost all day long, for more than 12 hours per day. *Disposable diapers* were used from morning until night without significant breaks, including while the infants slept at night. Although some mothers changed *disposable diapers* every 3–4 hours, several admitted to delaying changes until *the diapers* felt completely full or the infants appeared fussy. This situation caused the infants' skin to be exposed to moisture, urine, and feces for an extended period. Additionally, most mothers in this group rarely allowed diaper-free time during the day and did not routinely apply protective cream before putting on *disposable diapers*.

Based on the observations, the majority of infants in this group exhibited clinical manifestations of erythema (redness) in the genital area, buttocks, and thigh folds. Erythema is the most common early sign of *skin barrier* damage found in this group. According to the theory proposed by Kurniawan and Alfiyanti (2022), repeated friction on moist skin can damage the epidermal layer, thereby causing redness and a stinging sensation. This condition is exacerbated when *disposable diapers* are not changed immediately after they become full, as the infant's skin is exposed to irritants for a longer period of time. Nandari, Istiqomah, and Haryanti (2024) state that ammonia produced by the breakdown of urine can increase the baby's skin pH, thereby creating an environment that supports the growth of pathogenic microorganisms such as bacteria and fungi. It is this combination of moisture, pH changes, and friction that underlies the development of *diaper rash* in infants who frequently use *disposable diapers*.

The results of this study align with research conducted by Wasiah et al. (2021), which showed that frequent and prolonged use of *disposable diapers* significantly increases the risk of *diaper rash*. That study reported a significant association between the use of disposable diapers and the incidence of diaper rash in infants aged 0–3 years, with a p-value of <0.05 . Another study by Naimah (2019) also showed that infants with a high frequency of *disposable diaper* use have a greater risk of developing severe diaper dermatitis, with more severe clinical manifestations. One factor influencing these findings is the mothers' educational level. It was found that the majority of mothers who frequently used *disposable diapers* and whose infants experienced *diaper rash* were those with a high school education. According to Arifin et al. (2019), mothers' educational level is associated with patterns of *disposable diaper* use, particularly regarding duration of use. Mothers with a high school education may have basic knowledge about infant hygiene, but they may not fully understand the skin health risks associated with prolonged and excessive use of *disposable diapers*. These findings are also consistent with those of Aminy and Saputra (2021), who showed that parents' knowledge particularly that of mothers is closely linked to their educational level, and this influences how they care for their children's skin health.

Furthermore, this study found that the majority of infants with *diaper rash* in the group that frequently used *disposable diapers* were aged ≤ 6 months. Consequently, the researchers hypothesize that the infant's age is a factor that strengthens the association between *disposable diaper* use and the occurrence of *diaper rash*. Infants aged ≤ 6 months face a higher risk of *diaper*

rash because their skin is still highly sensitive and lacks an optimal protective barrier. Consequently, frequent use of *disposable diapers* in this age group significantly increases the risk of skin irritation. This aligns with research conducted by Dini, Nurhudhariani, and Royani (2024), which explains that in infants, the *skin barrier* function has not yet developed optimally, particularly in those under six months of age.

In addition to age, a baby's gender also appears to play a role in the incidence of *diaper rash*. Research findings indicate that *diaper rash* is more common among female infants than male infants in the group that frequently uses *disposable diapers*. This is consistent with the study by Maulida and Sari (2020), which states that female infants have a higher risk of developing *diaper rash* due to a more enclosed genital anatomy, causing the genital area to tend to be more moist and prone to microbial growth. These higher levels of moisture, combined with frequent and prolonged use of *disposable diapers*, further increase the risk of *diaper rash* and exacerbate the clinical manifestations observed in female infants.

Furthermore, this study also found that 4 infants (10.0%) frequently used *disposable diapers* but did not develop *diaper rash*. Based on supporting interview data from the observation sheets, it was found that all mothers in this group practiced excellent infant skin care. They changed *disposable diapers* regularly every 2–3 hours or immediately after the infant urinated or had a bowel movement, without waiting until the *disposable diapers* were completely full. The mothers also routinely cleaned the infants' genital areas with warm water and gently dried them with a clean, soft towel before putting on a new *disposable diaper*. In addition, the mothers always applied a protective cream containing *zinc oxide* before putting on *disposable diapers* to maintain the infants' *skin barrier*. Despite the high frequency of *disposable diaper* use, the mothers still allowed *diaper-free* time during the day. Based on the observations, the infants' skin in this group appeared clean, with no redness, rashes, or other signs of irritation, indicating that optimal skin care practices can prevent *diaper rash* even with high frequency of *disposable diaper* use.

This suggests that good skin care practices can serve as a strong protective factor, even with high frequency of *disposable diaper* use. These findings align with the study by Rahmawati, Pratiwi, and Andini (2020), which stated that the frequency of diaper changes and perineal hygiene play a crucial role in preventing *diaper rash*. According to Aryunani (2022), preventing *diaper rash* requires a comprehensive approach not only limiting the use of *disposable diapers* but also implementing proper skin care practices. The use of protective creams containing *zinc oxide* can form a protective layer on the baby's skin, reduce friction and maceration, and provide superior waterproof protection. Irfanti et al. (2020) also noted that topical *zinc oxide* is an excellent agent for reducing friction and maceration while providing protection against skin irritation.

According to the researchers, one factor contributing to these results is mothers' knowledge of infant skin care. Although quantitative data on knowledge was not collected in this study, based on supporting interviews, the mothers in this group demonstrated a good understanding of the importance of maintaining their babies' skin hygiene, changing *disposable diapers* regularly, and using appropriate care products. According to Aminy and Saputra (2021), parents' knowledge especially that of mothers significantly influences how they maintain their children's skin health. Mothers with good knowledge tend to be more attentive and consistent in implementing optimal infant skin care practices. This is consistent with research conducted by Aldian and Susilawati (2021), which explains that good infant skin care practices can significantly reduce the risk of *diaper rash*, even in infants who frequently use *disposable diapers*.

Based on the research findings, the researchers concluded that the relationship between the use of *disposable diapers* and the incidence of *diaper rash* among infants at RSIA Sitti Khadijah Kota Gorontalo is significant and is influenced by the dominance of the duration of use indicator over the frequency of use. Although the frequency of *disposable diaper* use was relatively high among some respondents, the duration of use was the most decisive factor in the occurrence of *diaper rash* because it is directly related to the length of time the infant's skin is exposed to moisture, urine, and feces, which then triggers various clinical manifestations ranging from erythema as an early sign to *erythematous papules* in more severe cases. However,

the researchers also assume that the occurrence of *diaper rash* cannot be explained by a single factor alone. Other factors, such as the infant's age, gender, the mother's educational level, knowledge of infant skin care, and hygiene practices, also influence the strength of the association between *disposable diaper* use and the occurrence of *diaper rash*.

Thus, the results of this study confirm that frequent and prolonged use of *disposable diapers* is significantly associated with an increased incidence of *diaper rash* in infants. Therefore, ongoing educational efforts are needed to inform mothers about the prudent use of *disposable diapers*, limiting the duration of use, and the importance of proper infant skin care practices to reduce the risk of *diaper rash*. Based on the description of the research results above, supporting theories, and studies consistent with this research, it can be concluded that there is a significant association between the use of *disposable diapers* and the incidence of *diaper rash* in infants at RSIA Sitti Khadijah Kota Gorontalo. Based on the *chi-square* statistical test, a *p-value* of 0.001 (< 0.05) was obtained, indicating a relationship between the use of *disposable diapers* and the incidence of *diaper rash* in infants at RSIA Sitti Khadijah Kota Gorontalo.

4. CONCLUSION

The study concludes that frequent use of disposable diapers is common among infants at RSIA Sitti Khadijah Kota Gorontalo, and diaper rash remains a prevalent condition in this population. Statistical analysis demonstrated a significant association between the frequency of disposable diaper use and the incidence of diaper rash ($p = 0.001$). These findings suggest that the pattern of disposable diaper use may be an important factor associated with the occurrence of diaper rash among infants. Therefore, appropriate diaper-use practices, including attention to wearing frequency, diaper-changing intervals, and infant skin hygiene, should be emphasized as part of efforts to reduce the occurrence of diaper rash. Further studies with prospective designs are recommended to clarify the temporal relationship and other factors that may contribute to diaper rash.

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