
ORIGINAL ARTICLE**A cross-sectional study to determine prevalence of neonatal dermatoses in a tertiary health care centre of Andhra Pradesh, South India**

Deepti Vemu¹, Shalini Eslavat¹, Shankar Kunti², Prasad Naik NM^{1*}, Ritu Gujarati Vishwanath³,
Sruthi Kamatham¹

¹Department of Dermatology, Venereology and Leprology, Govt. Medical College, Wanaparthy-506303 (Telangana) India, ²Department of Dermatology, Venereology and Leprology, Govt. Medical College, Sangareddy-502001 (Telangana) India, ³Consultant Dermatologist, RiVa Skin and Plastic Surgery Clinic, Warangal-506001 (Telangana) India

Abstract

Background: By definition, the term "neonatal dermatoses" refers to a broad range of cutaneous conditions that develop in the first four weeks of life. Dermatologists and paediatricians must be able to recognize typical events and distinguish them from the more serious cutaneous illnesses that affect newborns. **Aim and Objectives:** To assess the prevalence of dermatoses in the neonatal period and to find the association with some of the demographic, neonatal and obstetric variables. **Material and Methods:** This study was a cross sectional study with a sample size of 600 neonates who attended the outpatient department of dermatology in a private medical college in Andhra Pradesh between May 2021 and April 2022. All full-term babies with birth weight > 2.5 kg of both sexes within neonatal period born with normal delivery and caesarean section were included in the study. **Results:** Out of 600 neonates, 312 (56%) were males, and 502/600 (87.3%) presented with dermatoses. A total of 17 types of dermatoses were diagnosed. The prevalent dermatoses in decreasing order were Mongolian Spots (MS) 196 (32.7%); Erythema Toxicum Neonatorum (ETN) 86 (14.3%); and Physiological Desquamation (PD) 66 (11%). Miniature pubertal signs were commonly observed in newborns of multiparous women ($p < 0.05$) amongst which, genital hyper pigmentation ($p = 0.03$) was most common ($p < 0.01$). Naevi and PD were associated with vaginal deliveries ($p = 0.03$). **Conclusion:** Dermatitis in neonates was associated with high parity, vaginal delivery, and consanguinity. Most of them were physiological changes. These are to be differentiated and reassurance must be given to the parents who are worried about the children.

Keywords: Neonate, Dermatitis, Maternal Factors

Introduction

Skin of a neonate plays an important role in transition from an aqueous to an air-dominant environment by providing mechanical protection, assisting thermoregulation, immune surveillance and fluid balance [1]. Skin rashes and other dermatological conditions are one of the common concerns among the parents of newborn and the reason for frequent visit to paediatrician [2]. It has been noted that 68.8% of the skin conditions

occurring in children can be physiological which include sebaceous hyperplasia, milia, mongolian spot, cutis marmorata, harlequin colour changes, Erythema Toxicum Neonatorum (ETN), pigmentary changes, haemangioma etc [3]. However, serious infectious, congenital skin diseases and sometimes malignant tumours should be taken into consideration [4]. Neonatal dermatoses can be classified as transient skin disorders, congenital

disorders like birthmarks and genodermatoses, acquired skin disorders specific to the neonatal period, and iatrogenic dermatologic complications [5]. They are intrinsically related to the ethnic, demographic, and obstetric profiles of the populations studied. It is extremely important that, in addition to dermatologists, professionals directly involved in the primary care of newborns can diagnose these physiological changes. Neonatal Dermatoses (ND) may occur because the skin that is still immature at birth gradually pass through a maturation process in the early neonatal period. As such, the skin plays a role in adapting to extrauterine life [4, 7]. The high prevalence demonstrates that skin adaptation is an intrinsic phenomenon to human development, even despite ethnic differences and cutaneous peculiarities [5-8]. Differences between dermatoses in different populations may occur due to methodological and ethnic-social variations, such as: sample size, term of the neonatal period when performing the examination, inclusion of pathological dermatoses [9]. Sanitary infrastructure conditions are also highlighted, as in Indian regions, the prevalence of infectious dermatoses overlap with physiological dermatoses. Knowledge regarding the various dermatoses of infancy is of great importance in offering quality care to the baby. Very few studies have been conducted in this region undertaking both early and late neonatal period. This study was done to assess the burden of neonatal dermatosis amongst babies coming to our hospital and to observe their association with the neonatal and obstetric variables.

Material and Methods

Study design and setting

This was a cross-sectional study conducted in newborn babies delivered at the Department of Obstetrics and Gynaecology, neonates who attended the

outpatient department of Dermatology and also who were referred from paediatric department at Dr. Pinnamaneni Siddhartha Institute of Medical Sciences and Research Foundation, Gannavaram, Andhra Pradesh. The study was carried out between May 2021 and April 2022. Institutional Ethics Committee approved the study with reference number: PG/15/Derma/2013-14. After getting an informed written consent from the mother or guardian, all the neonates were examined thoroughly, and the findings were recorded. Based on other similar studies [4], 55% was considered as percentage of neonate with neonatal dermatoses in India, with an allowable margin error of (d) 5%, at a 95% confidence interval and accounting for the finite population for 707 health care workers, a minimum sample size of 382 was obtained, using formula; $n = \frac{3.96pq}{d^2}$ where p = prevalence, q=(1-p), d=5% allowable error at 95% confidence limit. Any sample size above 382 would be valid for the study. Hence, a sample size of 600 babies with neonatal dermatosis during the given time was considered optimum.

All full-term babies with birth weight > 2.5 kgs of both sexes in the neonatal period (both normal and caesarean deliveries) were included in the study. Neonates who were preterm, had Intrauterine Growth Retardation (IUGR), structural anomalies and/or sexual ambiguity, and whose mothers had medical illness or drug abuse were excluded.

Important parameters studied were type of dermatosis and their association with demographic, neonatal and obstetric factors. Neonatal parameters such as age, sex, birth weight and presence of any systemic disease were recorded. Obstetrical parameters like age, parity, consanguinity, mode of delivery, any illness during pregnancy were recorded.

Simple non-invasive investigations such as examinations of scrapings for candida, pus swabs for bacterial culture and smear from pustules for gram staining, microscopic examinations and Tzanck smear from vesicles were performed as and when required. The collected data was entered in Microsoft excel sheet and analysed for frequency, percentage. Z test, Chi-square test and Fisher's exact test were applied to know the association of neonatal and obstetric factors with type of neonatal dermatoses. Statistical Package for the Social Sciences version 24 software was used for statistical analysis and $p < 0.05$ was considered statistically significant.

Results

Among the 600 newborns observed, 312 (56%)

were males. Children born of consanguineous marriage were 32 (7.3%). About 570 (95%) were between 2500 g and 3500 g, 5% of the babies had weight between 3500 to 4500 g with a mean weight of 3173.4 ± 422.57 g. The mean age of the mothers was 21.9 ± 4.7 years with age range of 21-28 years. With respect to the type of delivery, 442/600 (73.6%) had a vaginal delivery and 158/600 (26.33%) had a caesarean delivery. Amongst the mothers, 298/600 (49.7%) were multiparous and 302/600 (50.3%) were primiparous. Consanguinity was seen among 7.3% of newborns. The point prevalence of neonatal dermatosis was found to be 87.3% among the evaluated newborns (Table 1, Figure 1).

Table 1: Distribution of transient/physiological dermatoses

Dermatoses (N=502)	Frequency (Percentage)
Mongolian Spots	196 (32.7%)
Erythema Toxicum Neonatorum	86 (14.3%)
Physiological desquamation	66 (11.0 %)
Sebaceous gland hyperplasia	58 (9.7%)
Miniature puberty	36 (6.0%)
Miliaria	40 (6.7%)
Milia	38 (6.3%)
Vernix caseosa	36 (6.0%)
Lanugo	28 (4.7%)
Epstein Pearls	20 (3.3 %)
Acrocyanosis	5 (1.7 %)
Physiological jaundice	6 (2.0 %)
Seborrheic dermatitis	11 (3.7%)
Acne neonatorum	4 (1.3%)
Cutis marmorata	3 (1.0%)

Fifteen different types of neonatal dermatosis were encountered (Figure 1) in 600 study subjects. Mongolian spot was the most frequently observed dermatosis (33%) followed by Erythema Toxicum Neonatorum (ETN) (14%) and physiological desquamation (11%) respectively. The prevalence of neonatal dermatosis varied according to the sex of the newborns. Data showed the prevalence of congenital and acquired skin lesions. Amongst the congenital skin lesion, naevi was most common (8%) followed by vascular birth marks. Candidiasis (4.3%) was the most common acquired skin lesion followed by napkin dermatitis (2.3%) (Table 2).

Amongst the naevi detected, melanocytic naevi was the most common form (7.3%), followed by Naevus depigmentosus (0.7%) and Naevus sebaceous (0.3%) (Table 3). Miniature pubertal signs were observed among 18 newborns. Genital hyper pigmentation was most common and was found to be statistically significant ($p < 0.001$).

Other miniature pubertal signs observed were vaginal discharge, clitoral hypertrophy, and enlarged breasts (Table 4). The association between neonatal and obstetrics factors such as gender, parity, mode of delivery and consanguinity was also recorded.

Table 2: Distribution of congenital and acquired dermatosis among newborns

Type of Dermatitis	Frequency (Percentage)
Congenital	
Naevi	50 (8.3%)
Vascular birthmarks	30 (5.0%)
Aplasia Cutis	4 (0.6%)
Accessory tragus	2 (0.3%)
Epidermolysis bullosa	2 (0.3%)
Acquired Skin Lesion	
Candidiasis	26 (4.3%)
Napkin dermatitis	14 (2.3%)
Impetigo	8 (1.3%)
Omphalitis	6 (1.0%)
Staphylococcal Scalded Skin Syndrome	2 (0.3%)

Table 3: Distribution of Naevi

Type of Dermatitis	Frequency (Percentage)
Melanocytic naevi	44 (7.3%)
Naevus depigmentosus	4 (0.7%)
Naevus sebaceous	2 (0.3%)
Total	50 (8.3%)

Table 4: Distribution of miniature puberty (n=36)

Type of Dermatitis	Frequency (Percentage)
Vaginal discharge	8 (1.3%)
Clitoral hypertrophy	6 (1.0%)
Genital hyperpigmentation	20 (3.4%)
Enlarged breasts	2 (0.3%)

Discussion

The current study showed high prevalence of neonatal dermatosis in our area which constituted to 87.3%. A total of about seventeen types of neonatal dermatosis were encountered. Although numerous studies have reported the occurrence of skin lesions in newborns, they have primarily concentrated on the first few days of life. To determine the frequency of dermatoses occurring in the first four weeks of life and observe the pattern of neonatal dermatoses, the current clinical study was conducted. Additionally, the association between newborn dermatoses and a few neonatal and obstetrics factors was assessed.

Mongolian spot: Mongolian Spots (MS) are birthmarks that are present at birth. Lesions may be single or multiple and usually involve < 5%

total body surface area (Figure 1). In our study, MS was the most common type of dermatosis encountered among 30% of cases. Cases were common among women undergoing vaginal delivery. Our results are comparable with the results of study conducted by Samanta *et al.* (33.3%) [7]. Studies by Shah *et al.* and Cordova *et al.* have found 67% and 80% incidence of cases respectively [8-9].



Figure 1: Mongolian spot

Erythema toxicum neonatorum: ETN was observed in 14% of neonates (Figure 2) and marginally higher incidence was seen among females. Study by Shivakumar *et al.* showed slightly higher incidence of ETN (23%) [10] compared to this study and higher male preponderance was noted. According to the study by Jacob *et al.* [11] in 1976, Sadana *et al.* [12] in 2014, there was a drastic change of incidence from 1.3% to 43%.



Figure 2: Erythema toxicum neonatorum

Genital hyperpigmentation: Among newborn, transient hyper pigmentation can be seen in genital areas, lower abdomen, axillae, areolae, pinnae, and in the base of the fingernails, most probably due to *in utero* hormonal influence of Melanocyte Stimulating Hormone (MSH) (Figure 3). In our study genital hyperpigmentation was seen to be most common miniature pubertal sign (3.4%) which was found to be statistically significant ($p = 0.001$). Study by Reginatto *et al.* showed higher incidence of genital hyper pigmentation which was statistically significant ($p = 0.001$) [13]. Subsequently study by Pandit *et al.* showed comparatively high incidence 12% [14].



Figure 3: Genital hyperpigmentation

Miliaria: Miliaria, commonly known as heat rash, sweat rash, or prickly heat, is a skin disease marked by small, itchy rashes due to sweat trapped under the skin by clogged sweat gland ducts (Figure 4). Miliaria was the most common transient skin lesion presented in 40 (6.7%) neonates. It was common among males (60%) and those born to primigravid women (65%). Study by Gupta *et al.* showed comparatively higher prevalence i.e. 14% [15]. A study by Jain *et al.* showed prevalence in neonate (19%) which is comparatively higher [5]. However sweat gland disorders were seen only in

2% in a study by Gujarati *et al.* [16]. Relatively lesser humid conditions can be the reason for lower prevalence in our study.



Figure 4: Miliaria

Congenital melanocytic naevus: The prevalence of Congenital Melanocytic Naevus (CMN) in our study was 8.3% which was considerably high compared to other studies which noted incidence of around 1-2% [17-18] (Figure 5). Also, the prevalence was seen higher among males (66.6%) and multigravida mothers (68%). Study by Pokhrel *et al.* showed no gender disparity for prevalence of naevi [19]. Incidence was higher among those who were born by vaginal delivery. Consanguinity was seen in 11.2% of the cases.



Figure 5: Congenital melanocytic naevus

Epsteinpearls: Epstein Pearls (EPs) are yellowish white keratinous cysts which range in size from 1 to 2 mm. The incidence ranged from 18.2% to 61% in previous studies [20-21]. Also, study by Gudurpenu *et al.* showed much lower incidence of EP of 1.8%. Our study also showed lower incidence of EPs (3.3%). These were seen significantly higher among males as compared to females ($p = 0.03$). Also, high incidence was seen among primigravid women (70%).

Staphylococcal Scalded Skin Syndrome: Staphylococcal Scalded Skin Syndrome (SSSS) is a severe exfoliative dermatitis that mainly affects babies and children who were previously healthy (Figure 6). The exfoliative or epidermolytic toxin produced by *Staphylococcus aureus* is the cause of this condition. Current study showed 0.3% incidence of this exfoliative dermatitis. Study by Mudang *et al.* (2023) have observed an incidence of 2.2% among 270 patients investigated [22].



Figure 6: Staphylococcal Scalded Skin Syndrome

Current study noticed the presence of some infectious lesions among the neonates of which candidiasis was the most common (4.6%) followed by napkin dermatitis (2.3%). This prevalence of infectious lesions in the present study was comparable with that reported for newborns in neonatal intensive care units (4%) [23]. Ethnic, demographic and

obstetric profiles of the populations studied might be responsible for occurrence of above result. The low prevalence was probably because mainly admitted neonates were examined in this study.

Trauma: The evidence of injury during delivery was in the form of caput succedaneum (3, 2%) and subgaleal hematoma (1, 0.7%), which occurred during vaginal delivery.

Limitations of the study

The reliability of the study would have increased if it was a multicentric study with a greater sample size. Because of lack of resources, the above limitation could not be rectified. Also, some of the neonatal and obstetric factors could have been studied which was not done in our study e.g. division of cases as per the term born, and weight of the baby at birth, etc.

Conclusion

A high prevalence of neonatal dermatosis was noted in the current study which accounted for 87% of the total cases but most of the skin lesions were physiological and self-limiting. Male babies, multiparity and caesarean section were the common associations. Mongolian spot was the most common physiological dermatosis while candidiasis was the most common acquired skin infection.

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*Author for Correspondence:

Dr. Prasad Naik NM, Department of Dermatology, Venereology and Leprology, Govt. Medical College, Wanaparthy -506303, Telangana
Email: pras2win@gmail.com Cell:9703544807

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