

### **A study of Pattern and spectrum of Neonatal dermatoses in a tertiary care hospital**

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#### **Abstract**

**Background:** The transition of neonatal skin from an aqueous to an air-dominant environment results in various changes, both physiological and pathological. Neonatal dermatology encompasses a spectrum of cutaneous disorders from benign to life threatening. An in-depth knowledge regarding the various dermatoses of neonates is of great significance in offering quality care to the baby

**Aim:** The objective of the study was to observe and analyze the various patterns and clinical spectrum of neonatal dermatoses.

**Methods:** A cross sectional observational study was conducted at Government General Hospital, Guntur Medical College, Guntur after obtaining Institutional Ethics Committee approval. A total of 200 neonates, below the age of 28 days, presenting with any dermatological (cutaneous) lesions attending Dermatology O.P and also referral from Paediatric O.P, NICU & maternal ward were included. A general

examination followed by a detailed dermatological examination was carried out in individual study participants.

**Results & Discussion:** Of all the neonatal dermatoses, 73% presented with physiological skin lesions and 27% were acquired /pathological lesions. Among them, 73% were males and 27% were females. The most common physiological dermatosis were erythema toxicum neonatorum (ETN) accounting about 14.5%. Other transient benign disorders include Vernix caseosa with physiological Scaling (11.5%) and Miliaria (11%). The most common pathological dermatoses observed in the neonates were infections (10.5%) - bacterial followed by fungi. Among the vascular disorders and pigmentation disorders, hemangiomas accounts for 5.5%, Congenital melanocytic naevi (1-giant) accounts for 1.5%, Oculocutaneous albinism accounts for 0.5%, Naevoid hypo melanosis accounts for 1%, Salmon patch accounts for 0.5%. The most common reported Genetic dermatosis include epidermolysis bullosa (2%) and collodion baby (1.5%).

**Conclusion:** The rapidly adapting neonatal skin, being anatomically and physiologically distinct from that of an adult may exhibit a variety of entities ranging from mild and/or self-limiting ones to the severe and/or life threatening. Accurate diagnosis of these physiological and pathological conditions in neonates and counseling of the parents relieve the anxiety, avoiding unnecessary diagnostic testing and treatment

**Keywords:** Neonates, Dermatitis, cutaneous, Erythema toxicum neonatorum

### Introduction

Neonatal life, as defined by the World Health Organization, constitutes the first 28 days of extrauterine life<sup>(1)</sup>. It may be further subdivided into the very early

(birth to < 24 hrs), early (birth to < 7 days) and late neonatal periods (7 to <28 days)<sup>(2)</sup>.

Neonatal skin differs in structure and function from that of adults and hence the dermatoses seen during this period differ in their clinical presentation and therapeutic requirements. It gives physical protection and also aids in fluid balance, thermoregulation, and immunosurveillance. The skin of neonate is thinner, delicate, has weaker intercellular attachments and produces fewer sweat and sebaceous gland secretions and is more susceptible to several infections<sup>(3)</sup>. The transition of neonatal skin from an aqueous to an air-dominant environment results in various changes, both physiological and pathological<sup>(4)</sup>.

Neonatal dermatology encompasses a spectrum of cutaneous disorders from benign to life threatening<sup>(3)</sup>

The dermatosis incidence in neonates is frequent and varies from 96 to 99.3% of all newborn babies, and this may vary from benign diseases to life-threatening ones<sup>(5)</sup>.

Erythema toxicum neonatorum (ETN), miliaria, and physiological desquamation are a few of the commonly encountered benign and transient lesions during the neonatal period and last for first few days of life, and some others such as Mongolian spots and hemangiomas might remain for many months. These conditions may cause anxiety and concern among the parents to seek medical advice, though they are harmless<sup>(6)</sup>.

It is important to differentiate between benign and pathological skin lesions in newborn as a physiological skin change would require no therapy but a pathological manifestation needs to be thoroughly investigated and treated<sup>(4)</sup>.

Differentiating Neonatal dermatosis is essential to reassure parents about physiological skin changes and

avoid unnecessary therapeutic interventions. An in-depth knowledge regarding the various dermatoses of infancy is of great importance in offering quality care to the baby<sup>(7)</sup>.

Study of these neonatal dermatosis by both Paediatrician and Dermatologist will be more fruitful in view of ascertaining confirmatory diagnosis and better therapeutic outcome. Early identification of potentially harmful lesions is essential for proper care of newborn<sup>(8)</sup>.

It is a must to know the prevalence, clinical patterns, and spectrum of dermatoses in neonates to differentiate between physiological and pathological lesions and also to alleviate unnecessary apprehension in parents. So, the Present study was undertaken to observe the pattern of Neonatal dermatoses presenting to a tertiary care hospital in South India.

#### **Aims and objectives**

The objective of the study was to observe and analyze the various patterns and clinical spectrum of neonatal dermatoses.

#### **Materials and methods**

A cross sectional observational study was conducted at Government General Hospital, Guntur Medical College, Guntur, Andhra Pradesh. The study was carried out from September 2018 to December 2019 after obtaining Institutional Ethics Committee approval. A total of 200 Neonates presenting with any dermatological (cutaneous) lesions attending Dermatology O.P and also referral from Paediatric O.P, NICU & maternal ward in the tertiary care hospital were included.

The study included all children below the age of 28 days with physiological and pathological skin conditions. An informed written consent was obtained from either of the parent/guardian of the study infants, before including them in the study. All critically ill patients and patients

whose parents/guardians were not willing to give consent for the study were excluded from the study.

A standard case study proforma was used to obtain a detailed demographic and clinical history of the child comprising of age, sex, birth weight, duration of illness, and type and extent of skin lesions. A general examination followed by a detailed dermatological examination was carried out in individual study participant. Investigation reports and previous medical reports were used for filling relevant parts of the proforma. The relevant family history and ante-partum history of the mother (regarding maternal age, parity, consanguinity, mode of delivery) were obtained.

A detailed systemic and dermatological examination was carried out and recorded in a standard proforma. Photographic records were maintained. Neonatal dermatosis was diagnosed in individual patients by the qualified dermatologist and a pediatrician with good experience in respective specialties.

#### **Data analysis**

Data was entered in MS Excel spreadsheets and analyzed. The proportion of various dermatoses was reported as percentages.

#### **Results**

A total of 200 neonates were included in the study attending the dermatology department along with referrals from other departments. Among them, 146 (73 %) were males and 54 (27 %) were females with Male: Female ratio of 2.7:1.

Out of the neonates, 187 (93.5%) were term, 12 (6%) was preterm and 1(0.5%) were post term babies. Out of the total 200 infants, 51 babies (25.5 %) were less than 7 days and 149 babies (74.5%) were neonates between 7 to 28 days. Of these, 14 (7 %) weighed less than 2 kg, 105 (52.5%) weighed between 2 and 3 kg, 71 (35.5%) were

above 3 kg. History of consanguinity was present in 38 (19 %) cases.

Table 1: Demographic characteristics

Demographic characteristics	Frequency	Percentage (%)
Sex		
Male	146	73 %
Female	54	27 %
Maturity at the time of delivery		
Preterm	12	6 %
Term	187	93.5 %
Post term	1	0.5 %
Age of neonate		
Birth to < 7 days	51	25.5 %
7 -28 days	149	74.5 %
Birth weight		
<2 kg	14	7 %
2-3 kg	105	52.5 %
>3 kg	71	35.5 %
Maternal age		
<35years	170	85 %
>35years	30	15 %
Mode of delivery		
Vaginal	96	48 %
LSCS	104	52 %
Consanguineous marriage		
Yes	38	19 %
No	162	81 %
Referrals from		
DVL OP	102	51 %
NICU	88	44 %
Maternity ward	8	4 %
Paediatric Surgery ward	2	1 %

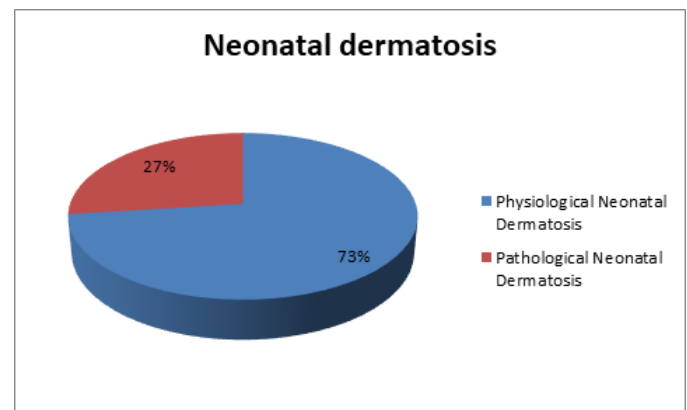
Most of the mothers of neonates were of age < 35 years (85 %) . 96 (48 %) and 104 (52 %) infants were born by normal vaginal delivery and caesarean section, respectively.

Of all the neonatal dermatoses, 146 (73% ) presented with physiological skin lesions and 54 (27%) were acquired /pathological lesions .

Table 2: Neonatal Dermatoses

Neonatal Dermatoses	Frequency	Percentage (%)
Physiological Neonatal Dermatoses	146	73%
Pathological Neonatal Dermatoses	54	27%

Graph 1:



In the present study, the most common physiological dermatosis were erythema toxicum neonatorum (ETN) accounting about 14.5 %.

Other transient benign disorders include Vernix caseosa with physiological Scaling (11.5%), Miliaria (11%) - (Crystalline (6.5 %), Rubra (4.5%)), Cradle cap (8%), Mongolian spots (7.5%), milia (7%), Neonatal acne/ Neonatal cephalic pustulosis (7.5%), Transient neonatal pustular melanosis (2%), Sebaceous hyperplasia (1.5 %), Umbilical granuloma (0.5%), Occipital alopecia (0.5%), Cutis marmorata (0.5%), Preterm skin with increased lanugo hair (0.5%), Suckling blister (0.5%).

Table 3: physiological neonatal dermatoses

Physiological neonatal dermatoses	Frequency	Percentage
Erythema Toxicum Neonatorum (ETN)	29	14.5%
Vernix caseosa with physiological Scaling	23	11.5%
Miliaria	22	11%
Crystalline	13	6.5%
Rubra	9	4.5%
Cradle cap	16	8%
Mongolian spots	15	7.5%
Milia	14	7%
Neonatal acne / Neonatal cephalic pustulosis	15	7.5%
Transient neonatal pustular melanosis	4	2%
Sebaceous hyperplasia	3	1.5%
Umbilical granuloma	1	0.5%
Occipital alopecia	1	0.5%
Cutis marmorata	1	0.5%
Preterm skin with increased lanugo hair	1	0.5%
Suckling blister	1	0.5%
Total	146	73%

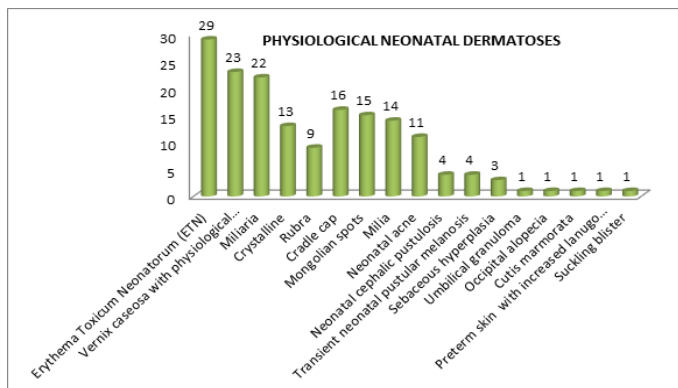
Figure 1: Neonatal Acne



Figure 2: Miliaria crystallina.



Graph 2:



The most common pathological dermatoses observed in the neonates were infections (21, 10.5%) - bacterial followed by fungi. The most common types of bacterial infections were Pyoderma (6 %) and fungal infections were candidal intertrigo (4 %), tinea corporis (0.5 %). The most common inflammatory dermatosis includes diaper dermatitis (2 %).

Among the vascular disorders and pigmentation disorders, hemangiomas accounts for 5.5 %, Congenital melanocytic naevi (1-giant) accounts for 1.5 %, Oculocutaneous albinism accounts for 0.5 %, Naevoid hypo melanosis accounts for 1 %, Salmon patch accounts for 0.5 %.

One neonate was born with oculocutaneous albinism with diluted pigmentation of skin and hair which was a rare reported dermatosis. The most common reported Genodermatosis include epidermolysis bullosa (2 %) and collodion baby (1.5 %).

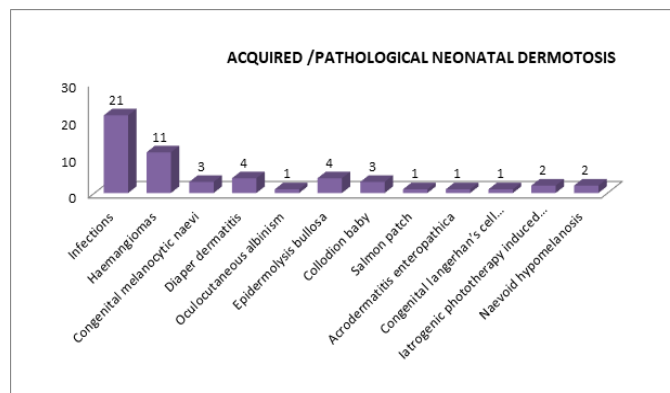
Among nutritional dermatosis, Acrodermatitis enteropathica (0.5 %) was reported. Among other disorders, Iatrogenic phototherapy induced erythema accounted to 1 %, Congenital langerhan’s cell histiocytosis accounted to 0.5 % respectively.

Table 4: Acquired /pathological neonatal dermatosis

Acquired /pathological neonatal dermatosis	Frequency	Percentage (%)
Infections	21	10.5%
Bacteria		
Pyoderma	12	6%
Fungus		
Tinea corporis	1	0.5%
Candidial intertrigo	8	4%
Haemangiomas	11	5.5%
Congenital melanocytic naevi (1-gaint)	3	1.5%
Diaper dermatitis	4	2 %
Oculocutaneous albinism	1	0.5 %
Epidermolysis bullosa	4	2%
Simplex	3	1.5%
Dystrophic	1	0.5%
Collodion baby	3	1.5%
Salmon patch	1	0.5%
Acrodermatitis enteropathica	1	0.5%
Congenital langerhan’s cell histiocytosis	1	0.5%

Iatrogenic phototherapy induced erythema	2	1%
Naevoid hypo melanosis	2	1%
Total	54	27%

Graph 3:



Graph 4:

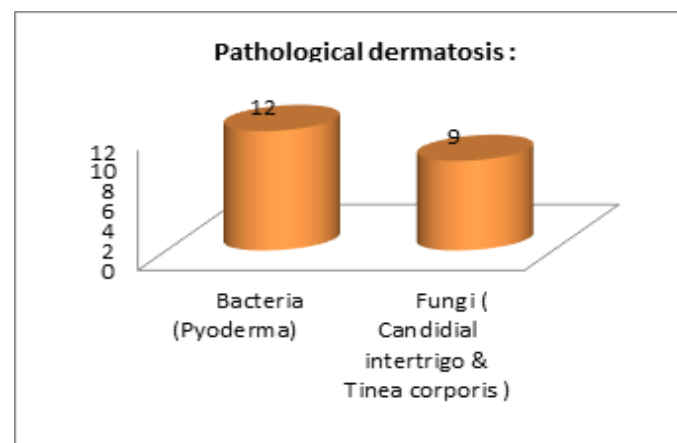


Figure 3: Oculocutaneous albinism



Figure 4: Haemangiomas



Figure 5: Epidermolysis bullosa



### Discussion

The early neonatal period is marked by the newborn adapting to extrauterine life, moving from the liquid uterine environment to the external dry environment. Neonatal cutaneous constitution differs from adult skin because of its glandular and melanocytic immaturity, its thin layer and its biochemical composition. These anatomical and physiological peculiarities of neonatal skin make it predisposed to neonatal dermatoses (ND). Because of the benign and self-limiting physiological nature of most of the lesions, there is no need for any intervention and reassurance to caregivers/ parents is a must.

In our study, 146 (73%) presented with physiological skin lesions and 54 (27%) were acquired / pathological lesions. Various studies have shown the prevalence of physiological changes among neonates ranging from 57% to 100%. The incidence of physiological dermatoses was comparable to other Indian studies by Nobbay and Chakrabarty et al <sup>(9)</sup> (69%), Kulkarni and Singh et al <sup>(10)</sup> (72%), and Patel et al <sup>(11)</sup> (78%). But is significantly higher than a study by Jawade et al <sup>(12)</sup> (39.69%) and slightly lower than a study by Baruah et al <sup>(13)</sup> (93%).

In the present study, the most common physiological dermatosis were erythema toxicum



Figure 6: Collodion baby



Figure 7: Congenital melanocytic naevus

neonatorum (ETN) accounting about 14.5 %. This is slightly higher than a study by Jawade et al<sup>(12)</sup> (12.97%) and lower than another study by Abraham et al<sup>(14)</sup>(22.76%). ETN is one of the common transient disorders in newborn presenting as an erythematous macule, papule, or pustule, requiring no intervention

The incidence of Mongolian spots has shown variation in India from 9.16%<sup>(12)</sup> up to 42.5%<sup>(15)</sup>. In the present study, Mongolian spots accounted for 7.5% of dermatosis. Majority of Mongolian spots were found on the lumbosacral regions. In contrast, Mongolian spot was the commonest infant dermatoses in studies by Pandit and Udaya et al<sup>(16)</sup> and Shivakumar et al<sup>(17)</sup>.

In the present study, among other physiological dermatoses, Vernix caseosa with physiological Scaling was reported to be 11.5%. Physiological scaling is a benign superficial skin desquamation affecting 18% of the newborns which was within the literature range (7.2%–83%). In our study Miliaria was reported in 11% of neonates which is similar to a study by Jawade et al<sup>(12)</sup> (11.45%). In this study, Cradle cap were noted in 8 % of neonates whereas a study by Behera B et al<sup>(15)</sup> reported cradle cap in 2 % neonates. In our study milia was reported in 7% of neonates. Jawade et al<sup>(12)</sup> noted milia in 9.92% of the cases and Abraham et al<sup>(14)</sup> in 2.71% of the cases. In this study, Neonatal acne was reported in 7.5 % cases.

Among pathological dermatosis, infections were seen in 10.5 % of cases. Behera et al<sup>(15)</sup> reported an incidence of 3.5% bacterial, 2% fungal, and 0.8% viral among the neonates. In the study by Dogra and Kumar<sup>(18)</sup> 11.4% of the disorders were of infectious etiology. Bacterial infections were noted in 6 % in our study. Similar to our study, bacterial infections have been common as seen in the studies by Patel et al<sup>(11)</sup>(24.9%), Thappa

<sup>(19)</sup>(25.64%), and Behera et al<sup>(15)</sup>. Fungal infections were seen in 4.5 % of neonates in our study. Candida intertrigo and tinea corporis were the common fungal infections reported in our study. Among other studies, fungal infection was found in 7.81% of the cases in Patel et al<sup>(11)</sup> and Thappa<sup>(19)</sup>(8.49%). In this study, Diaper dermatitis was reported in 2 % of cases whereas Diaper dermatitis was reported as the most common skin disorder of infancy in United States. A less frequent use of synthetic diapers could be the reason for the observed lower frequency in this study. Hemangiomas and other vascular disorders were seen in 5.5 % (11) neonates in this study. In a study by Behera et al<sup>(15)</sup> hemangiomas were seen in five neonates.

The most common reported Genodermatosis include epidermolysis bullosa (2 %) and collodion baby (1.5 %). Consanguinity could be one reason for the higher frequency of collodion babies. A study by Behera et al<sup>(15)</sup> and July Mudang et al<sup>(20)</sup> reported collodion babies in 0.9% and 1.1 % cases respectively. One neonate was born with oculocutaneous albinism (0.5 %), which has a history of consanguineous marriage, with diluted pigmentation of skin and hair. Albinism is a genetic disorder inherited in an autosomal recessive pattern characterized by the absence of pigmentation of skin, hair, and eyes at birth. Congenital melanocytic naevi (1-giant) accounts for 1.5 %, Naevoid hypomelanosis accounts for 1 % of neonates in this study. Congenital melanocytic nevus (0.7%) and nevus depigmentosus (0.7%) was reported in a study by Pandit and Udaya et al<sup>(16)</sup> which was comparable to our study.

A case of nutritional dermatosis (Acrodermatitis enteropathica) was noted in this study. Nutritional disorders were found in about 3.82% of cases in a study by Jawade et al<sup>(12)</sup>. Cutis marmorata (0.5 %), salmon



patch (0.5%), and Iatrogenic phototherapy induced erythema (0.5%), Occipital alopecia (0.5%), Congenital langerhan's cell histiocytosis (0.5%) were the other less common features found in neonates of this study. The limitation of our study is the small sample size.

### Conclusion

The rapidly adapting neonatal skin, being anatomically and physiologically distinct from that of an adult may exhibit a variety of entities ranging from mild and/or self-limiting ones to the severe and/or life threatening. However, their occurrence makes the parents/caregivers disconsolate. Hence, all dermatologists and pediatricians should be acquainted with neonatal dermatoses and their patterns, presentation, course, and prognosis.

This study annotates on knowledge about various physiological as well as pathological conditions affecting the neonates. In this study, Physiological skin manifestations (Erythema Toxicum Neonatorum) were the most common. Physiological dermatoses (73 %) are transient and self-resolving and the pathological dermatoses (27 %) are caused most commonly by infections (bacterial) and inflammatory in origin, which warrants a clean and hygienic living. Accurate diagnosis of these physiological and pathological conditions in neonates and counseling of the parents relieve the anxiety, avoiding unnecessary diagnostic testing and treatment. Owing to wide variety & public health problem of cutaneous dermatoses in neonates, the current data can be useful in supplementing knowledge on neonatal dermatoses among the dermatologists, pediatricians, and the health care community.

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