

# Clinico-Epidemiological Study of Cutaneous Findings in Neonates in a Hospital Setting in Nepal

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## ABSTRACT

**Introduction:** Though cutaneous manifestations in the neonates are a common occurrence, its frequency has not been well documented in the Nepalese population. Majority of the lesions present in this age group are benign and transient but some require further attention. It is important to differentiate the presence of benign cutaneous manifestations in the newborns from the more serious dermatoses which need additional management.

**Aim:** To determine the patterns of various cutaneous manifestations in a sample of Nepalese neonates and to report the relationship of the commonest dermatoses with neonatal variables .

**Materials and Methods:** This was a cross sectional descriptive study, where we sought to determine the various types of cutaneous manifestations in 504 newborns who were either delivered in the Department of Obstetrics and Gynaecology or admitted in the NICU of Manipal Teaching Hospital, Pokhara, Nepal.

**Results:** The commonest skin lesions seen were: Erythema toxicum neonatorum (34.1%), physiological jaundice (32.7%), Mongolian spot (28.8%), Milia (23.6%), Epstein pearl (18.8%) and Lanugo hair (17.5%). Erythema toxicum neonatorum, jaundice, Mongolian spot and Lanugo hair were found to be significantly related to birth weight ( $p < 0.05$ ). The presence of physiological jaundice was significantly higher in neonates delivered vaginally whereas Epstein pearl was observed more in babies born through caesarean section. Positive correlation was noted between Erythema toxicum neonatorum, Mongolian spot and Epstein pearl with the race of the baby.

**Conclusion:** In this study we found that the majority of the skin lesions seen among the neonates were benign and transient. With this study we intend to increase the awareness of the various skin lesions in neonates among the paediatricians to enable them to treat or reassure the parents.

**Keywords:** Dermatoses, Newborn, Skin manifestations

## INTRODUCTION

Various cutaneous manifestations are commonly seen during the neonatal period. In most instances, the commonly observed lesions during this period are considered to be benign, physiological and transient [1], however these lesions can be distressing for the parents and they may seek medical attention for their newborns dermatological problems. In majority of the cases, the skin manifestations are generally only managed by the paediatrician because as per the authors knowledge, paediatric dermatology subspecialty are not yet established in Nepal. Therefore, it is imperative that the paediatrician identifies the nature of the lesion, makes the proper diagnosis, avoids unnecessary treatment and addresses the concerns of the parents. In circumstances where the diagnosis is confusing, it is equally pertinent to refer the neonates to a dermatologist for further evaluation. To the best of the authors' knowledge, there has been no previous documentation of neonatal dermatoses in Nepal and this is the first study carried out in a sample of Nepalese newborns. As it is inappropriate to extrapolate

data obtained from one population to another [2], we tried to determine the frequency of different cutaneous manifestations among our own population.

## MATERIALS AND METHODS

**Sample and setting:** This was a hospital based, cross sectional descriptive study conducted in Manipal Teaching Hospital (MTH), a 750 bedded, tertiary hospital in Pokhara, Nepal. The study was conducted from the period of July 2014 to November 2014; during this study period, a total of 504 newborns who were either delivered in the Department of Obstetrics and Gynaecology, MTH, or newborns admitted in the Neonatal Intensive Care Unit (NICU), MTH, were included for the study.

**Inclusion criteria:** All neonates who were delivered in MTH or admitted into the NICU of MTH having cutaneous lesions were included in the study.

**Exclusion criteria:** Neonates who were sick, those in whom excessive handling could increase chances of sepsis and babies under mechanical ventilation were

excluded from the study.

**Data collection:** Each newborn was examined by the principal author in broad daylight; they were fully undressed to facilitate the examination of the entire skin surface including the nails, scalp, genitalia and oral cavity. All dermatological manifestations were noted and diagnosis was made on clinical impression. In doubtful lesions, consultation with a dermatologist was made. In babies having impetigo, pus from the lesion was sent for gram stain, culture and sensitivity. Relevant data were noted during the time of examination; this included the baby's gender, mode of delivery, birth weight, gestational age and race. Nepal is country with diverse ethnic groups [3] so for convenience sake, we divided the babies into three main racial groups: Aryan, Mongolian, and Mixed.

### Ethical consideration

The Research was conducted in accordance to the latest version of the declaration of Helsinki [4]. Written consent was obtained from the research participants' parent/guardian. Prior to the study, approval for the study was taken from the institutional ethical committee of Manipal Teaching Hospital, Pokhara, Nepal.

### STATISTICAL ANALYSIS

The data collected was analyzed using Excel 2003, R 2.8.0 Statistical Package for Social Sciences (SPSS) for Windows Version 16.0 (SPSS Inc; Chicago, IL, USA) and EPI Info 3.5.1 Windows Version. Chi square test was used to observe the difference between different variables. A  $p < 0.05$  was considered as statistically significant.

### RESULTS

A total of 504 neonates were included in this study. Majority of the newborns examined were from the post-natal wards (411), whereas the rest were NICU admissions. The various reasons for NICU admission included preterm, low birth weight (44), suspected neonatal septicemia (13) and babies born through meconium stained amniotic fluid with or without meconium aspiration syndrome (36). The birth weight of the neonates ranged from 1150 grams to 4500 grams with a mean of  $2760 \pm 600$  grams. The various demographical characteristics of the babies are depicted in [Table/Fig-1].

Sixty three percent of the babies presented with more than one cutaneous manifestation and the maximum number of cutaneous manifestations noted in one single child was six. The frequencies of the various dermatological manifestations seen the sampled neonates are given in [Table/Fig-2].

As shown in the table, Mongolian spot was the commonest type of birth mark noted in this study. They were bluish green to bluish grey in colour depending on the skin colour of the newborn. Most of these lesions

Gender	N	(%)CI
Male	296	58.7 [CI (54.3, 63)]
Female	208	41.3 [CI (37, 45.7)]
<b>Birth weight</b>		
< 2500gm	122	24.2 [CI (20.6, 28.2)]
≥ 2500gm	382	75.8 [CI (71.8, 79.4)]
<b>Mode of delivery</b>		
Vaginal delivery	298	59.1 [CI (54.8, 63.4)]
Caesarean section	206	40.9 [CI (36.6, 45.3)]
<b>Gestation</b>		
Preterm	59	11.7 [CI (9.1, 14.9)]
Term	433	85.9 [CI (82.5, 88.8)]
Post dated	12	2.4 [CI (1.3, 4.2)]
<b>Ethnicity</b>		
Aryan	284	56.3 [CI (51.9, 60.7)]
Mongolian	183	36.3 [CI (32.1, 40.7)]
Mixed	37	7.3 [CI (5.3, 10.1)]

[Table/Fig-1]: Demographic characteristics of the studied neonates.

Skin lesions	N	Percentage (%)
<b>1. Birth marks</b>		
Mongolian spot	146	29.2
Café au lait spot	11	2.2
Salmon patch	1	0.2
Portwine stain	1	0.2
<b>2. Physiological cutaneous lesions/changes</b>		
Physiological jaundice	165	32.7
Milia	119	23.6
Epstein pearl	95	18.8
Lanugo hair	88	17.5
Physiological desquamation (peeling)	40	7.9
<b>3. Transient non-infective lesions</b>		
Erythema toxicum neonatorum	172	34.1
Miliaria	49	9.7
<b>4. Infectious lesion</b>		
Impetigo	17	3.4
<b>5. Eczematous eruptions</b>		
Nappy rash	9	1.8
Cradle cap	1	0.2
<b>6. Developmental defects</b>		
Congenital fossa (sacral)	18	3.6
Accessory skin tag	5	1.0
Sacral hypertrichosis	4	0.8
<b>7. Other</b>		
Umbilical granuloma	2	0.4
Ichthyosis	1	0.2

[Table/Fig-2]: Dermatological manifestations seen in the studied samples of neonates.

Socio demographic Variables (number)	Skin lesions (number)								
	Erythema toxicum neonatorum (172)			Physiological jaundice (165)			Mongolian spot (146)		
	n	%	p value	n	%	p value	n	%	p value
<b>Gender</b>			0.565			0.551			0.111
Male (296)	98	33.1		100	33.8		94	31.8	
Female (208)	74	35.6		65	31.2		52	25.0	
<b>Birth weight</b>			0.02			0.001			0.005
<2.5 (122)	31	25.4		63	51.6		23	18.9	
≥2.5 (382)	141	36.9		102	26.7		123	32.2	
<b>Mode of delivery</b>			0.606			0.04			0.791
Vaginal	99	33.2		87	52.7		85	28.5	
Caesarean	73	35.4		78	47.3		61	29.6	
<b>Gestation</b>			0.005			0.001			0.094
Preterm (59)	9	15.3		41	69.5		10	16.9	
Term (433)	158	36.5		121	27.9		132	30.5	
Post dated (12)	5	41.7		3	25.0		4	33.3	
<b>Race</b>			0.040			0.083			0.001
Aryan (284)	106	37.3		82	28.9		59	20.8	
Mongolian (183)	50	27.3		71	38.8		78	42.6	
Mixed (37)	16	43.2		12	32.4		8	21.6	
<b>Skin lesion (number)</b>	<b>Milia (119)</b>			<b>Epstein pearl (95)</b>			<b>Lanugo (88)</b>		
	n	%	p value	n	%	p value	n	%	p value
<b>Gender</b>			0.981		0.780			0.581	
Male	70	23.6		57	19.3		54	18.2	
Female	49	23.6		38	18.3		34	16.3	
<b>Birth weight</b>			0.492			0.596			0.001
<2.5	26	21.3		21	17.2		38	31.1	
≥2.5	93	24.3		74	19.4		50	13.1	
<b>Mode of delivery</b>			.352			0.018			0.154
Vaginal	66	22.1		46	15.4		58	19.5	
Caesarean	53	25.7		49	23.8		30	14.6	
<b>Gestation</b>			0.418			0.327			0.001
Preterm	17	28.8		8	13.6		31	52.5	
Term	98	22.6		86	19.9		55	12.7	
Post dated	4	33.3		1	8.3		2	16.7	
<b>Race</b>			0.480			0.001			0.090
Aryan	71	25.0		16	5.6		58	20.4	
Mongolian	42	23.0		76	41.5		23	12.6	
Mixed	6	16.2		3	8.1		7	18.9	

[Table/Fig-3]: Commonest skin lesions in association with study variables.

were seen in the sacral and lower lumbar areas and in a few, they were seen around the ankles.

[Table/Fig-3] depicts six of the commonest cutaneous lesions in association with various study variables.

## DISCUSSION

### Erythema toxicum neonatorum

Neonatal dermatoses are common occurrences and have been documented in various studies in different

countries [2,5-11]. The most frequently seen skin lesion in our context was Erythema Toxicum Neonatorum (ETN) (172; 34.1%). The frequency of this particular lesion varied from 1.3- 46.8% in other studies [12-17]. In our study, ETN was observed more commonly in males than in females, but no statistical significance could be found. In a study by Zagne et al., statistically significant female predominance was noted [18]. Though we were unable to establish a correlation between mode of delivery and ETN in our study, Ozlem et al., noted a

significant association between delivery via Caesarean section and this condition [10]. In contrast, Sadana et al., reported significantly higher ETN in babies who were delivered normally [17]. Regarding gestational age, we observed a statistically significant relationship between ETN and gestational age ( $p=0.005$ ). It was seen mostly in term babies. Boccardi et al., in their study established a similar positive correlation between maturity and ETN [19].

### Physiological Jaundice

Icterus, the second commonest skin change noted in our study, was seen in 165 (32.7%) of the neonates. We found a statistically significant relationship between gestational age, birth weight, mode of delivery and jaundice. Similar findings were seen in a study done by Sadana et al., where icterus had a positive correlation with low birth weight babies [17]. In another study by Jain et al., icterus was reported in 3.33% of the studied neonates [20].

Mongolian spot were observed in 146 (29.2%) neonates. The presence of Mongolian spot in neonates varied from 10.3-89% in previous studies [7,13,15,21-23]. We found a statistically significant relationship between birth weight and Mongolian spot; Sachadeva et al., have reported a higher number of Mongolian spot among babies with normal birth weights but statistical significance was not calculated [23]. In a study done in Zanjan, Iran, a significant relationship between gestational age and Mongolian spot was observed, however no such findings were evident in our study [1]. Mongolian spot has generally been more frequently seen in Asian, east Africans with lower numbers seen in Caucasians [13,17,22,23]. As all our sample population consisted of Asian babies, we were unable to make a similar observation, but we did find a statistically significant relationship between race and Mongolian spot in our present study with the highest numbers seen in babies of Mongolian descent.

### Milia

The presence of milia in newborns varies from 3-36% [12,24]. In our study it was seen in 119 (23.6%) of the newborns. We did not find any positive correlation of milia to any of our variables. Sachadeva et al., have mentioned that in their study a higher incidence of milia in term babies and those babies weighing more than 2500 gm, but statistical significance was not established [23].

### Epstein Pearl

Epstein pearl was noted in 95 (18.8%) of the 504 studied babies. Other studies found Epstein pearl to be the commonest skin lesion with incidence varying between 58.7-83% [9,23-25]. As the lesion is more common in caucasians and whites [7], it could explain the lower incidences seen in our particular setting.

We found the frequency of Epstein pearl to be more among term babies and babies with birth weight more than 2500gm. Similar findings were reported in studies done by Ahsan et al., Moosavi et al., and Sachadeva et al., [5,13,23]. Moosavi et al established a significant relationship between gestational age and Epstein pearl, but in our study, significant association could not be made between gestational age and Epstein pearl ( $p=0.327$ ) [5]. However, we did establish a statistically significant relationship between Epstein pearl and mode of delivery; similar outcome was seen in study done in Zanjan, Iran [1].

### Lanugo hair

The presence of lanugo hair was seen in 17.5% of the studied newborns. We observed a statistically significant relationship between lanugo hair and Low Birth Weight (LBW) and gestational age. Jain et al., and Sachadeva et al., have reported higher frequencies of lanugo hair in preterms and LBW babies, but p-value wasn't available to see for statistical significance. Sachadeva et al., also reported that lanugo was seen more commonly in babies born via vaginal delivery; we observed similar findings in our study but it wasn't statistically significant. In contradiction to our findings, Jain et al., saw lanugo hair more frequently in those born by caesarean section [20,23].

### Malaria

The percentage of malaria varied in different literatures, ranging from 1.7 – 28.3% [7,13,20,23]. Our numbers were higher (9.7%) than in the study done in American newborns where they reported it to be 1.7% [13,26]; this could be due to over-wrapping of babies which is a common practice in our country and use of fans in neonates is almost never seen in Nepal.

### Physiological desquamation

Desquamation was noted in 40 (7.9%) of the studied 504 neonates. We did not appreciate any significant correlation with any of the variables but it was noticed more in term babies. Findings of studies done by Haveri et al., Sadana et al., and Dash et al., revealed similar observations [7,15,17].

### Impetigo

Impetigo was observed in 17 (3.4%) of the neonates in the current study. This was relatively lower than in a study done in Pakistan (11.4%)[13], but slightly higher than seen in Iranian newborns where it was reported to be 1% [5]. In all of the seventeen cases of impetigo in our study, pus was sent for culture and sensitivity testing; eleven showed growth of *Staphylococcus aureus*; all the eleven cases were methicillin sensitive *Staphylococcus aureus*. Appropriate management for impetigo was given to the neonates and no further adverse events were detected.

## Nappy rash

Nappy rash in our study was comparatively lower (1.8%) than in a study done by Javed in Karachi where it was reported to be seen in 15.6% of the studied neonates [14]. The lower figures in our study could possibly be due to better care, frequent change of nappies and possibly climatic differences

## LIMITATION

The uses of new clothing's were not assessed in this study, which could play a part in some of the transient lesions seen. Also, as some of the babies were examined before the third day of life and some cases of ETN and icterus might have been missed since vaginal deliveries are discharged within 48 hours and the former conditions usually appears after the third day of life. One of the main strengths of this study was that the examination of the neonates was carried out by a single examiner and this greatly reduces the bias in the study.

## CONCLUSION

This study allowed us to see the different dermatoses seen in Nepalese neonates and to make correlation with different variables. The majority of the dermatological lesions seen in this study were all benign and transient. It is important as a paediatrician to recognize the different dermatoses, which then allows the paediatrician to appropriately proceed to initiate further evaluation or treatment or simply reassure the parents. Special attention must be given to those cases which has the potential for complications. As this is the first known study carried out in Nepal, we were unable to make comparisons with other studies in our country, but we hope that in the future, similar studies using a larger study population and utilising various additional variables are carried out to validate the correlations seen in this study.

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