

# Frequency of Cutaneous Manifestation in Full Term Newonate and Its Relation to Different Factors

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## ABSTRACT

Cutaneous alterations are common in neonates, with a majority of lesions are physiological, transient, or self-limited and require no therapy. Many reports are available about the various disorders peculiar to the skin of infants; however, very little yet known about variations and activity of the skin in neonates. The study attempt to determine the frequency of various dermatoses, i.e., physiological and pathological among newborns within the neonatal period, determine the effect of other variables on the frequency of various dermatoses, determine the most common site of various dermatoses, and to study the mother response among various dermatoses. A total of 260 newborns have examined in a hospital-based, cross-sectional prospective study extending from the first of July 2019 to the fifteenth of September 2020, with regular working hours. Erythema Toxicum Neonatorum (ETN) has observed in 6.25%, Milia has observed in 31.25%, Omphalitis observed in 6.25%. The frequency of Traumatic skin Lesions reached 6.25%, with no significant differences observed in the prevalence of dermatoses concerning maternal diseases. There were statistically significant differences for salmon patches and erythema toxicum neonatorum with toxic habits, vernix caseosa to drug intake during pregnancy, palatal cyst, verinex caseosa, and jaundice concerning dietary supplements. Birthmarks and various dermatoses were more in males than females' newborns. Significant differences between various dermatoses and mood of delivery. Significant differences between various dermatoses with maternal health status and neonatal age. Birth Traumas were more in babies who had birth weight more than 3.5 KG (3.5 KG) and those delivered by NVD than CIS.



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## 1. INTRODUCTION

The skin is the most visible and easily accessible organ of the body. It has many functions, acting as a barrier against infection, protecting internal organs, contributing to thermoregulation, storing insulating fats, excreting electrolytes, and providing tactile sensory input [19]. The infant skin differs from that of the adult in that it is thinner, delicate, has weaker intercellular attachments and produces less sweat and sebaceous gland secretions, and is more susceptible to several infections [9]. Neonatal skin plays a significant role

with vernix caseosa through their antimicrobial properties to protect the neonate in utero and after birth [9]. Skin diseases commonly observe during the neonatal period, and they may be benign transient lesions, napkin dermatitis, and related disorders, lesions of infections, blistering dermatoses, genodermatoses, or birthmarks [15].

Many changes from transient physiological to grossly pathological lesions are seen in the skin of a neonate [12], [21]. The majority of the disorders in the newborn are physiological, transient, and self-limited and require no therapy. Working knowledge of both normal and abnormal cutaneous lesions of the neonates is required to determine which skin lesion requires early intervention [17].

Several studies have documented differences in dermatological findings in neonates of various racial groups. For example, the incidence of dermal melanosis is more common in black, native American, Asian and Hispanic populations [7]. Another study showed a higher prevalence of birthmarks in the Jewish than in the Arab Israeli population [5].

This study aimed to determine the prevalence of different cutaneous lesions in newborns admitted in the neonatal unit of Al-Noman Children's Hospital and evaluates the association between age, gender, maturity, route of delivery, birth weight, maternal diseases, and different skin lesions.

## **2. Methodology**

A hospital-based, cross-sectional, prospective study has been conducting in the Department of Paediatric / Faculty of Medicine. Al-Iraqia University. The current work represented an observational cross-sectional study conducted during the period extending from the first of July 2019 to the fifteenth of September 2020, with regular working hours. Ethical approval for the study was obtained from the Department of Paediatric / Faculty of Medicine, Al-Iraqia University. Parental consent before data collection and assessment of the baby indicated.

The study includes two components: interviewer administration of questionnaire & birth weight with newborns ages. Before the interview, the purpose of data collection has is explained & consent obtained. The mothers were interviewed after labour or operation according to the urgency of each case.

The patient's records and antenatal investigations have been taken into consideration.

### **2.1 Inclusion and exclusion criteria**

Live born full-term babies (Gestational age  $\geq 37$  completed weeks) (i.e.,  $\geq 259$  days) to (gestational age 42 completed weeks), birth weight  $\geq 2500$  grams to birth weight 4500 grams, and babies age from birth to 28th days of life (1st 28 days of life). Exclusion Criteria included liveborn preterm babies (gestational age  $< 37$  completed weeks) (i.e.,  $< 259$  days), post-term babies (gestational age  $> 42$  completed weeks), birth weight  $< 2500$  grams and  $> 4500$  grams, Babies ages  $> 28$  days, Babies with frank congenital anomalies, Icterus, Twins babies also excluded.

Study Group and Sampling: samples were collected from operative and labour theatre, neonatal care unit, pediatric outpatients unit, pediatric ward with regular morning working hours of 10:00 a.m to 02:00 p.m (five days a week). There were 2003 live births; 260 births attended, representing more than 10% of the total number of live births. Demographics, duration of the study, and inclusion criteria played an essential role in determining the size of the study population. The total sample size chosen is suspected to be suitable to this study for showing the expected degree of difference regarding different variables.

A detailed history included neonatal age, residence, sex, past medical and obstetric history, parity, history of present pregnancy, hypertension, diabetes mellitus, urinary tract infection, fever, and antepartum hemorrhage (Vaginal bleeding after 20 weeks of gestation). Antenatal care (5 visits considered regular), mode of delivery, duration of labour, and prolonged rupture of membranes (more than 18 hours), use of any drug, radiation exposure, the color of the liquor, babies condition at birth were also considered.

Examination: Gestational age in completed weeks was assessed by an accurate menstrual history measured from the first day of the last menstrual cycle and antenatal ultrasound measurements when available.

Babies were examined regarding their weight, heart rate, respiratory rate, colour, fontanelles, systemic examination of the cardiovascular, respiratory, and particularly nervous system in terms of muscle tone and primitive reflexes, and abdominal examination organomegaly, umbilical stump also examined for any signs of infection. Any evidence of birth injury or anomaly was also noted.

Investigations: An x-ray of the skull and extremities (Trans fontanel ultrasound), Laboratory inform of culture and gram stain, and cytology in the form of smear were conducted.

Statistical Analysis: Data was statistically analyzed to provide descriptive statistics, namely frequencies and percentages for categorical data. Conventional statistical techniques were applied to the data in the study of distribution by frequency percentages, tables, and graphs. Chi-square test and Least Significant Deviation (LSD) were applied, and P values were calculated for babies' risk factors and outcome. Considering the level of significance of this study is  $\leq 0.05$  to minimize alpha error (rejecting the null hypothesis when it is true).

### 3. Results

In this study, a comparison between cases with skin lesions and controls who had no skin lesions concerning sex was employed. A total of 160 cases, 100 (62.5%) boys and 60 (37.5) girls, were included. The Control group included 100 cases, of which 60 (60%) were boys, and 40 (40%) were girls. The results showed no significant relationship between groups according to gender factor,  $p > 0.05$  (Table1).

The total cases that NVD delivered were 120 babies as fellows; 81 (50.62%) had a normal delivery, 27 (16.87%) had obstructed labor, and 12 (7.5%) had assistant delivery. C/S delivered forty cases, 26 out of total (16.25%) and 14 (8.75%) delivered by elective c/s and emergent c/s, respectively The total number of controls was 100, 85 out of total delivered by NVD (70 had normal delivery without any assistant or inductions, five had obstructed labor and ten had assistant delivery). The remaining 15 (15%) of controls were delivered by elective c/s, and no emergent c/s were performed. The study revealed a significant relationship between cases and controls according to the mode of delivery,  $P < 0.05$  (Table 1).

**Table (1):** Effect of different variables on skin lesions in cases and controls.

virables		cases	control	P value	X <sup>2</sup> / DF
Gender	M	100(62.5%)	60(60%)	$\geq 0.05$	0.16 / 1
	F	60(37.5%)	40(40%)		
Delivery mode	NVD	81(50.625%)	70(70%)	$\leq 0.05$	20.29 / 4
	Obst .VD	27(16.875%)	5(5%)		
	Assist.VD	12(7.5%)	10(10%)		

	ELL CS	26(16.25%)	15(15%)		
	EME CS	14(8.75%)	0(0)		
Body weight	2.5-3.5	130(81.25%)	80(80%)	$\geq 0.05$	0.06 /1
	3.5 $\leq$	30(18.75%)	20(20%)		
Maternal health status	UTI	80(50%)	10(10%)	$\leq 0.05$	93 /3
	HT	20(12.5%)	10(10%)		
	DM	26(16.25%)	0		
	Apparent normal	34(21.25%)	80(80%)		
Age of neonate	24hr	30(18.75%)	30(30%)	$\leq 0.05$	6.50 /2
	1-7d	100(62.5%)	60(60%)		
	7 $\leq$	30(18.75%)	10(10%)		
Neonatal health status	Lethargy	22(13.75%)	20(20%)	$\geq 0.05$	1.77 /1
	active	138(86.25)	80(80%)		

The current study showed that the most common site for skin lesions was the nose, 50 cases (31.25%). The second common site was back with 48 cases (30%), while the least site was thigh with 2 cases (1.25%), as shown in Table (2).

**Table (2):** Distribution of Skin Lesions According to the Sites.

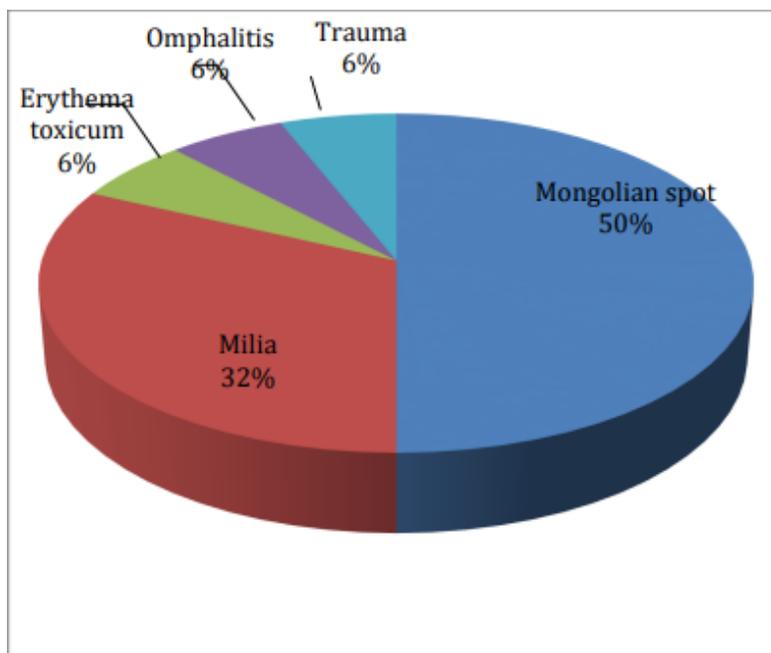
Site	Lesion	
	No.	%
Head	6	3.75
Nose	50	31.25
Cheek	10	6.25
Back	48	30
Buttock	30	18.75
Thigh	2	1.25
Umbilical	10	6.25
Clavicle	4	2.5
<b>Total</b>	<b>160</b>	<b>100</b>

This study also showed that the most common skin lesion found was Mongolian spots, which reached 80 (50%), followed by Milia with 50 cases (31.25%) and erythema toxicum with 10 cases (6.25%). From these lesions, smears were taken, eosinophilia was observed. Omphalitis was reported in 10 cases (6.25%); samples were taken for culture and gram stain, the results were negative. Birth trauma was reported in 10 cases (6.25%) as shown in (Table 3), Figure (1).

**Table (3):** Distribution of Skin Lesions According to their Types.

Types of skin lesion	Number of cases	Percentage%
Mongolian spot	80	50
Milia	50	31.25

Erythema Toxicum	10	6.25
Omphalitis	10	6.25
Trauma	10	6.25
Total	160	100



**Figure (1)** Distribution of Skin Lesions According to their Types.

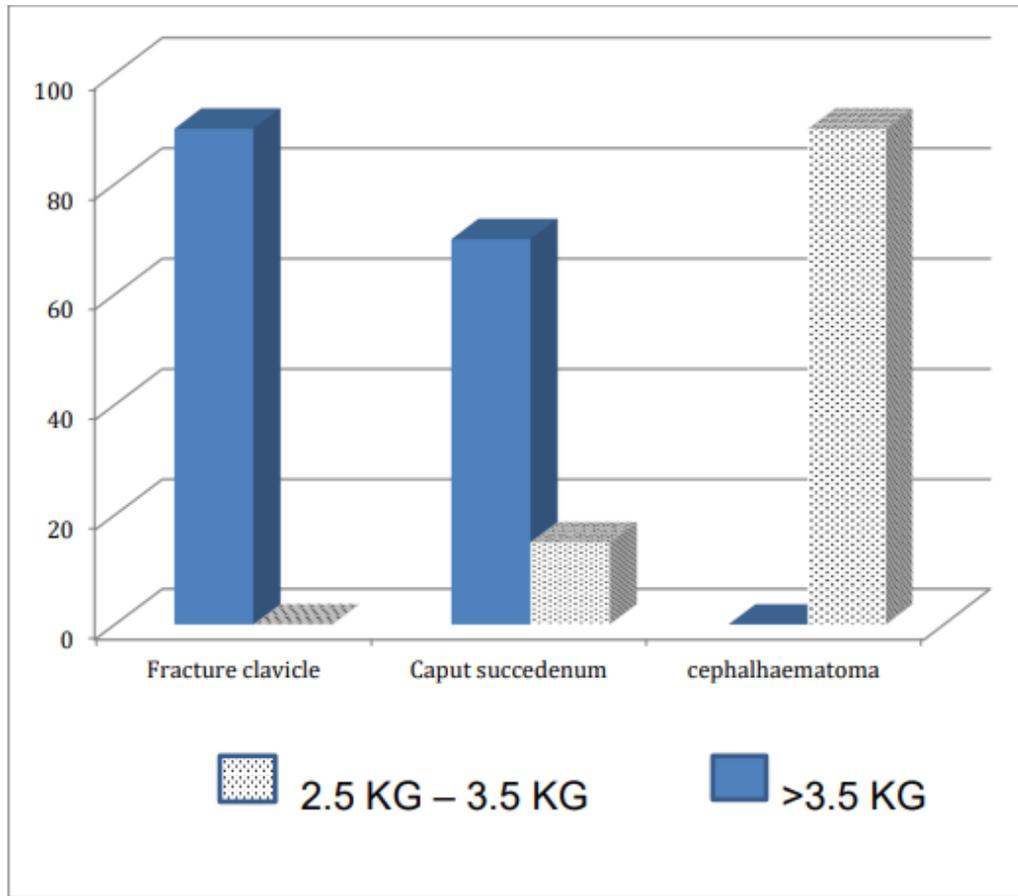
Mongolian spots appeared more in boys with 50 cases (62.5%) than in girls with 30 cases (37.5%). Mongolian spots in boys were present mainly in two sites; the first site was a lumbosacral area in 35 cases (70%), the second site was buttock in 15 cases (30%). Mongolian spots in girls were present in three sites; the first common site was the buttock in 15 cases (50%), followed by lumbosacral in 13 cases (43.3%) and thigh in 2 cases (6.67%) (Table4).

**Table (4):** Distribution of Mongolian Spots according to Gender Factor.

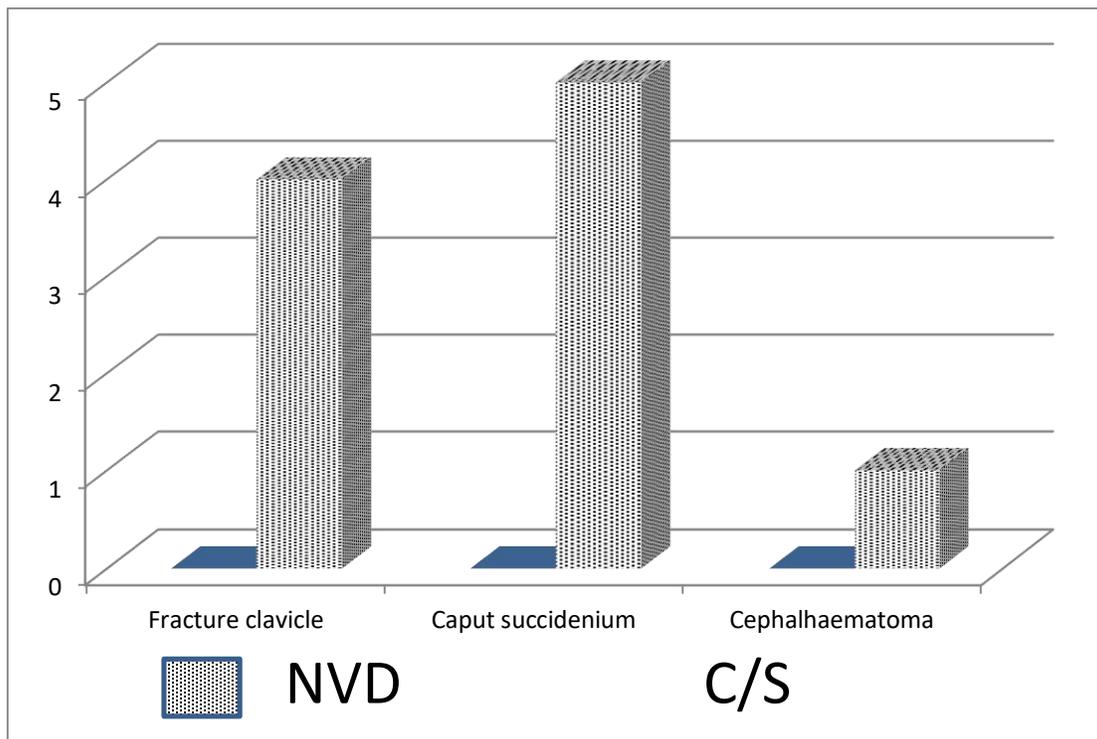
Site of Mogolian spot	Male		Female	
	Number of cases	Percentage %	Number of cases (No)	Percentage%
Lumbo sacral (Back)	35	70	13	43.3
Buttock	15	30	15	50
Thigh	0	0	2	6.67
Total	50	100	30	100

**3.1 Chi-square couldn't calculate because one cell is less than 1.**

The finding of the current study revealed that most of the birth trauma was found in neonates who had a birth weight of more than 3500g, as shown in Figure (2). The finding also showed that birth trauma was more in babies delivered by NVD than those delivered by C/S, Figure (3). Trans fontanel ultrasound, skull x-ray, and x-ray of extremities were used in the investigation.

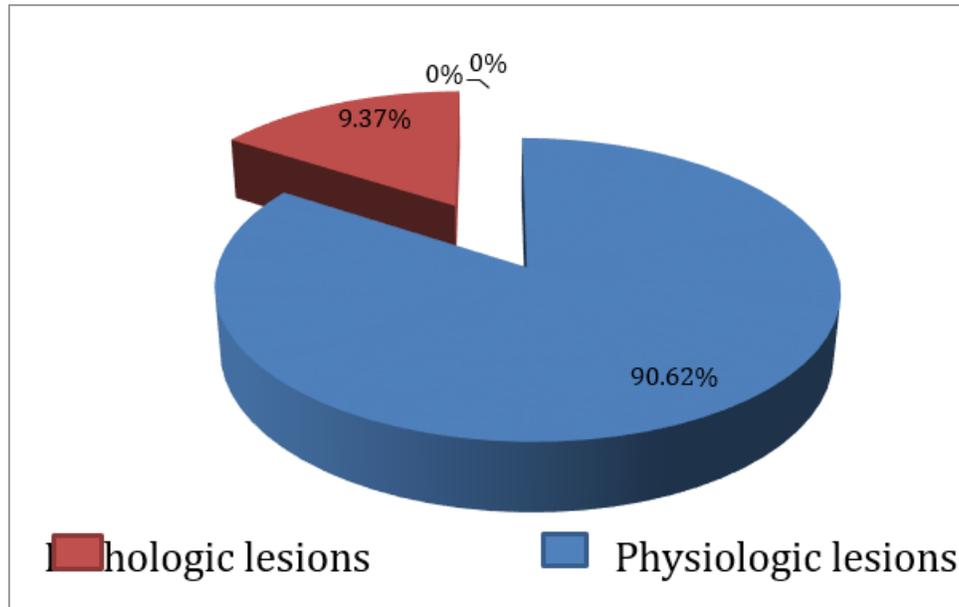


**Figure (2):** Distribution of Birth Trauma According to Birth Weight.



**Figure (3)** Distribution of Birth Trauma According to Mode of Delivery.

The current finding revealed two major types of skin lesions, physiologic and pathologic. Physiologic skin lesions constituted 90.62% compared to pathologic skin with 9.37%, as shown in Figure (4).



**Figure (4):** Distribution of Skin Lesions According to its Character

There was a non-significant relationship between skin lesions (pathologic, physiologic) and neonatal health status (lethargic, active), where 145 babies had physiologic skin lesions, 30 (13.8%) were lethargic, and 125 (86.22%) were active; meanwhile, 15 babies had pathologic skin lesions, 2 (13.3%) were lethargic, and 13 (86.7%) were active,  $P > 0.05$ , as shown in Table (5).

**Table (5)** Distribution of Skin Lesions to the Neonatal Health Status

Skin lesions	Pathological lesions		Physiological lesions	
	No.	%	No.	%
<b>Lethargy</b>	2	13.3	20	13.8
<b>Active</b>	13	86.7	125	86.2
<b>Total</b>	15	100	145	100

Yates' corrected  $X^2=0.12$ , P value=  $>0.05$  not significant

#### 4. Discussion

Skin rashes are common in neonates causing parental anxiety. Several of these are transient and physiological, but some may require additional workup to exclude serious disorders. [22], [25], [2], [24]. Many studies about the prevalence of neonatal dermatoses have been documented in various countries and different racial groups. Skin disorders were detected in 40% of neonates in Sohag University Hospital

Nursery. The frequency of cutaneous lesions in German neonates was 59.7% and in Indian neonates was 94.8%, [8], [16], [3]. In the current study, different cutaneous lesions were observed in 93.75% of newborns, which may attribute to inherent individual differences. Most dermatoses appeared to be physiological in 90.62% of cases; this result is approximately similar to that found in Pakistanian study 91.5% [11], while pathological dermatoses form about 9.3% compared to 8% in Pakistanian study. Benign transient skin lesions of the newborn were the most common category of neonatal cutaneous disorders that were seen in 90.62% of cases; Mongolian spots were the most common finding in 50% of cases in this study, with the following dermatoses mentioned in descending manner, milia, erythema toxicum, omphalitis, and trauma. In 32% of neonates, Milia was observed similarly with other studies whose reported incidence of 2.6-7.3% [8], [16], [3] while was 16.5% in oher study [22] while another study demonstrate 40-50% [26]. In Iranian neonates, pigmentary birthmarks were the most frequent skin manifestation with a frequency of Mongolian blue spots of 71.3% [10] while [22] detect 66.7%. Furthermore, the Mongolian spot was the most frequent birthmark found among Thai neonates [23].

Although lanugine hair is common in preterm babies, null was reported in this study as preterm babies were excluded. Birthmarks in newborns were reported in various countries, with Mongolian spots being the predominant one. It appears there are marked racial differences that contribute to the prevalence (0.1% in Finland, 11% in Arabs, 62% in Indian, 71% in Iran, 81% in Japan) [10], [4]. The occurrence of neonatal dermatoses in the literature was reported between 57 and 63 [10]. In this study, most neonates (90%) had one or more cutaneous findings; the difference might reflect the study methods and racial differences. Epstein's pearls (58%) were the most common finding in a Turkish study, being less frequent in post-term babies than preterm and term ones. A higher incidence of Epstein's pearls term babies was reported by [10]. Other studies reported the frequency of Epstein's pearls as 56, 70, and 88%, respectively [10], [4]. A study conducted on Iranian babies at their first 72 hrs of age revealed that Epstein pearls were the most frequently observed lesions in 88% of babies & Annalisa Patrizi920160 observe 64-89 %. The incidence in the latter study was similar to the incidences observed in other studies [10]. Epstein's pearls had not been reported in some studies because the oral mucosa has not been included in the examination [10]. In this study, we did not see Epstein pearls; the reason could be associated with the small sample taken (260 neonates) compared to a large sample that included 1000 Pakistanian neonates.

Hypertrichosis was seen in 12% of babies; [10] reported the occurrence as 25.7% in Iranian newborns. The frequency of occurrence was reported as 1.3 % in American babies [11] however, this study has reported null. These differences could be due to racial characteristics. They also found that most hypertrichosis was associated with bodyweight less than 2.5 Kg [11]. The reason for this association is unknown. These babies may be "small for the date," and the Lanugine hair in them is not completely shed at the time of birth. In this study, a bodyweight of less than 2.5kg was excluded.

Erythema Toxicum is a common eruption in the neonate, particularly in term infants. Mechanical trauma has been suggested as etiological factors [20]. Dissimilar to other reports, the incidence of ETN was (13%) in the Turkish study and was more common in babies who delivered by cesarean section [20]. ETN was observed in 6.25% of cases in the current study, mostly in those delivered by NVD, being predominant in males. The reason for such an association is not clearly understood. However, the increased level of adrenal and gonadal androgens in male newborns may directly affect hair follicles and the sebaceous gland, which is involved in the pathogenesis of ETN. Genetic, environmental, or racial features might play a role in the etiology of ENT. In Japanese infants, the occurrence has been 40.8% [6], and in Indians as 28.6% [4], [26] as 50%. Two other studies, reported frequencies of 34% and 70%, respectively; but they did not look for its association with the gender of newborns.

Infection of umbilical cord stump, omphalitis, was observed in 6.25% of cases in the current study, mostly appear after the seventh day of age, while the prevalence reaches 8% in Paskistianian babies, with the majority being noted on the third or fourth day of life as redness with pus accumulation at the site of cord stump. The differences could be due to different study protocols [11]. In this study, pus and discharge from the umbilical cord were taken for culture and gram stain, the result was negative.

The frequency of Traumatic skin Lesions was 6.25% in this study, 87% in Pakistani newborns, while it was 1% in the United States of America. The increased Frequency of Traumatic skin lesions in this study was attributed to the mode of delivery, some newborns had prolonged/ obstructed labour, and most of them had body weight more than 3.5kg.

Many studies have examined the impact of maternal diseases and illicit drugs, medications, and dietary supplements during pregnancy on the newborn's health. Interestingly, only [1], [16] have correlated these factors with the presence of birthmarks and transient benign coetaneous lesions [1], [16], and this in agreement with our finding. The results showed a statistically significant difference for salmon patches and erythema toxicum neonatorum to toxic habits, vernix caseosa to drug intake during pregnancy, palatal cyst, verinex caseosa, Jaundice concerning dietary supplements [16].

Maternal illness during pregnancy does not appear to influence their development and there was no correlation to the sex and weight of newborns and mood of delivery in Iranian study. Mongolian spot was seen in (81%) of babies. The incidence of Mongolian spots in Irani study was almost similar to those in other studies [16], [20], 25, and 30). Mongolian spots were found in over (90%) of Native American and Asian babies [11]. They had no relationship to any disease or babies to any disease or mode of delivery. In the Irani study, ETN incidence was 30 to 70% of the newborn in different studies, and these variations were associated with the length of the follow up which exceed five days in some studies [1], [16], [20]. The curent finding revealed a statistically significant difference for maternal diseases and various dermatoses; where 50% of mothers had a history of UTI during pregnancy, their babies had various dermatoses at the neonatal period. The level of antenatal care performed to mothers during pregnancy differs in developed Countries; this will decrease the incidence of maternal disease during pregnancy and improve newborn's health. On the other hand, the UTI was common among pregnant mothers in our study, a cause that is correlated with a high percentage of various dermatoses among newborns. All of these mothers had a history of receiving drugs therapy for the treatment of UTI, but we did not found a specific birthmark that in direct relation with drug therapy, compared to verinex caseosa, which found to be high in among mothers who had history of drugs therapy during pregnancy [16].

This research did not study the relationship between various dermatoses and maternal toxic habits and dietary supplements; therefore, we had no comparable result with other studies. Therefore, a future study will be conducted to address this relationship. Sebaceous hyperplasia was not reported in the current study; however, sebaceous hyperplasia was the second most common finding with 48% in the Turkish study, which was similar to that observed in other studies. No association of sebaceous hyperplasia with gender, racial factors, and gestational age was reported [10], [4]. They also found that sebaceous hyperplasia was more frequent in preterm than term babies, but these results might be misleading because of an unknown maturity group in their study. In full-term neonates, the skin is smooth and moist at birth. However, mild superficial skin peeling may be seen in infants because of the reduction of transepidermal water loss. This term is called "physiologic desquamation [20]. Xerosis was not reported in our study, which might be associated with the climate, race, and sample collection method. Known that the prevalence of Xerosis and desquamation were more common in post-term babies, according to [10]. The exclusion of the post-term

babies from the current study could explain our findings. The frequency of Milia varies from 7.5 to 36% [10], [4]. In the current study, milia constituted 31.25% and were more common in female babies than male babies. The current finding was similar to that reported by [11].

In the Irani study, salmon patch found in (52%) and milia in (46%) of the study sample, petechia was present in (0.08%) of cases and more prevalent in vaginal delivery and those with high birth weight (Nada et.al, 2002). The latter findings are in agreement with the current one. Unlike the latter study, mottling was not observed in the current study due to excluding the premature and low birth babies.

The correlation of various dermatoses with neonatal health status was not significant; we found that some babies had no skin lesions but were lethargic (poor sucking, poor feeding, poor reflexes, poor crying). Meanwhile, some babies had various skin lesions but were active {good sucking, good feeding, good reflexes, good crying}. Therefore various dermatoses are not considered a direct cause for changing neonatal health status in most cases.

Most mothers' response to various dermatoses varies from no response 50% to least response, which sought herbal therapy 6% in this study and no comparable result could be found.

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