

Study of dermatological manifestations in neonates attending a tertiary healthcare centre

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Abstract

Background: Skin of newborn can be a considerable source of information about infant's health and promptly alerts the physician regarding serious diseases. Since neonatal skin and adult skin differ in physiology and pathological presentations, neonatal skin conditions require special attention. **Aim:** This study highlights the pattern of various neonatal dermatoses in a tertiary care healthcare center. **Materials & Methods:** The study was conducted in a tertiary healthcare center where 804 neonates delivered/visiting in the institute were included and observed for any kind of dermatological condition. After taking informed consent from parents, thorough examination was done and observations were noted in a preset proforma. **Result:** Among the patient in our study, males were 54% (324) and females were 46% (276). Overall most common neonatal dermatoses was desquamation of skin (396, 66%) followed by Mongolian spots(390,65%), Erythema toxicum neonatorum (162,27%), sebaceous gland hyperplasia (120,20%). The most common dermatoses in full term neonates were Mongolian spots(354,73.8%), desquamation of skin (324,67.5%), ETN(162,33.8%) while in pre term babies, desquamation of skin was followed by SGH, physiological jaundice, Impetigo and Mongolian spots. (24,26.7% each). **Conclusion:** Skin disorders in neonates require considerable knowledge of pediatric medicine. Hence, the study assesses the pattern of neonatal dermatoses.

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Introduction

The skin in the newborn serves the most essential function just like in adults that is protecting the body from various stresses of the external environment thereby providing a barrier between the host and the physical, chemical and biological environment.

The term neonate or newborn (derived from the Latin word neonatus, newborn) refers to an infant in the first 28 days of life; thus the term applies to preterm as well as post-term and full term infants in first 28 days of life.

The skin of a neonate differs from adult skin in several ways that place the neonate at an increased risk of thermal instability, skin damage, percutaneous infection and toxicity from topically applied agents[1]. To avoid inappropriate diagnosis, unnecessary investigations and treatment, clinicians should be aware of the postnatal adaptation process, maturation and physiological conditions of the newborn skin

An understanding of the nature of neonatal skin, the physiological and non-physiological skin conditions of preterm and term neonates and skin care are essential in pediatric practice[2,3].

Neonatal skin is special in many ways, being thinner, less hairy, less firmly attached than mature skin and neonates have a relatively larger body surface area. Protective flora is absent and the microbiological load is encountered in continuous flux. Trans epidermal water loss is elevated in premature babies (33-34 weeks' gestation), this period of additional vulnerability may last up to 2 months in more premature babies[4,5].

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These factors not only affect fluid, electrolyte and thermal regulation, but also predispose to potential drug and toxin absorption.

Skin is one organ in the newborn can be a considerable source of information about infant's health and promptly alerts the physician regarding serious diseases.

Neonatal period is an important link in the chain of events of adaptation from intrauterine to extra uterine life. Proper care of newborn babies forms the foundation for subsequent life not only in terms of longevity or survival but also in terms of qualitative outcome without mental and physical disabilities[6].

Need of the study: Skin disorders in neonates require considerable knowledge of pediatric medicine. It is at this juncture pediatric dermatology as a sub specialty finds its place.

Skin lesions in neonates can have significant psychological stress on parents. Unfortunately, specialized pediatric dermatology clinics are not available in most parts of the country.

Hence an effort is being made to study the pattern of neonatal skin disorders in this part of the country amongst babies attending the Dermatology / Pediatric OPD at a tertiary healthcare institute in central India, as relatively, there are very few Indian studies of neonatal dermatoses.

Material & Methods

The study was conducted in the Department of Dermatology, Venereology & Leprosy, in collaboration with Department of Pediatrics from September 2016 to march 2018 A total of 804 newborns delivered/visiting in our institute were included and observed for any kind of dermatological condition.

Institutional Ethics Committee of Index Medical College, Hospital & Research Center has approved the study with the letter no. IEC/02/2016/10 dated 23/02/16.

Inclusion criteria

Newborns delivered/visiting our institute with any dermatological manifestation.

Exclusion criteria

Newborns whose parents did not consent for including in study.

All babies were examined in the post-natal care (PNC) room and in the nursery as soon as they recovered from the stress of labor and delivery. Similarly, neonates coming to dermatology and pediatric OPD were examined.

After thorough examination, observations were noted in a preset proforma including sex, maturity, birth weight, basic neonatal reflexes and age at the time of examination. The diagnosis of various skin lesions was confirmed by relevant investigation wherever needed (e.g. Direct microscopic examination of skin scraping, Wood's lamp examination, Skin biopsy etc).

A history of any significant event during pregnancy or labor was also recorded.

A photographic record was maintained to illustrate the skin disorder.

Statistical analysis

The data was entered in Microsoft Office Excel 2016 for Windows. Frequencies (n), percentages (%), mean and standard deviation of variables were calculated. Statistical tests used was Pearson chi-square test. P value <0.05 was considered statistically significant. Data analysis was performed using version 21.0 of the Statistical Package for Social Sciences (IBM Corporation, Armonk, New York, USA).

Result

Out of the 804 neonates examined, 600 (74.6%) had one or more cutaneous manifestations. Majority of the babies were found to have one or few skin lesions, Skin lesions were classified into:

1. Physiological/Transient skin disorders
2. Acquired skin disorders
3. Developmental/Congenital disorders and Genodermatoses

Babies were followed up on alternate days during their period of stay in the hospital and then once a week up to 4 weeks of their life.

120 babies could be followed up to the end of 4 weeks of age. Sex and maturity of 600 babies (out of 804) forming the study group is depicted in table 2 respectively.

In our study, there were 443 (55.09%) males and 361 (44.90%) females among total neonates.

Table No. 1: Gender wise distribution of Total Cases

Sex	No. of Cases	Percentage
Male	443	55.09%
Female	361	44.90 %
Total	804	100 %

**Table No. 2: Gender wise distribution of Cases with Neonatal Dermatoses
Total =600**

Sex	No. of Cases	Percentage
Male	324	54 %
Female	276	46 %
Total	600	100 %

Table No. 3: Gender wise distribution of Neonatal Dermatoses

Disease	Male	Female	Z Value	P value
Desquamation of skin (DS)	228 70.4%	168 60.9%	2.45	0.014*
Erythema Toxicum Neonatorum (ETN)	108 33.3%	54 19.6%	3.88	0.000*
Sebaceous Gland Hyperplasia (SGH)	60 18.5%	60 21.7%	0.98	0.328, NS
Miliaria	66 20.4%	42 15.2%	1.66	0.098, NS
Physiological Jaundice (PJ)	36 11.1%	24 8.7%	0.99	0.321, NS
Epstein Pearls (EP)	12 3.7%	18 6.5%	-1.55	0.121, NS
Acrocyanosis (AC)	24 7.4%	12 4.3%	1.61	0.108, NS
Vernix Caseosa (VC)	12 3.7%	24 8.7%	-2.50	0.012*
Sucking Blister (SB)	12 3.7%	12 4.3%	-0.40	0.690, NS
Harlequin Colour (HC)	0 0.0%	6 2.2%	-2.48	0.013*
Impetigo	30 9.3%	18 6.5%	1.25	0.212, NS
Candidiasis	18 5.6%	12 4.3%	0.68	0.495, NS
Seborrheic Dermatitis (SD)	18 5.6%	6 2.2%	2.19	0.029*
Scabies	12 3.7%	6 2.2%	1.12	0.263, NS
Mongolian Spot (MS)	216	174	0.93	0.354, NS

Disease	Male	Female	Z Value	P value
	66.7%	63.0%		
Congenital Melanocytic Nevus (CMN)	30 9.3%	18 6.5%	1.25	0.212, NS
Haemangioma	18 5.6%	6 2.2%	2.19	0.029*
Port wine Stain (PWS)	0 0.0%	6 2.2%	-2.48	0.013*
Epidermolysis Bullosa (EB)	0 0.0%	1 0.3%	-1.00	0.316, NS

Z test for two sample proportion applied.

P value < 0.05 was taken as statistically significant

Desquamation of skin, ETN, seborrheic dermatitis, hemangioma were significantly higher in the males in comparison to the females (P<0.05).

Vernix Caseosa, Harlequin color, Epidermolysis Bullosa and Port wine stain were significantly higher in the females in comparison to the males (P<0.05).

Graph 1

Maturity wise distribution of babies having Neonatal Dermatoses

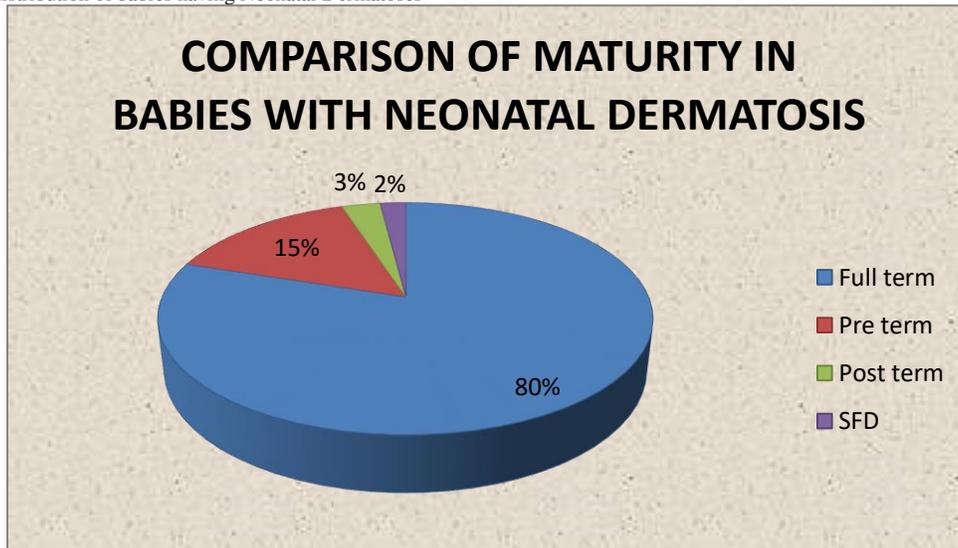


Figure 1: Pie diagram showing comparison of maturity in babies with neonatal dermatoses

Table No. 4: Maturity wise distribution of Neonatal Dermatoses.

	Maturity				Chi-square value	P value
	Full-Term	Pre-Term	Post-Term	SFD		
Desquamation of skin (DS)	324 67.5%	54 60.0%	12 66.7%	6 50.0%	695.63, df=3	0.000*
Erythema Toxicum Neonatorum (ETN)	162 33.8%	0 0.0%	0 0.0%	0 0.0%	486.00, df=3	0.000*
Sebaceous Gland Hyperplasia (SGH)	96 20.0%	24 26.7%	0 0.0%	0 0.0%	206.4, df=3	0.000*
Miliaria	102 21.3%	0 0.0%	6 33.3%	0 0.0%	278.67, df=3	0.000*
Physiological Jaundice (PJ)	30 6.3%	24 26.7%	0 0.0%	6 50.0%	40.8, df=3	0.000*
Epstein Pearls (EP)	24 5.0%	6 6.7%	0 0.0%	0 0.0%	51.6, df=3	0.000*
Acrocyanosis (AC)	30 6.3%	0 0.0%	0 0.0%	6 50.0%	68, df=3	0.000*
Vernix Caseosa (VC)	30 6.3%	6 6.7%	0 0.0%	0 0.0%	68, df=3	0.000*
Sucking Blister (SB)	18 3.8%	6 6.7%	0 0.0%	0 0.0%	36, df=3	0.000*
Harlequin Colour (HC)	0 0.0%	6 6.7%	0 0.0%	0 0.0%	18, df=3	0.000*
Impetigo	18 2.5%	24 26.7%	0 0.0%	6 50.0%	30, df=3	0.000*

	Maturity				Chi-square value	P value
	Full-Term	Pre-Term	Post-Term	SFD		
Candidiasis	12 2.5%	18 20.0%	0 0.0%	0 0.0%	32.4, df=3	0.000*
Seborrheic Dermatitis (SD)	12 2.5%	6 6.7%	6 33.3%	0 0.0%	12, df=3	0.007*
Scabies	18 3.8%	0 0.0%	0 0.0%	0 0.0%	58, df=3	0.000*
Mongolian Spot (MS)	354 73.8%	24 26.7%	12 66.7%	0 0.0%	902.67, df=3	0.000*
Congenital Melanocytic Nevus (CMN)	48 10.0%	0 0.0%	0 0.0%	0 0.0%	144, df=3	0.000*
Haemangioma	24 5.0%	0 0.0%	0 0.0%	0 0.0%	72, df=3	0.000*
Port wine Stain (PWS)	6 1.3%	0 0.0%	0 0.0%	0 0.0%	18, df=3	0.000*
Epidermolysis Bullosa (EB)	1 0.2%	0 0.0%	0 0.0%	0 0.0%	3, df=3	0.392, NS

Pearson chi-square for goodness of fit applied.

P value < 0.05 was taken as statistically significant

Table 4 shows the comparison of the dermatological findings in relation to maturity. Statistically significant differences in proportional distribution was seen in Desquamation of skin, ETN, SGH, Miliaria, Physiological jaundice, Epstein pearls, Acrocynosis, Vernix Caseosa, Sucking blisters, Harlequin color, Seborrheic

dermatitis, Scabies, Mongolian spot, CMN, Hemangioma, Port wine stain (P<0.05), showing a high proportion of maturity in the full term babies in comparison to the preterm and post-term babies.

While impetigo and candidiasis were significantly higher in the preterm (P<0.05).

Epidermolysis Bullosa shows an incidence of 0.2 % in term neonates.

Table No. 5: Distribution of Neonatal Dermatoses on the basis of Diagnosis (Total – 600)

Physiological		Acquired		Developmental	
Desquamation of skin (DS)	396	Impetigo	48	Mongolian Spot (MS)	390
Erythema Toxicum Neonatorum (ETN)	162	Candidiasis	30	Congenital Melanocytic Nevus (CMN)	48
Sebaceous Gland Hyperplasia(SGH)	120	Seborrheic Dermatitis (SD)	24	Haemangioma	24
Miliaria	108	Scabies	18	Epidermolysis Bullosa (EB)	1
Physiological Jaundice (PJ)	60			Port wine Stain (PWS)	6
Epstein Pearls (EP)	30				
Acrocynosis (AC)	36				
Vernix Caseosa (VC)	36				
Sucking Blister (SB)	24				
Harlequin Colour (HC)	6				



Figure 2: Desquamation of Skin



Figure 3a,b: Erythema Toxicum Neonatorum



Figure 4: Sebacaceous Gland Hyperplasia



Figure 5: Sucking Blister



Figure 6: Impetigo with Sucking Blister and Hemangioma



Figure 7: Neonatal Candidiasis



Figure 8: Infantile Hemangioma



Figure 9: Port wine Stain or Stork bite



Figure 10: Congenital Melanocytic Nevus



Figure 11: Mongolian Spot

Discussion

A total of 804 live born newborns selected at random formed the study group. The male: female ratio in the present study was 1.2:1. This was roughly similar to that observed Nobby and Chakravarty et al[7] study (1.1:1) and Baruah, Bhat and Bhargav[8] study of 500 Indian newborns (1.22:1). In a study of 474 newborns done at Amritsar by Sachdeva et al[9], male to female ratio was 1.34:1.

In the present study, most commonly found dermatoses were Desquamation of Skin which was found in 70.4% of males and 60.9% of the females. Next common dermatoses were Mongolian spot (males 66.7%, females 63.0%), ETN (males 33.3%, females 19.6%), miliaria (males 20.4%, 15.2% females), SGH (males 18.5%, females 21.7%). Other dermatological conditions were physiological jaundice, CMN, impetigo, acrocyanosis, candidiasis, seborrheic dermatitis, hemangioma, Epstein pearls, vernix caseosa, sucking blister, scabies, Harlequin colour, epidermolysis bullosa and port wine stain.

Except 80% full term, 15% were preterm, 3% were post term and 2% were small for date with neonatal dermatoses. Sachdeva et al[9] reported 92% term deliveries where as 9.8% preterm deliveries out of 500 new born and also in a study by Dash et al[10], Bangalore conducted in 2000 neonates, 92% were full term and 8% were preterm which were almost in line with our findings.

The most common cutaneous finding in full term was Mongolian spots (73.8%), followed by desquamation of skin (67.5%), ETN (33.8%), miliaria (21.3%), SGH (20.0%), CMN (10.0%). Among the preterm the most common cutaneous findings were desquamation of skin (60.0%), SGH (26.7%), physiological jaundice (26.7%), impetigo (26.7%), Mongolian spots (26.7%), candidiasis (20.0%). Among the post term the most common was desquamation of skin (66.7%) and Mongolian spots (66.7%) followed by miliaria (33.3%) and seborrheic dermatitis (33.3%).

Among the SFD babies the most common cutaneous findings were desquamation of skin (50.0%), physiological jaundice (50.0%), acrocyanosis (50.0%), impetigo (50.0%). The findings were in contrast to studies by Lorenz et al[11] done on neonates of up to 5 days' age as well as Shih et al [12] where most common findings were desquamation of the skin and SGH.

In the present study 72.0% of the newborns had birth weight >2.5 kg, 21.0% had birth weight between 2 to 2.5 kg whereas only 7.0 % had birth weight less than 2 kg with dermatoses. These birth weight statistics almost matched the studies by Dash et al[10], Rivers et al[13] and Sachdeva et al[19].

The commonest dermatosis, observed in the present study was desquamation of skin found to be in 66.0% of cases with majority having at least one or few neonatal dermatoses, whereas in Zagne et al[20] the incidence of desquamation was 18%. The incidence observed in other studies varied from 7.2% to 85%[20, 10, 17, 7]. In full term infants, scaling was observed to begin on third or fourth day after birth and reach a peak by 8-10 days (Griffith[21], Hodgman[22], Solomon and Esterly[23]). Our observations were similar and in addition fine scales were observed in many infants, at creases and flexors delivered between 40-42 weeks of gestation. Griffith et al[21] showed that 75% infants had some scaling over the ankles on the first day of life but the period of gestation in these babies was not mentioned. Solomon and Esterly[23] noted that infants born between 40-42 weeks had significant degree of shedding compared to those between 36 to 40 weeks. However, in present study it was found that in preterm babies (29-36 weeks) the shedding started between 8-19th day and in post-term small for date babies the diffuse scaling was present even at birth. It is important to note that in post-term babies in present study scaling was completed by 5-6 day and then new scales appeared on flexors or creases. It is felt that post-term babies show shedding of two crops of scale, the second appearing in the usual way as in the full-term babies. However, this postulation needs to be confirmed.

SFD babies were found to have diffuse scaling at birth and this was directly correlated with the degree of intrauterine growth retardation. Important differences were observed between scales of post-term babies and SFD babies. Post-term babies showed fine but large

scales, which got peeled off in sheets, whereas SFD babies had very small and fine scales which come off as in normal full-term neonates. Other common dermatosis in the present study was Mongolian spot (65%). The incidence in our study was comparable to other studies by Baruah et al[8], Dash et al[10], Kulkarni et al[17], Nanda et al, Nobby et al[7], Uzma Ahsan et al[14]. A higher incidence was observed in multipara and in babies with more birth weight.

The incidence of ETN in the present study was 27.0%. ETN was observed in 12% babies in Uzma et al[14] study. It was more commonly seen in males. The increased level of adrenal and gonadal androgens in male newborns, may have a direct effect on hair follicle and on sebaceous glands which are involved in pathogenesis of ETN as proposed by Liu et al[24]. Chang et al[25] reported a case of delayed onset erythema toxicum.

Next common dermatosis observed in present study was Sebaceous gland hyperplasia. It was observed in 120 babies (20.0%). The incidence in a study by Dash et al was 22%[10]. The maximum incidence of SGH was seen in babies examined at 12-24 hours. Surprisingly contrary to the previous report by Solomon and Esterly[23], that SGH is not seen in pre-term babies, in the present study the incidence was more in the pre-term babies and also that lesions were more prominent in them. However, we found that SGH was significantly more in male newborns ($p < 0.001$). The possible reason for this association may be the increased levels of circulating testosterone in male newborns along with the effect of maternal androgens, leading to increased activity of sebaceous glands.

In our study, Epstein pearls were seen in 5% cases. The incidence of Epstein and Bohn's pearl's had been reported to vary between 64.3% to 85%. Also it was 61% in a study by Sachdeva et al[9] & 47.8% in Uzma Ahsan et al[14]. Significant differences in frequency were seen from other international studies, e.g. Nanda et al[15] (88.7%) Moosavi and Hosseini[16](70.2%). We also found that Mongolian spots were significantly more in babies with a birth weight of >2.5 kg. As per Uzma et al[14], Epstein pearls were significantly more in full-term neonates as compared to pre-term or postdate babies.

The incidence of impetigo was observed to be 8.0%. The findings were similar that of a study by Uzma Ahsan[14] et al (11.4%) as compared to most of the international studies that reported 0.02% in American newborns and in 1% of Iranian neonates. Nanda et al[15] found almost similar frequency of impetigo i.e. 11.3%. These differences can be explained on the basis of seasonal and temperature differences. Overcrowding, less efficient sterilization and cleanliness in our hospitals and poor standard of hygiene in Indian setting may be the other factors contributing to increase frequency of impetigo in our population. Impetigo was more common in the months of July to September.

Miliaria was observed in 18.0% of cases in the present study. The incidence was higher during summer. Babies nursed in incubators showed more prominent lesions of Miliaria. All cases observed in the present study were of Miliaria rubra. In Uzma et al study, miliaria was observed in 128 (12.8%) newborns, where 90 had miliaria rubra, 29 had miliaria crystallina and 9 had miliaria pustulosa[14]. This was similar to observation made earlier by Hidano et al[19]. Baruah et al[15] observed 72.7% of miliaria rubra and 27.3% of miliaria crystallina. While Nanda et al[8] observed miliaria crystalline to be the most common type as opposite to the present study.

The incidence of hemangioma as observed in the present study was (4.0%). This roughly coincided with observations of previous workers. Pratt, observed them in 1.1% of Caucasoids and 1.4% of Negroids[27], Hidano et al observed them in 1.7% of Japanese neonates[19].

The incidence of portwine stain as observed in the present study was (1.0%). This was different from the findings of Zagne and Fernandez et al[20] in which the incidence was 3.5 percent.

Conclusion

The aim of present study was to know the incidence of dermatosis in babies of neonatal age group, to classify them as physiological, acquired and congenital disorders and also to note the effect of Birth

weight, Sex and Maturity on incidence of various skin disorders in neonatal age group.

Most of physiological changes observed in neonatal age group were self-limiting and required no active intervention, hence many dermatoses observed in neonatal age group may be under reported.

Newborns skin differ in reaction pattern or response to that of adults therefore require special attention.

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