

Original Research Article

Study of Cutaneous Lesions in Term Neonates in a Tertiary Care Hospital

Anuja Anna Varghese^{1*}, S. Srikanth^{2*}, D. Gunasekaran^{2**}, Najuk Mehta^{3*}

¹PostGraduate, ²Professor, ³Assistant Professor,
*Department of Dermatology Venerology Leprosy, **Department of Paediatrics,
Mahatma Gandhi Medical College and Research Institute, Pondicherry.

Corresponding Author: Anuja Anna Varghese

Received: 28/01/2016

Revised: 18/02/2016

Accepted: 05/03/2016

ABSTRACT

Introduction: Newborn period is described as the first 4 weeks of extra-uterine life. In comparison to the skin of adults, the skin and appendage of newborns are different. Majority of the neonatal cutaneous lesions do not require therapy as they may be physiological and transient. It is important to distinguish between benign dermatoses in newborns from more serious disorders with cutaneous manifestations. This will help in recognition of the lesion and allows the physician to proceed appropriately, reassure the parents and initiate further evaluation or treatment as necessary.

Materials and Methods: This was an institutional cross sectional study, conducted between February 2014 to January 2015. A total of 300 babies within 48 hours of life, born to a healthy mother were enrolled in this study. All term neonates satisfying the inclusion criteria were examined thoroughly in daylight to detect the morphology of skin lesions and findings were recorded.

Results: The most common lesion seen was Mongolian spot (38.0%) followed by Milia (27.7%), Miliaria rubra (7.0%), Epstein pearls (7.0%), Erythema toxicum neonatorum (5.0%), Miliaria crystallina (4.7%), Scaling (4.0%), Acne neonatorum (3.0%), Cutis marmorata (2.0%), Miliaria pustulosa (1.0%), Acrocyanosis (0.3%), Impetigo contagiosum (0.3%), Vernix caseosa (0.3%), Cradle cap (0.3%). There were 224(74.67%) and 39(13.0%) babies with one and two lesions respectively. The babies without any lesions were 37(12.33%).

Conclusion: Mongolian spots to be the commonest skin lesion observed in newborns irrespective of gender, gestational age, consanguinity, parity, type of delivery and socioeconomic status. The physiological lesions were more prevalent in newborns compared to pathological lesions.

Keywords: Neonate, Dermatoses, Mongolian spot, Milia.

INTRODUCTION

The first 28 days of extra-uterine life is known as the neonatal period. [1] In addition to providing the barrier thereby protecting the body from micro-organisms and injuries, the neonatal skin with the help of the underlying subcutaneous tissue provide thermoregulation, one of the vital event in this period. The skin lesions can be transient or self limiting. In order to arrive at a correct diagnosis and plan for adequate treatment it is essential to know clinical

features and etiopathogenesis of various lesions.

The neonate's skin and the appendages are slightly different from that of the adults; its thickness is only 40-60% of that of the adult skin. [2] Also, the intercellular attachment is weak and sweat production is less, thereby predisposing the skin to various dermatoses. In addition, the skin of the "Pre-term babies" (babies born before 37 completed weeks of gestation) are much more thin and soft and hence at higher

risk for injury; the loss of subcutaneous fat in the “Post-term babies” (babies born after 42 completed weeks) make them much more vulnerable to heat loss. [3]

Majority of the neonate’s skin lesions are physiological and transient but may mimic a serious skin problem. [4] Hence the knowledge about the prevalence and the clinical features of the common dermatoses become essential as it may give confidence to the treating physician and thereby unnecessary investigations can be avoided.

The prevalence of the Neonatal cutaneous lesions as reported by various authors vary from 57% to 99.3% worldwide; most of these studies have been done with emphasis on a particular type of disease or a particular time period of the neonates. [5-8]

Except few reports, hardly there is any data from south India. Hence, it was planned to conduct the study to find out the prevalence and pattern of the cutaneous lesions appeared in neonates within 48 hours of birth in our hospital.

Aims and objectives

1. To study the various patterns of cutaneous lesions in neonates within 48 hours of life.
2. To estimate the prevalence of both physiological and pathological lesions in neonates within 48 hours of life.

MATERIALS AND METHODS

This was an institutional cross sectional study, which was conducted at the Mahatma Gandhi Medical College and Research Institute Hospital. The Institutional Medical Ethics Committee approved this study. From February 2014 to January 2015 we enrolled 300 babies within 48 hours of life, born to a healthy mother to participate in this study. Written informed consent was obtained from the parents and detailed clinical and dermatological examination including oral cavity, genitalia, scalp, hair & nails was done to all newborns to detect any physiological and pathological lesions.

Inclusion criteria

- All babies within 48 hours of life born to a healthy mother

Exclusion criteria

- All preterm babies (<36 weeks of gestation)
- Post term babies (>42 weeks of gestation)
- Newborns kept in neonatal intensive care unit
- Babies born by instrumental delivery
- Any history of systemic illness or infection to the mother.

All term neonates satisfying the inclusion criteria were examined thoroughly in daylight to detect the morphology of skin lesions and findings were recorded. In all instance diagnosis was made by clinical examination. Information regarding the bio-data of the newborn like sex, birth weight and gestational age and in specific to the lesion, if any was gathered by interviewing the parents. Information regarding the maternal age, parity and consanguinity and mode in which delivery took place were recorded. The Socio-economic status of newborn was classified according to modified B. G. Prasad classification 2014. [9]

It is based on the following

- Per capita monthly income = total monthly income of the family/total members of family.
- All India Average Consumer Price Index (AICPI)
- Multiplication factor or Correction factor

Multiplication factor is derived by multiplying the linking factor between 1960 and 1982 which is 4.63 and the linking factor between 1982 and 2001 which is 4.93 (as 2001 is considered as the base year) and AICPI for the base year 2014 which is 254 (as of January 2014). The product thus obtained is divided by 100. In the next step the product is multiplied by the income limits of original BG Prasad’s classification. Thus the new income limits are obtained after

taking into consideration, the correction factor and the latest AICPI.

Socioeconomic class	B.G. Prasad SES (1961) ^[10]	Modified Prasad Classification (2014) ^[9]
Upper class(I)	100 and above	5357 and above
Upper middle class(II)	50 - 99	2652 - 5356
Middle class(III)	30 - 49	1570 - 2651
Lower middle class(IV)	15 - 29	812 - 1569
Lower class(V)	Less than 15	Less than 811

History of the maternal illnesses like fever, respiratory tract infection, viral infections, Diabetes Mellitus, Hypertension during the period of pregnancy were noted and babies born to them were excluded from the study. No specific investigations or intervention were conducted on the newborns. Clinical photographs were taken with the consent of parents by masking the identity of the baby.

Statistical analysis

Statistical analysis was carried out using SPSS version 19.0 (IBM SPSS, US) software with Regression Modules installed. All patient identifiable numbers and information was replaced by anonymous numbers. Descriptive analyses were reported as mean and standard deviation of continuous variables. Percentage analysis was performed to determine the prevalence of lesion among newborns.

RESULTS

A total of 300 newborns were enrolled in the study, out of which 155 (51.7%) were males and 145 (48.3%) were females.

The age of mothers of newborns studied were analysed. It was found that the minimum age was 18 years and maximum 31 years with mean of 23.67 and standard deviation of 2.792.

The number of mothers with each parity in our study was 138(46.0%), 123(41.0%), 39(13.0%) for parity1 (P1), parity2 (P2), parity3 (P3) respectively.

The study showed consanguineous marriages 29(9.7%) and non consanguineous marriages 271(90.3%).

The gestational age in weeks showed minimum of 37 weeks and maximum of 41 weeks with mean value of 38.48 and standard deviation of 0.941.

The birth weight (Kg) of newborns analysed showed that the minimum weight was 2.6 kilograms and maximum 3.3 kilograms with mean of 2.839 and standard deviation of 0.163.

The socioeconomic status analysis in our study showed that study population is distributed among three classes as Class II, Class III, Class IV of Prasad's classification with 119(39.7%), 128(42.7%), 53(17.7%) of newborns in each class respectively.

The type of delivery in our study showed 244(81.3%) Vaginal delivery (VD) and 56(18.7%) Lower segment caesarean section (LSCS) cases.

The study analysis showed that the regions of involvement of lesions in newborns were Back 120(40.0%), Buttocks 76(25.3%), Nose 72(24.0%), Trunk 34(11.33%), Forehead 33(11.0%), Chest 29(9.67%), Chin 26 (8.67%), Oral cavity 21(7.0%), Cheek 19(6.33%), Upper limb 19(6.33%), Lower limb 18(6.0%), Vertex 2(0.67%), Fingers 1(0.33%), Toes 1(0.33%).

The lesions seen in our study were Mongolian spot 114(38.0%), Milia 83(27.7%), Miliaria rubra 21(7.0%), Epstein pearls 21(7.0%), Erythema toxicum neonatorum 15(5.0%), Miliaria crystallina 14(4.7%), Scaling 12(4.0%), Acne neonatorum 9(3.0%), Cutis marmorata 6(2.0%), Miliaria pustulosa 3(1.0%), Acrocyanosis 1(0.3%), Impetigo contagiosum 1(0.3%), Vernix caseosa 1(0.3%), Cradle cap 1(0.3%).

There were 224(74.67%) and 39(13.0%) babies with one and two lesions respectively. The babies without any lesions were 37(12.33%).

The comparison of gender with the type of lesions in our study showed, Mongolian spot 63(46.30%), Milia

42(30.90%), Miliaria rubra 12(8.80%), Epstein pearls 11(8.10%), Erythema toxicum neonatorum 11(8.10%), Miliaria crystallina 7(5.10%), Scaling 4(2.90%), Acne neonatorum 3(2.20%), Miliaria pustulosa 3(2.20%), Cutis marmorata 2(1.50%), Impetigo contagiosum 1(0.70%), Vernix caseosa 1(0.70%), Cradle cap 1(0.70%) in male babies.

In female babies the lesions seen were Mongolian spot 51(40.20%), Milia 41(32.30%), Miliaria rubra 9(7.10%), Epstein pearls 10(7.90%), Erythema toxicum neonatorum 4(3.10%), Miliaria crystallina 7(5.50%), Scaling 8(6.30%), Acne neonatorum 6(4.70%), Cutis marmorata 4(3.10%), Acrocyanosis 1(0.80%).

In our study lesions seen in babies born out of consanguinous marriage were Milia 13(52.0%), Mongolian spot 9(36.0%), Miliaria rubra 4(16.0%), Erythema toxicum neonatorum 2(8.0%), Acne neonatorum 2(8.0%), Scaling 1(4.0%) and Epstein pearls 1(4.0%). In babies born out of non consanguinous marriage the lesions seen were, Mongolian spot 105(44.10%), Milia 70(29.40%), Epstein pearls 20(8.40%), Miliaria rubra 17(7.10%), Miliaria crystallina 14(5.90%), Erythema toxicum neonatorum 13(5.50%), Scaling 11(4.60%), Acne neonatorum 7(2.90%), Cutis marmorata 6(2.50%), Miliaria pustulosa 3(1.30%), Acrocyanosis 1(0.40%), Impetigo contagiosum 1(0.40%), Vernix caseosa 1(0.40%), Cradle cap 1(0.40%).

In our study on comparing the parity and type of lesions it showed that in first parity there were Mongolian spots 50(42.70%), Milia 33(28.20%), Erythema toxicum neonatorum 18(6.80%), Miliaria rubra 11(9.40%), Epstein pearls 8(6.80%), Miliaria crystallina 8(6.80%), Cutis marmorata 4(3.40%), Scaling 4(3.40%), Acne neonatorum 4(3.40%), Miliaria pustulosa 1(0.90%) and Acrocyanosis 1(0.90%).

In second parity the lesions were Mongolian spot 46(42.20%), Milia 36(33.0%), Miliaria rubra 9(8.20%), Epstein

pearls 8(7.20%), Erythema toxicum neonatorum 6(5.50%), Miliaria crystallina 5(4.60%), Scaling 6(5.50%), Acne neonatorum 4(3.70%), Cutis marmorata 2(1.80%), Miliaria pustulosa 1(0.90%), Impetigo contagiosum 1(0.9%), Vernix caseosa 1(0.90%) and Cradle cap 1(0.90%).

In third parity the lesions were Mongolian spot 18(48.60%), Milia 14(37.80%), Epstein pearls 5(13.50%), Scaling 2(5.40%), Miliaria rubra 1(2.70%), Erythema toxicum neonatorum 1(2.70%), Miliaria crystallina 1(2.70%), Acne neonatorum 1(2.70%) and Miliaria pustulosa 1(2.70%).

In our study babies born out of vaginal delivery showed lesions such as Mongolian spot 101(47.40%), Milia 69(32.40%), Miliaria rubra 19(8.90%), Miliaria crystallina 13(6.10%), Epstein pearls 12(5.60%), Scaling 8(3.80%), Erythema toxicum neonatorum 7(3.30%), Cutis marmorata 5(2.20%), Acne neonatorum 3(1.40%), Miliaria pustulosa 3(1.40%), Impetigo contagiosum 1(0.50%) and Cradle cap 1(0.50%). In Lower segment caesarean section(LSCS) the lesions seen in newborns were, Mongolian spot 13(26.0%), Milia 14(28.0%), Epstein pearls 9(18.0%), Erythema toxicum neonatorum 8(16.0%), Acne neonatorum 6(12.0%), Scaling 4(8.0%), Miliaria rubra 2(4.0%), Miliaria crystallina 1(2.0%), Cutis marmorata 1(2.0%), Acrocyanosis 1(2.0%) and Vernix caseosa 1(2.0%).

In our study the correlation of maternal age with the type of lesions were as follows.

Among the newborns, there were Mongolian spot 2(50.0%), Milia 1(25.0%) and Epstein pearls 1(25.0%) with mothers age less than 20 years.

Table 1: Maternal age distribution

Maternal age in years	Count	Column N %
Less than 20	6	2.0%
20-24 years	182	60.7%
25-29 years	103	34.3%
>=30 years	9	3.0%
Total	300	100.0%

Table 2: Consanguinity

	Count	Column N %
Consanguinous	29	9.7%
Non-consanguinous	271	90.3%
Total	300	100.0%

In 20-24 years of maternal age group the lesions in newborns were Mongolian spot 68(43.30%), Milia 46(29.30%), Miliaria rubra 14(8.90%), Epstein pearls 10(6.40%), Erythema toxicum neonatorum 9(5.70%), Miliaria crystallina 9(5.70%), Acne neonatorum 7(4.50%), Scaling 6(3.80%), Cutis marmorata 6(3.80%), Miliaria pustulosa 3(1.30%), Acrocyanosis

1(0.60%) and Impetigo contagiosum 1(0.60%).

Table 3: Distribution of lesions on basis of regions involved

Region*	Count	Column %
Back	120	40.00%
Trunk	34	11.33%
Oral cavity	21	7.00%
Buttocks	76	25.33%
Chest	29	9.67%
Chin	26	8.67%
Nose	72	24.00%
Cheek	19	6.33%
Vertex	2	0.67%
Upper limb	19	6.33%
Lower limb	18	6.00%
Fingers	1	0.33%
Toes	1	0.33%
Forehead	33	11.00%

Table 4: Correlation of maternal age and type of lesions

Type of lesions	Maternal Age							
	Less than 20		20-24 years		25-29 years		>=30 years	
	Count	Column %	Count	Column %	Count	Column %	Count	Column %
Acrocyanosis	0	0.00%	1	0.60%	0	0.00%	0	0.00%
Mongolian spot	2	50.00%	68	43.30%	39	41.90%	5	55.60%
Milia	1	25.00%	46	29.30%	34	36.60%	2	22.20%
Erythema toxicum neonatorum	0	0.00%	9	5.70%	5	5.40%	1	11.10%
Miliaria crystallina	0	0.00%	9	5.70%	5	5.40%	0	0.00%
Miliaria Rubra	0	0.00%	14	8.90%	7	7.50%	0	0.00%
Miliaria pustulosa	0	0.00%	2	1.30%	0	0.00%	1	11.10%
Impetigo contagiosum	0	0.00%	1	0.60%	0	0.00%	0	0.00%
Cutis marmorata	0	0.00%	6	3.80%	0	0.00%	0	0.00%
Acne neonatorum	0	0.00%	7	4.50%	2	2.20%	0	0.00%
Vernix caseosa	0	0.00%	0	0.00%	1	1.10%	0	0.00%
Epstein pearls	1	25.00%	10	6.40%	9	9.70%	1	11.10%
Scaling	0	0.00%	6	3.80%	6	6.50%	0	0.00%
Cradle cap	0	0.00%	0	0.00%	1	1.10%	0	0.00%
Total	4	1.52%	157	59.70%	93	35.36%	9	3.42%

Table 5: Correlation of socioeconomic class and type of lesions

Type of lesions	Socioeconomic status					
	II		III		IV	
	Count	Column %	Count	Column %	Count	Column %
Acrocyanosis	0	0.00%	1	0.90%	0	0.00%
Mongolian spot	39	36.80%	54	49.10%	21	44.70%
Milia	42	39.60%	30	27.30%	11	23.40%
Erythema toxicum neonatorum	7	6.60%	4	3.60%	4	8.50%
Miliaria crystallina	5	4.70%	5	4.50%	4	8.50%
Miliaria Rubra	8	7.50%	8	7.30%	5	10.60%
Miliaria pustulosa	2	1.90%	1	0.90%	0	0.00%
Impetigo contagiosum	0	0.00%	1	0.90%	0	0.00%
Cutis marmorata	2	1.90%	3	2.70%	1	2.10%
Acne neonatorum	7	6.60%	1	0.90%	1	2.10%
Vernix caseosa	0	0.00%	0	0.00%	1	2.10%
Epstein pearls	7	6.60%	11	10.00%	3	6.40%
Scaling	3	2.80%	8	7.30%	1	2.10%
Cradle cap	1	0.90%	0	0.00%	0	0.00%
Total	106	40.30%	110	41.83%	47	17.87%

In 25-29 years of maternal age the lesions in newborns were Mongolian spot 39(41.90%), Milia 34(36.60%), Epstein pearls 9(9.70%), Miliaria rubra 7(7.50%), Scaling 6(6.50%), Erythema toxicum neonatorum 5(5.40%), Miliaria crystallina 5(5.40%), Acne neonatorum 2(2.20%),

Vernix caseosa 1(1.10%) and Cradle cap 1(1.10%). In maternal age more than or equal to 30 years, the lesions were Mongolian spot 5(55.60%), Milia 2(22.20%), Erythema toxicum neonatorum 1(11.10%), Miliaria pustulosa 1(11.10%) and Epstein pearls 1(11.10%).

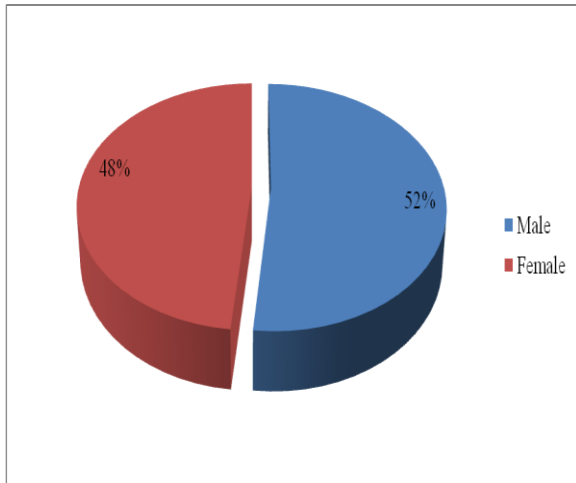


Figure 1: Gender distribution

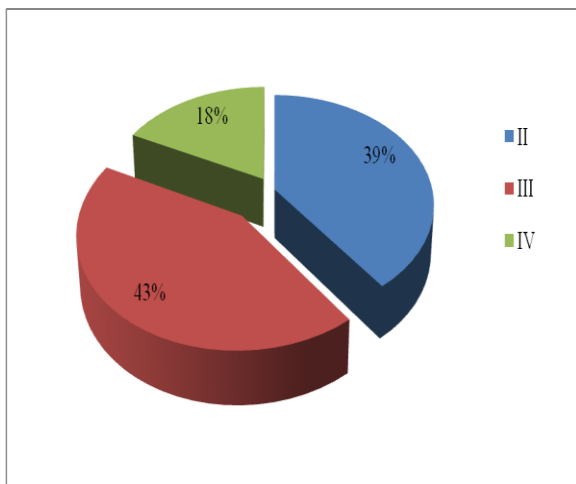


Figure 2: Socioeconomic class distribution

In our study the newborns of socioeconomic class II had lesions like Milia 42(39.60%), Mongolian spot 39(36.80%), Miliaria rubra 8(7.50%), Epstein pearls 7(6.60%), Erythema toxicum neonatorum 7(6.60%), Acne neonatorum 7(6.60%), Miliaria crystallina 5(4.70%), Scaling 3(2.80%), Cutis marmorata 2(1.90%), Miliaria pustulosa 2(1.90%) and Cradle cap 1(0.90%). In newborns of socioeconomic class III the lesions seen were Mongolian spot 54(49.10%), Milia 30(27.30%), Epstein pearls 11(10.0%), Miliaria rubra 8(7.30%), Scaling 8(7.30%), Miliaria crystallina 5(4.50%), Erythema toxicum neonatorum 4(3.60%), Cutis marmorata 3(2.70%), Acne neonatorum 1(0.90%), Miliaria pustulosa 1(0.90%), Acrocyanosis 1(0.90%) and Impetigo contagiosum 1(0.90%). In newborns of socioeconomic class IV the lesions seen

were Mongolian spot 21(44.70%), Milia 11(23.40%), Miliaria rubra 5(10.60%), Erythema toxicum neonatorum 4(8.50%), Miliaria crystallina 4(8.50%), Scaling 1(2.10%), Epstein pearls 3(6.40%), Acne neonatorum 1(2.10%) and Cutis marmorata 1(2.10%).

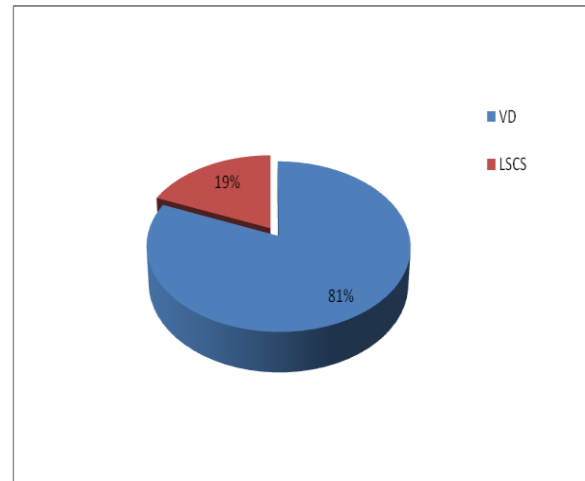


Figure 3: Type of delivery

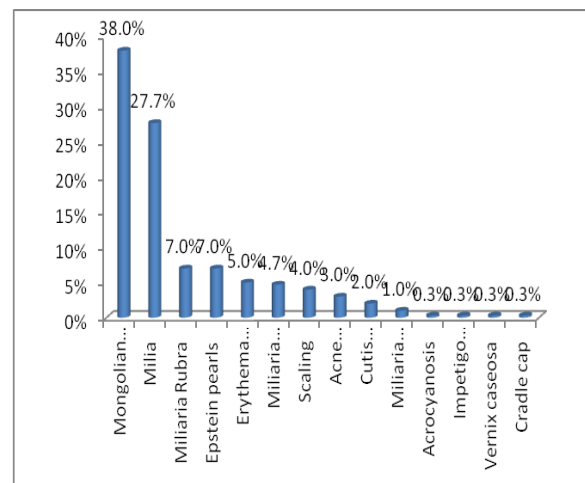


Figure 4: Type of lesions

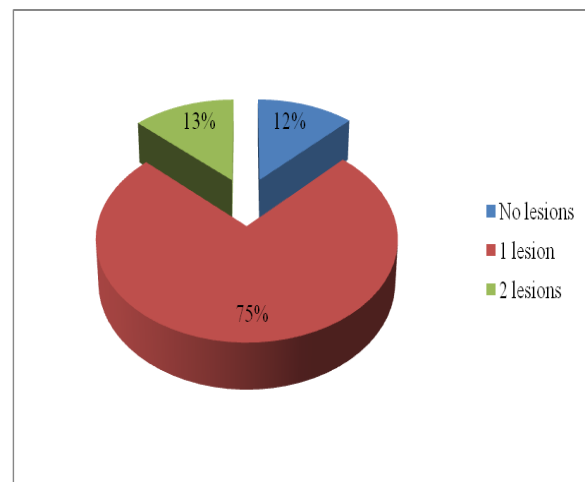


Figure 5: Number of lesions

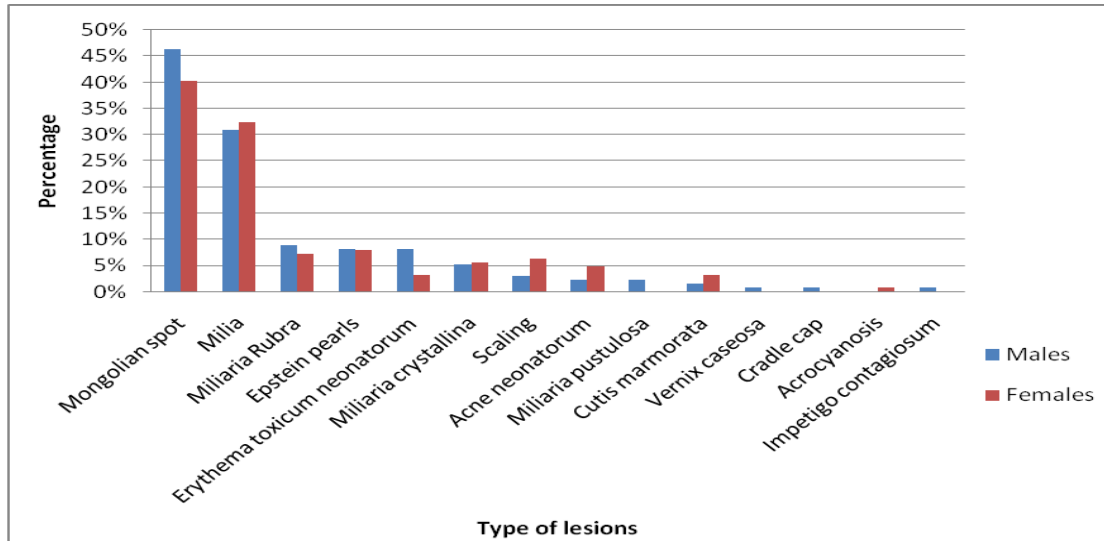


Figure 6: Correlation of gender and type of lesions

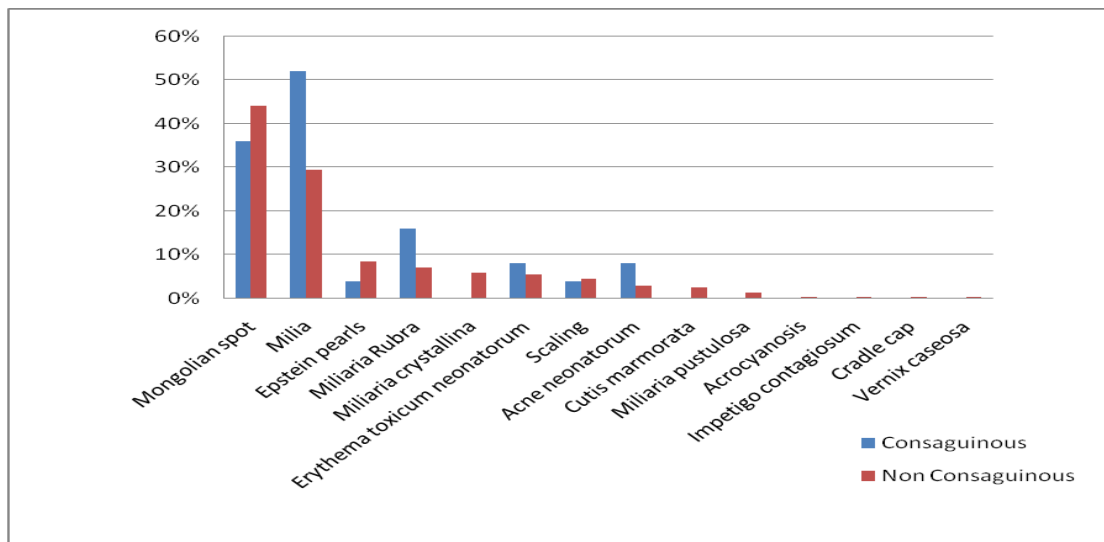


Figure 7: Correlation of consanguinity and type of lesions

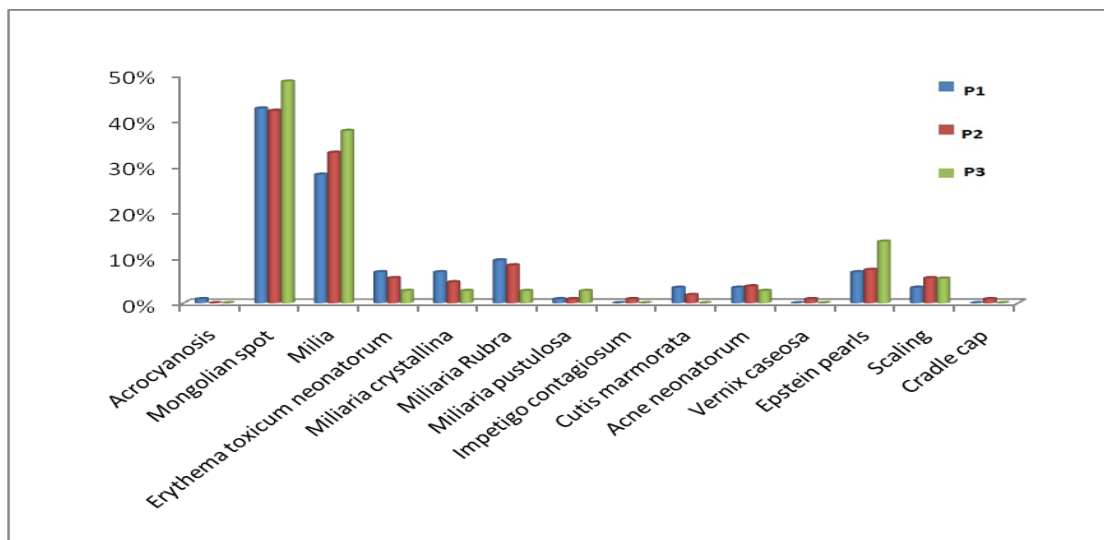


Figure 8: Correlation of parity and type of lesions

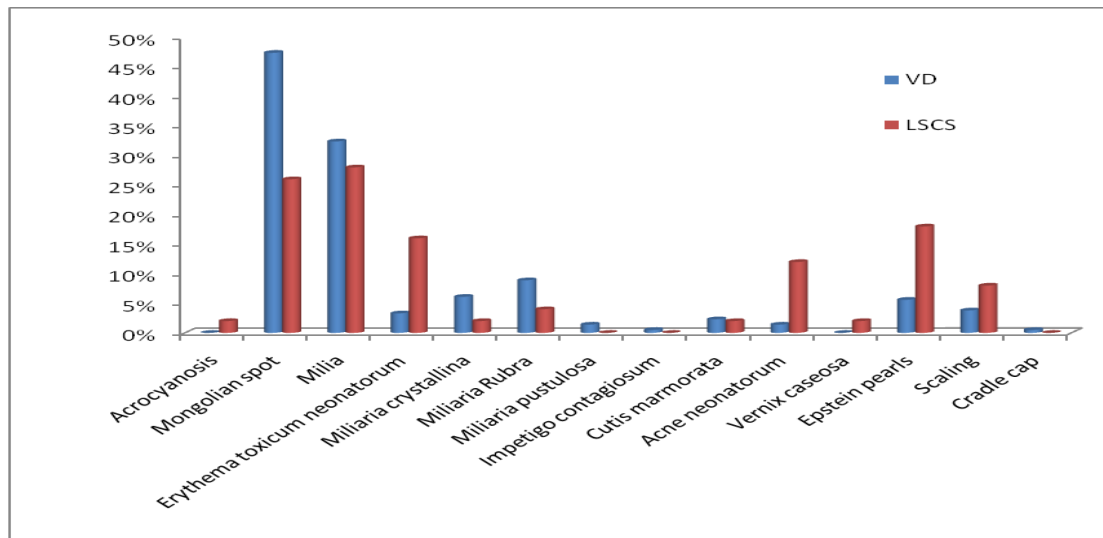


Figure 9: Correlation of type of delivery and lesions



Mongolian Spot



Milia



Miliaria-Rubra with Crystallina



Erythema Toxicum Neonatorum

DISCUSSION

This was an institutional cross sectional study, which was conducted at the Mahatma Gandhi Medical College and Research Institute Hospital, Pondicherry. After getting approval from the Institutional Medical Ethics Committee the study was conducted from February 2014 to January

2015 in which 300 term babies within 48 hours of life born to a healthy mother were enrolled. After obtaining written informed consent from the parents, a detailed clinical and dermatological examination including oral cavity, genitalia, scalp, hair & nails was done to all newborns to detect any physiological and pathological lesions.

The first one month of extra uterine life is termed as neonatal period. This is the period when skin of newborns 'interface' with the outside world. At birth, the newborn is exposed to a new environment of air, temperature changes, friction and microbes leaving the warm, sterile fluid medium of the uterus. [11]

Structure and function of skin in newborn depend on the gestational age at which birth occurred. There are various other factors which influence the pattern of cutaneous changes in neonate such as hereditary, race, maternal health, hygiene, socioeconomic status, customs and modes of delivery. [11]

Neonatal dermatoses are extremely frequent, such that one could affirm they are present in almost every newborn if one considers all cutaneous alternations. [12]

Among the 300 term newborns enrolled in our study, there were 155(51.7%) males and 145(48.3%) females.

Maternal age distribution

Our study showed maternal age ranging from 18 to 31 years. The maximum number was in an age group of 20-24 years which had 182(60.7%) mothers. The other maternal age groups like 25-29 years had 103(34.3%). There were 9(3.0%) mothers with age more than 30 years and 6(2.0%) mothers with age less than 20 years. The mean age was 23.67 with standard deviation of 2.792.

On comparing our study to another study done by Sachdeva M et al [13] it was found that the maximum number mothers were in the age group of 21-25 years which was 262(52.4%) it was also observed that mothers of less than 20 years of age were 129(25.8%) and 109(21.8%) mothers were in the age group of 26-40 years. But the study conducted by ML Kulkarni et al [14] it was shown that the babies born to mothers younger than 20 years 97.5% had skin lesions. When the maternal age was more than 30 years there were 97.4% babies with skin lesions. The skin lesions in babies born to mothers of 20 to 30 years of age were only 89.9%.

Parity distribution

In our study the maximum number of mothers was of parity 1 that is 138(46.0%). This was similar to the study done by Ekiz O et al [15] in which they also had maximum number of mothers of 1st order parity which was 43.4% and least in 2nd order parity which was 28.1%. But our study showed 123(41.0%), 39(13.0%) mothers with parity 2 and parity 3 respectively. In another study by Sachdeva M et al [13] there were 63% multigravida and 37% primigravida mothers enrolled in the study.

Consanguinity

The maximum number of babies in our study was born of non consanguineous marriage 271(90.30%). There were only 29(9.7%) babies born of consanguineous marriage.

Gestational age

Our study showed gestational age from range of 37 to 41 weeks with mean value of 38.48 and standard deviation of 0.941. The study conducted by Kulkarni M L et al [14] of the total of 2221 babies studied, 85.4% were term babies and 11.11% were preterm babies. In our study as the inclusion criteria had only term babies, the preterm were not taken into consideration.

Birth Weight

The birth weight of newborns ranged from 2.6 kilograms to 3.3 kilograms with mean 2.839 and standard deviation 0.163. In the study by Kulkarni M L et al 94.9% babies weighing more than 2.5 kg had various skin changes. There were 90.9% of babies weighing less than 2.5 kg with skin changes. [14]

Socioeconomic class

In our study the socioeconomic class analysis showed maximum number of newborns in Class III 128(42.7%). The other socioeconomic class had 119(39.7%), 53(17.7%) in Class II and Class IV respectively.

Type of delivery

Among the newborns studied maximum were born of Vaginal delivery

244(81.3%) and 56(18.7%) of Lower segment caesarean section.

Distribution of lesions

Our study showed that maximum number of newborns had lesions in the Back 120(40.0%). The other areas involved in order of decreasing frequency were Buttocks, Nose Trunk, Forehead, Chest, Chin, Oral cavity, Cheek, Upper limb, Lower limb, Vertex, Fingers and Toes. Only 1(0.33%) had involvement of Fingers and Toes. There were no lesions in 37(12.33%) newborns enrolled in the study.

Type of lesions

Mongolian spots were the lesion seen in majority of newborns 114(38.0%). The other lesions seen in descending order were Milia, Miliaria rubra, Epstein pearls, Erythema toxicum neonatorum, Miliaria crystallina, Scaling, Acne neonatorum, Cutis marmorata, Miliaria pustulosa, Acrocyanosis, Impetigo contagiosum, Vernix caseosa and Cradle cap. The lesions like Acrocyanosis, Impetigo contagiosum, Vernix caseosa and Cradle cap were each seen in only 1(0.3%) newborn.

The studies conducted in various countries showed the prevalence of Mongolian spots in newborns with marked racial difference. In the literature, various rates (0.1% in Finland, 11.8% in Arabs, 6.65% in Jewish, 62.2% in Indian, 71.3% in Iran, 81.5% in Japan) have been reported. [1,16,7,8,17] Studies demonstrated that Mongolian spots are significantly more common among Asian and black neonates. The difference may be due to racial variation and a greater degree of natural pigmentation and persistence of melanocytes in the affected area.

Author	Prevalence of Mongolian spots
Nobby B et al (1992) [18]	68.8%
Kulkarni M L et al (1996) [14]	72%
Sachdeva M et al (2002) [13]	60.2%
Gokdemir G et al(2009) [6]	20.1%
Zagne V et al (2011) [19]	50.74%

Our study had Mongolian spots as the major lesion seen. This observation was similar to the studies done by various authors like Shih IH et al, [20] Patil S et al.

[21] Dash K et al [22] and Prusachatkunakon et al [23] where they also found higher frequency of Mongolian spots among newborns. But studies by Dahiyat K A A et al [24] showed the incidence of Mongolian spots (78%) in their newborns next only to an observation of Epstein pearls (83%). In other studies by Gokdemir et al [6] and Shajari et al [25] also showed Epstein pearls to be the commonest lesions. In our study the prevalence of Epstein pearls were only 7.0%.

Number of lesions

There were 224(74.67%) and 39(13.0%) babies with one and two lesions respectively. The babies without any lesions were 37(12.33%).

Correlation of gender and type of lesions

In our study male newborns (51.7%) outnumbered female newborns (48.3%). It was similar to the studies conducted by Sachdeva et al, [13] Kulkarni M L et al. [14] Nobby B et al [18] in which cutaneous lesions were more prevalent in male newborns.

Among the males most common lesion was Mongolian spots (46.30%). The other common lesions seen in our male babies were Milia (30.90%), Miliaria rubra (8.80%), Epstein pearls (8.10%) and Erythema toxicum neonatorum (8.10%). This was in accordance to the studies done earlier like Shajari et al, [25] Sachdeva et al, [13] Tayeh RI et al [26] and Ahsan U et al. [27] The lesions like Impetigo contagiosum, Vernix caseosa and Cradle cap were seen in only 1(0.70%) newborn each. The lesion Acrocyanosis was not seen among the males studied.

Among the female newborns, the most common lesion was also Mongolian spots (40.20%). The other common lesions seen were also similar to that observed in male babies which were Milia (32.30%), Miliaria rubra (7.10%) and Epstein pearls (7.90%). But in another study done by Dahiyat K A A et al, [24] the most common lesions seen in females were Epstein pearls and café au lait spots. In our study the lesion, Acrocyanosis was found only in

0.80% newborns. The lesions absent in female newborns were Miliaria pustulosa, Impetigo contagiosum, Vernix caseosa and Cradle cap.

Correlation of consanguinity and type of lesions

In our study among the 29(9.7%) babies born of consanguineous marriage there were maximum numbers of babies with Milia (52.0%). The lesions like Epstein pearls and Scaling were seen in only (4.0%). The lesions not seen in these babies were Miliaria crystallina, Cutis marmorata, Miliaria pustulosa, Acrocyanosis, Impetigo contagiosum, Vernix caseosa and Cradle cap.

In babies born of non consanguineous marriage which were 271(90.3%), the lesion seen in maximum number of babies was Mongolian spot 105(44.10%). The lesions like Acrocyanosis, Impetigo contagiosum, Vernix caseosa and Cradle cap were only 0.40% each. But studies by Kulkarni M L et al [14] showed that Mongolian spots, Millia, Epstein pearls and Erythema toxicum were significantly higher in babies born to consanguineous couples. The difference may be due to the less number of consanguineous marriages occurring at present.

Correlation between parity and type of lesions

There were mothers of parity one, two and three in our study. The major lesion found was Mongolian spots with 42.70%, 42.20%, 48.60% in parity one, two and three respectively.

The least common lesion found in babies of mothers with parity one were Miliaria pustulosa and Acrocyanosis with only 0.90%. The lesions like Impetigo contagiosum, Vernix caseosa and Cradle cap were not seen in these babies.

In babies born of mothers in parity two, the lesions like Miliaria pustulosa, Impetigo contagiosum, Vernix caseosa and Cradle cap were only 0.90%. Acrocyanosis was not seen in these newborns.

The newborns of mothers with parity three had Acne neonatorum, Miliaria pustulosa, Erythema toxicum neonatorum and Miliaria crystallina as the least common lesion which is 2.70%. The lesions absent in these babies were Cutis marmorata, Acrocyanosis, Impetigo contagiosum, Vernix caseosa and Cradle cap.

In a study by Sadana D J et al [28] Mongolian spots was the most common lesion found in babies born to multipara women. In a study by Zagne V et al [19] it was found that Hypertrichosis Lanuginosa was the most common lesion in babies born to mothers of all parities followed by Mongolian spots. Our study showed Mongolian spot as most common lesion in both primipara and multipara.

Correlation between type of delivery and lesions

In our study the lesions like Mongolian spot (47.40%), Milia (32.40%), Miliaria rubra (8.90%) were common in babies born out of vaginal delivery. In Lower segment caesarean section(LSCS) the common lesions seen in newborns were Mongolian spot(26.0%), Milia (28.0%), Epstein pearls (18.0%), Erythema toxicum neonatorum (16.0%). In our study the most common lesion in both types of deliveries was Mongolian spots. But in a study by Gokdemir G et al, [6] Erythema toxicum neonatarum (ETN) was more frequent in the cesarean delivery group and Epstein's pearls; sebaceous hyperplasia and desquamation were more frequent in the vaginal delivery group. In other studies like Ahsan U et al [27] and Sachdeva M et al [13] there were no significant correlation between type of delivery and the lesions.

Correlation of maternal age and type of lesions

In mothers of all age group Mongolian spots and Milia were the common lesions found in our study. Among the age groups studied Mongolian spots were more common in babies born to mothers of less than 20 years of age (50.0%) and age more than or equal to 30 years (55.60%). But babies born to mothers of 25-

29 years of age had less frequency of Mongolian spots (41.90%) compared to other age groups. This was similar to the study done by Kulkarni M et al ^[14] in which the babies born to mothers in the age group 20 to 30 years showed the skin changes less frequently.

Correlation of socioeconomic status and type of lesions

The type of lesions when compared to socioeconomic status obtained on basis of Prasad's socio-economic status classification showed Mongolian spots and milia as the common lesion found in all class. There was no babies of socioeconomic status class I and class V.

The newborns of socioeconomic class III and class IV had Mongolian spot 49.10% and 44.70% respectively. There was less number of newborns with Mongolian spot (36.80%) in socioeconomic class II. This was similar to study by Kulkarni M L et al ^[14] in which the majority of the newborns with cutaneous lesions belonged to the lower socioeconomic strata.

Our study tried to evaluate the prevalence of skin lesions during the neonatal period and to determine its correlations with gender, gestational age, consanguinity, parity type of delivery and socioeconomic status. The study showed Mongolian spots to be the commonest skin lesion observed in newborns irrespective of gender, gestational age, consanguinity, parity, type of delivery and socioeconomic status. The pathological lesions were less prevalent in our study. The various skin lesions, physiologic or pathologic, are present at birth and a number of others appear during the neonatal period. It is very important to differentiate the physiologic skin lesions from the pathologic ones. It will help in avoiding unnecessary therapy to neonates and patients can be assured of good prognosis of these skin manifestations.

CONCLUSION

1. Based on the results and the methodology employed, we have concluded that: Mongolian spots to be

the commonest skin lesion observed in newborns irrespective of gender, gestational age, consanguinity, parity, type of delivery and socioeconomic status.

2. The physiological lesions were more prevalent in newborns compared to pathological lesions.

REFERENCES

1. Moosavi Z, Hosseini T. One year survey of cutaneous lesions in 1000 consecutive Iranian newborns. *Pediatr Dermatol* 2006; 23:61-3.
2. Chang MW, Orlow SJ. Neonatal, pediatric and adolescent dermatology. *Fitzpatrick's Dermatology in Medicine*. Eds. Freedberg IM, Eisen AZ, Wolff K, Austen KF, Goldsmith LA, Katz SI. 6th ed. New York, McGraw-Hill Co, 2003; 1366-1386. In.
3. Weston WJ, Lane AT. Neonatal Dermatology. In: Freedberg IM, Eisen AZ, Wolff K, Austen KF, Goldsmith LA, Katz IS et al, editors. *Dermatology in General Medicine*. 5th ed. New York. McGraw Hill; 1999. In.
4. Treadwell PA. (1997) Dermatoses in newborns. *Am Fam Physician*; 56(2): 443-50.
5. Ferahbas A, Utas S, Akcakus M, Gunes T, Mistik S. Prevalence of cutaneous findings in hospitalized neonates: A prospective observational study. *Pediatr Dermatol* 2009; 26:139-42.
6. Gokdemir G, Erdogan HK, Koslu A, Baksu B. Cutaneous lesions in Turkish neonates born in a teaching hospital. *Indian J Dermatol Venereol Leprol* 2009; 75:638.
7. M. Kahana, M. Feldman, Z. Abudi, and S. Yurman, "The incidence of birthmarks in Israeli neonates," *International Journal of Dermatology*, vol. 34, no. 10, pp. 704-706, 1995.
8. Hidano A, Purwoko R, Jitsukawa K. Statistical survey of skin changes in Japanese neonates. *Pediatr Dermatol* 1986; 3:140-4.
9. Mangal A, Kumar V, Panesar S, Talwar R, Raut D, Singh S. Updated BG Prasad socioeconomic classification, 2014: A commentary. *Indian J Public Health* 2015; 59:42-4.

10. Prasad BG. Social classification of Indian families. *J Indian Med Assoc* 1961; 37:250-1.
11. Stalder JF. Skin care of the newborn. In: Harper J, Oranje P, Prose NS. *Textbook of paediatric dermatology*. Edinburgh: Blackwell Science; 2000. Vol 1. P. 48-49,130.
12. Pereira LB, Gontijo B, Silva CM. Dermatoses neonatais. *An Bras Dermatol* 2001; 76:505-37.
13. M. Sachdeva, S. Kaur, M. Nagpal, and S. Dewan, "Cutaneous lesions in new born," *Indian Journal of Dermatology, Venereology and Leprology*, vol. 68, no. 6, pp. 334-337, 2002.
14. M. L. Kulkarni and R. Singh, "Normal variants of skin in neonates," *Indian Journal of Dermatology, Venereology and Leprology*, vol. 62, pp. 83-86, 1996.
15. Ekiz O, Gül U, Mollamahmutoğlu L, Gönül M. Skin findings in newborns and their relationship with maternal factors: observational research. *Ann Dermatol*. 2013 Feb; 25(1):1-4.
16. A.Nanda, S. Kaur, O. N. Bhakoo, and K. Dhall, "Survey of cutaneous lesions in Indian newborns," *Pediatric Dermatology*, vol. 6, no. 1, pp. 39-42, 1989.
17. Rivers JK, Frederiksen PC, Dibdin C. A prevalence survey of dermatoses in the Australian neonate. *J Am Acad Dermatol* 1990; 23:77-81.
18. Nobby B, Chakrabarty N. Cutaneous manifestations in the new born. *Indian J Dermatol Venereol Leprol* 1992; 58:69-72.
19. Dermatoses in the first 72 h of life: A clinical and statistical survey. Zagne, Vanessa; Fernandes, Nurimar. *Indian Journal of Dermatology, Venereology and Leprology* 77.4 (Jul/Aug 2011): 470-6.
20. I.-H. Shih, J.-Y. Lin, C.-H. Chen, and H.-S. Hong, "A birthmark survey in 500 newborns: clinical observation in two northern Taiwan medical center nurseries," *Chang Gung Medical Journal*, vol. 30, no. 3, pp. 220-225, 2007.
21. Patil S, Deodhar J, Tawade Y, Pandit A N. Neonatal Skin Lesions. *Indian Pediatrics* 1997; 34:651-652.
22. K. Dash, S. Grover, S. Radhakrishnan, and M. Vani, "Clinicoepidemiological study of cutaneous manifestations in the neonate," *Indian Journal of Dermatology, Venereology and Leprology*, vol.66, pp. 26-28, 2000.
23. Pruksachatkunakorn C, Duarte A M, Schachner L A. Skin lesions in Newborns. *International Pediatrics* 1999; 14:28-31.
24. Dahiyat KAA. Neonatal Skin Lesions in Jordan, study of consecutive 500 neonates at King Hussein Medical Center. *Calicut Medical Journal* 2006; 4 (4):16-18.
25. Shajari H, Shajari A, Sajadian N, Habiby M. The Incidence of Birthmarks in Iranian Neonates. *Acta Medica Iranica* 2007; 45 (5): 424-426.
26. Tayeh RI, Tayeh MI, Tayeh AI. Incidence of skin lesions in newborns. *Pak J Health Sci* 2007; 1 (4): 134-6.
27. Ahsan U, Zaman T, Rashid T, Jahangir M. Cutaneous manifestations in 1000 Pakistani newborns. *Journal of Pakistan Association of Dermatologist* 2010; 20: 199-205.
28. Sadana DJ, Sharma YK, Chaudhari ND, Dash K, Rizvi A, Jethani S. A clinical and statistical survey of cutaneous changes in the first 120 hours of life. *Indian J Dermatol* 2014; 59:552-7.

How to cite this article: Varghese AA, Srikanth S, Gunasekaran D. Study of cutaneous lesions in term neonates in a tertiary care hospital. *Int J Health Sci Res*. 2016; 6(4):80-92.
