



A STUDY ON THE SPECTRUM OF DERMATOLOGICAL MANIFESTATIONS IN PREGNANCY

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ABSTRACT **Background:** Pregnancy is associated with hormonal, immunological, and metabolic changes that result in a wide spectrum of physiological and pathological cutaneous manifestations. While most are benign, pregnancy-specific dermatoses require timely recognition because of their potential maternal and fetal implications. To evaluate the spectrum of dermatological manifestations in pregnancy and assess their association with selected sociodemographic and obstetric factors. **Methods:** A hospital-based observational descriptive cross-sectional study was conducted in the Department of Dermatology, Venereology and Leprosy, PESIMSR, Kuppam, over 18 months. A total of 115 pregnant women were enrolled using purposive sampling. Clinical history, dermatological examination, and relevant laboratory investigations were performed. Data were analyzed using SPSS version 23.0, employing descriptive statistics and the Chi-square test. **Results:** The mean age of participants was 27.90 ± 2.67 years. Physiological skin changes predominated, with striae gravidarum (86.96%) and linea nigra (77.39%) being the most common manifestations. Among pregnancy-specific dermatoses, polymorphic eruption of pregnancy (PUPPP) was the most frequent (16.52%). Fungal infections, eczema, acne, and psoriasis were the common non-specific dermatoses. No significant association was observed between dermatological manifestations and gravida, trimester, socioeconomic status, residence, or family type ($p > 0.05$). However, occupation and family history of skin disease showed significant associations ($p < 0.001$). **Conclusion:** Physiological skin changes are highly prevalent during pregnancy, with PUPPP being the most common pregnancy-specific dermatosis. Early dermatological evaluation during antenatal care facilitates accurate diagnosis, appropriate management, and patient reassurance.

KEYWORDS : Pregnancy; Dermatological manifestations; Physiological skin changes; PUPPP; Pregnancy-specific dermatoses.

INTRODUCTION

Pregnancy is a physiological state associated with significant endocrinological, immunological, metabolic, and vascular changes that support fetal growth and prepare the maternal body for childbirth. These adaptations result in various alterations of the skin, hair, nails, and mucous membranes. Dermatological manifestations are common during pregnancy and range from normal physiological changes to pregnancy-specific dermatoses and exacerbation of pre-existing skin diseases. Although most are benign and resolve after delivery, some conditions may adversely affect maternal and fetal health, making early diagnosis and appropriate management essential.[1]

Pregnancy-related skin changes are broadly classified into physiological changes, pregnancy-specific dermatoses, and dermatoses influenced by pregnancy.[2,3] Physiological changes such as hyperpigmentation, striae gravidarum, and vascular alterations are the most frequent, affecting the majority of pregnant women. Pregnancy-specific dermatoses, including polymorphic eruption of pregnancy, atopic eruption of pregnancy, intrahepatic cholestasis of pregnancy, and pemphigoid gestationis, are less common but clinically important because some are associated with adverse fetal outcomes.[4,5]

Despite their high prevalence, dermatological manifestations during pregnancy remain underrecognized, particularly in rural and resource-limited settings where awareness, healthcare access, and health-seeking behavior are limited.[6] Furthermore, there is a paucity of region-specific data from South India regarding the spectrum and prevalence of these conditions. Since climatic, genetic, nutritional, and socioeconomic factors may influence their occurrence, understanding the local pattern is important for improving antenatal care.

Therefore, the present study was undertaken to evaluate the spectrum of physiological and pathological cutaneous changes occurring during pregnancy and to contribute region-specific evidence that may facilitate early diagnosis and better maternal care.

METHODOLOGY

Study Design and Setting

The present hospital-based observational descriptive cross-sectional study was conducted in the Department of Dermatology, Venereology and Leprosy (DVL), PES Institute of Medical Sciences and Research (PESIMSR), Kuppam, Andhra Pradesh, India, over a period of 18 months. The study was conducted in accordance with the ethical principles of the Declaration of Helsinki after obtaining approval from the Institutional Human Ethics Committee (IHEC). Written informed consent was obtained from all eligible participants prior to their enrollment in the study.

Sampling Method: Participants were recruited using a purposive sampling technique.

Sample Size: Based on the prevalence of 82% reported by Sharma A et al., the sample size was calculated using Cochran's method with a 95% confidence interval and an absolute precision of 7%.[7] The minimum required sample size was estimated to be 115 participants, which was considered adequate for the present study.

Eligibility Criteria

Inclusion criteria: All pregnant women attending the DVL outpatient department during the study period who provided written informed consent were included in the study.

Exclusion criteria: Pregnant women who were already receiving treatment for pre-existing dermatological conditions were excluded from the study.

Data Collection Procedure

A detailed clinical history, including demographic details, obstetric history, onset and duration of skin lesions, associated symptoms, and relevant comorbid illnesses, was recorded. Subsequently, a comprehensive general, systemic, and dermatological examination was performed. Cutaneous manifestations were documented and classified as physiological skin changes, pregnancy-specific dermatoses, or other dermatological disorders associated with pregnancy.

Laboratory Investigations

Routine laboratory investigations, including complete blood count (CBC), liver function tests (LFT), and renal function tests (RFT), were performed whenever clinically indicated. Special investigations such as potassium hydroxide (KOH) mount, Gram staining, Tzanck smear, and skin biopsy were carried out in selected cases where necessary to establish the diagnosis.

Statistical Analysis

Data were entered into Microsoft Excel 2019 and analyzed using Statistical Package for the Social Sciences (SPSS) version 23.0 (SPSS Inc., Chicago, IL, USA). Descriptive statistics were expressed as frequencies and percentages for categorical variables and as mean $\pm$ standard deviation (SD) for continuous variables. Associations between categorical variables were assessed using the Chi-square test. Appropriate tables and graphical representations were used wherever necessary. A p -value of <0.05 was considered statistically significant.

RESULTS

A total of 115 pregnant women were included in the study. The mean age of the participants was 27.90 ± 2.67 years (range: 19–32 years). Most participants were second gravida (52.17%), followed by primigravida (22.61%), third gravida (19.13%), and fourth gravida (6.09%). The majority were in the third trimester (53.91%), belonged to the lower middle socioeconomic class (44.35%), resided in semi-urban areas (54.78%), and lived in nuclear families (74.78%). Only 5.22% of the participants had a positive family history of skin diseases (Table 1).

Physiological dermatological manifestations were more common than pathological conditions. Striae gravidarum was the frequent finding, affecting 86.96% of participants, followed by linea nigra (77.39%) and chloasma (34.78%). Among pregnancy-specific dermatoses, polymorphic eruption of pregnancy (PUPPP) was the most common (16.52%), followed by pruritus gravidarum (8.70%), atopic eruption of pregnancy (5.22%), intrahepatic cholestasis of pregnancy (1.74%), and pemphigoid gestationis (0.87%) (Figure 1).

Most dermatological manifestations were observed among second gravida women; however, there was no statistically significant association between gravida status and dermatological manifestations ($p = 0.943$) (Table 2). Similarly, although striae gravidarum, linea nigra, and chloasma were more frequently observed during the third trimester, the association between trimester of pregnancy and dermatological manifestations was not statistically significant ($p = 0.920$) (Table 3).

Dermatological manifestations were frequently observed among women belonging to the lower middle socioeconomic class; however, no statistically significant association was found between socioeconomic status and dermatological manifestations ($p = 0.997$) (Table 4).

A statistically significant association was observed between occupation and dermatological manifestations ($p < 0.001$). Most skin disorders were observed among unskilled women, with all cases of chloasma occurring in this occupational group (Table 5).

Although dermatological manifestations were slightly more common among women residing in semi-urban areas, no statistically significant association was found between residence and dermatological manifestations ($p = 0.715$) (Table 6). Likewise, the majority of skin manifestations were observed among women from nuclear families, but family type was not significantly associated with dermatological manifestations ($p = 0.276$) (Table 7).

A highly statistically significant association was observed between family history of skin disease and dermatological manifestations ($p < 0.001$). All cases of atopic eruption of pregnancy occurred in women with a positive family history, whereas the majority of other dermatoses occurred in women without a family history of skin disease (Table 8).

Table 1: Demographic Characteristics of the Study Participants

Characteristic	Frequency (n)	Percentage (%)
Age (years)		
Mean $\pm$ SD	27.90 ± 2.67	
Range	19–32	
Gravida		

G1	26	22.61
G2	60	52.17
G3	22	19.13
G4	7	6.09
Trimester		
Second	53	46.09
Third	62	53.91
Socioeconomic status		
Low	39	33.91
Lower middle	51	44.35
Upper lower	25	21.74
Residence		
Rural	52	45.22
Semi-urban	63	54.78
Family type		
Joint	29	25.22
Nuclear	86	74.78
Family history of skin disease		
Yes	6	5.22
No	109	94.78

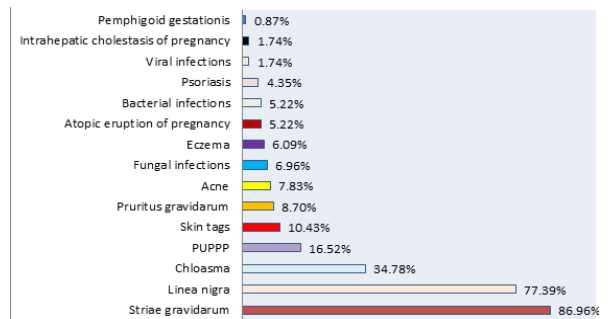


Figure 1: Spectrum of Dermatological Manifestations Among Pregnant Women

Table 2: Distribution of Dermatological Manifestations During Pregnancy According to Gravida Status

Diagnosis	G1 n (%)	G2 n (%)	G3 n (%)	G4 n (%)	p-value
Acne	2 (22.22)	6 (66.67)	0 (0.00)	1 (11.11)	0.943
Atopic eruption of pregnancy	3 (50.00)	3 (50.00)	0 (0.00)	0 (0.00)	
Bacterial infections	2 (33.33)	4 (66.67)	0 (0.00)	0 (0.00)	
Chloasma	7 (17.50)	21 (52.50)	9 (22.50)	3 (7.50)	
Eczema	1 (14.29)	5 (71.43)	1 (14.29)	0 (0.00)	
Fungal infections	2 (25.00)	4 (50.00)	2 (25.00)	0 (0.00)	
Intrahepatic cholestasis of pregnancy	0 (0.00)	1 (50.00)	1 (50.00)	0 (0.00)	
Linea nigra	22 (24.72)	48 (53.93)	14 (15.73)	5 (5.62)	
PUPPP	5 (26.32)	8 (42.11)	4 (21.05)	2 (10.53)	
Pemphigoid gestationis	1 (100.0)	0 (0.00)	0 (0.00)	0 (0.00)	
Pruritus gravidarum	1 (10.00)	4 (40.00)	3 (30.00)	2 (20.00)	
Psoriasis	2 (40.00)	1 (20.00)	1 (20.00)	1 (20.00)	
Skin tags	3 (25.00)	6 (50.00)	2 (16.67)	1 (8.33)	
Striae gravidarum	23 (23.00)	52 (52.00)	21 (21.00)	4 (4.00)	
Viral infections	0 (0.00)	2 (100.00)	0 (0.00)	0 (0.00)	

$P < 0.05$ was considered statistically significant

Table 3: Association Between Dermatological Manifestations and Trimester of Pregnancy

Diagnosis	Second Trimester n (%)	Third Trimester n (%)	p-value
Acne	4 (44.4)	5 (55.6)	0.920
Atopic eruption of pregnancy	4 (66.7)	2 (33.3)	
Bacterial infections	2 (33.3)	4 (66.7)	
Chloasma	16 (40.0)	24 (60.0)	

Eczema	3 (42.9)	4 (57.1)	
Fungal infections	5 (62.5)	3 (37.5)	
Intrahepatic cholestasis of pregnancy	1 (50.0)	1 (50.0)	
Linea nigra	38 (42.7)	51 (57.3)	
PUPPP	10 (52.6)	9 (47.4)	
Pemphigoid gestationis	1 (100)	0	
Pruritus gravidarum	7 (70.0)	3 (30.0)	
Psoriasis	2 (40.0)	3 (60.0)	
Skin tags	6 (50.0)	6 (50.0)	
Striae gravidarum	45 (45.0)	55 (55.0)	
Viral infections	1 (50.0)	1 (50.0)	

$P < 0.05$ was considered statistically significant

Table 4: Association Between Dermatological Manifestations and Socioeconomic Status

Diagnosis	Low n (%)	Lower Middle n (%)	Upper Lower n (%)	p-value
Acne	3 (33.3)	3 (33.3)	3 (33.3)	0.997
Atopic eruption of pregnancy	4 (66.7)	2 (33.3)	0	
Bacterial infections	2 (33.3)	3 (50.0)	1 (16.7)	
Chloasma	14 (35.0)	17 (42.5)	9 (22.5)	
Eczema	3 (42.9)	2 (28.6)	2 (28.6)	
Fungal infections	3 (37.5)	3 (37.5)	2 (25.0)	
Intrahepatic cholestasis of pregnancy	1 (50.0)	1 (50.0)	0	
Linea nigra	30 (33.7)	41 (46.1)	18 (20.2)	
PUPPP	7 (36.8)	8 (42.1)	4 (21.1)	
Pemphigoid gestationis	1 (100)	0	0	
Pruritus gravidarum	2 (20.0)	5 (50.0)	3 (30.0)	
Psoriasis	1 (20.0)	3 (60.0)	1 (20.0)	
Skin tags	3 (25.0)	5 (41.7)	4 (33.3)	
Striae gravidarum	35 (35.0)	43 (43.0)	22 (22.0)	
Viral infections	0	1 (50.0)	1 (50.0)	

$P < 0.05$ was considered statistically significant

Table 5: Distribution of Dermatological Manifestations During Pregnancy According to Occupation

Diagnosis	Semi-skilled n (%)	Unemployed n (%)	Unskilled n (%)	p-value
Acne	2 (22.22)	4 (44.44)	3 (33.33)	<0.001
Atopic eruption of pregnancy	0 (0.00)	2 (33.33)	4 (66.67)	
Bacterial infections	0 (0.00)	5 (83.33)	1 (16.67)	
Chloasma	0 (0.00)	0 (0.00)	40 (100.00)	
Eczema	2 (28.57)	4 (57.14)	1 (14.29)	
Fungal infections	2 (25.00)	3 (37.50)	3 (37.50)	
Intrahepatic cholestasis of pregnancy	0 (0.00)	1 (50.00)	1 (50.00)	
Linea nigra	10 (11.24)	33 (37.08)	46 (51.69)	
PUPPP	4 (21.05)	7 (36.84)	8 (42.11)	
Pemphigoid gestationis	0 (0.00)	0 (0.00)	1 (100.00)	
Pruritus gravidarum	3 (30.00)	3 (30.00)	4 (40.00)	
Psoriasis	2 (40.00)	2 (40.00)	1 (20.00)	
Skin tags	3 (25.00)	6 (50.00)	3 (25.00)	
Striae gravidarum	13 (13.00)	35 (35.00)	52 (52.00)	
Viral infections	1 (50.00)	1 (50.00)	0 (0.00)	

$P < 0.05$ was considered statistically significant

Table 6: Distribution of Dermatological Manifestations During Pregnancy According to Residence

Diagnosis	Rural n (%)	Semi-urban n (%)	p-value
Acne	4 (44.44)	5 (55.56)	0.715

Atopic eruption of pregnancy	3 (50.00)	3 (50.00)	
Bacterial infections	3 (50.00)	3 (50.00)	
Chloasma	14 (35.00)	26 (65.00)	
Eczema	4 (57.14)	3 (42.86)	
Fungal infections	2 (25.00)	6 (75.00)	
Intrahepatic cholestasis of pregnancy	0 (0.00)	2 (100.00)	
Linea nigra	40 (44.94)	49 (55.06)	
PUPPP	10 (52.63)	9 (47.37)	
Pemphigoid gestationis	0 (0.00)	1 (100.00)	
Pruritus gravidarum	3 (30.00)	7 (70.00)	
Psoriasis	2 (40.00)	3 (60.00)	
Skin tags	7 (58.33)	5 (41.67)	
Striae gravidarum	46 (46.00)	54 (54.00)	
Viral infections	2 (100.00)	0 (0.00)	

$P < 0.05$ was considered statistically significant

Table 7: Distribution of Dermatological Manifestations During Pregnancy According to Family Type

Diagnosis	Joint Family n (%)	Nuclear Family n (%)	p-value
Acne	5 (55.56)	4 (44.44)	0.276
Atopic eruption of pregnancy	2 (33.33)	4 (66.67)	
Bacterial infections	3 (50.00)	3 (50.00)	
Chloasma	5 (12.50)	35 (87.50)	
Eczema	1 (14.29)	6 (85.71)	
Fungal infections	1 (12.50)	7 (87.50)	
Intrahepatic cholestasis of pregnancy	0 (0.00)	2 (100.00)	
Linea nigra	24 (26.97)	65 (73.03)	
PUPPP	4 (21.05)	15 (78.95)	
Pemphigoid gestationis	1 (100.00)	0 (0.00)	
Pruritus gravidarum	2 (20.00)	8 (80.00)	
Psoriasis	1 (20.00)	4 (80.00)	
Skin tags	2 (16.67)	10 (83.33)	
Striae gravidarum	26 (26.00)	74 (74.00)	
Viral infections	1 (50.00)	1 (50.00)	

$P < 0.05$ was considered statistically significant

Table 8: Distribution of Dermatological Manifestations During Pregnancy According to Family History of Skin Disease

Diagnosis	No n (%)	Yes n (%)	p-value
Acne	9 (100.00)	0 (0.00)	<0.001
Atopic eruption of pregnancy	0 (0.00)	6 (100.00)	
Bacterial infections	6 (100.00)	0 (0.00)	
Chloasma	39 (97.50)	1 (2.50)	
Eczema	7 (100.00)	0 (0.00)	
Fungal infections	8 (100.00)	0 (0.00)	
Intrahepatic cholestasis of pregnancy	2 (100.00)	0 (0.00)	
Linea nigra	85 (95.51)	4 (4.49)	
PUPPP	18 (94.74)	1 (5.26)	
Pemphigoid gestationis	1 (100.00)	0 (0.00)	
Pruritus gravidarum	10 (100.00)	0 (0.00)	
Psoriasis	5 (100.00)	0 (0.00)	
Skin tags	12 (100.00)	0 (0.00)	
Striae gravidarum	95 (95.00)	5 (5.00)	
Viral infections	2 (100.00)	0 (0.00)	

$P < 0.05$ was considered statistically significant

DISCUSSION

The present hospital-based cross-sectional study evaluated the spectrum of dermatological manifestations among 115 pregnant women attending the Dermatology Outpatient Department of PESIMSR, Kuppam. Physiological cutaneous changes predominated over pathological dermatoses, with striae gravidarum, linea nigra, and chloasma being the most common manifestations. Among pregnancy-specific dermatoses, polymorphic eruption of pregnancy (PUPPP) was the most frequently encountered condition. Most dermatological manifestations occurred during the second and third trimesters, reflecting the hormonal and immunological changes associated with advancing gestation.+

The demographic profile of the present study revealed a mean maternal

age of 27.90 ± 2.67 years, with the majority of participants being multigravida and in the third trimester. These findings are comparable to those reported by Kumari et al., Panicker et al., Ramamurthy & David., and Rao and Rajamma, who also observed that pregnancy-related skin changes were more frequently encountered during the later stages of pregnancy.[6,8-10] The predominance of second-trimester and third-trimester participants in the present study may explain the high prevalence of physiological skin changes.

Among physiological changes, striae gravidarum (86.96%) was the most frequent manifestation, followed by linea nigra (77.39%) and chloasma (34.78%). Similar observations have been reported by Muzaffar et al., Shah et al., Ikram et al., Zerouali et al., and Fernandes and Amaral, all of whom demonstrated that pigmentary alterations and connective tissue changes constitute the most common dermatological manifestations during pregnancy.[11-15] Minor differences in prevalence across studies are likely attributable to variations in ethnicity, gestational age, climatic conditions, diagnostic criteria, and study populations.

Among pregnancy-specific dermatoses, PUPPP (16.52%) emerged as the most common disorder in the present study. Comparable findings were reported by Kumari et al., Puri and Deora et al., and Kande et al., whereas Bangaru et al. and Chaudhary et al. reported atopic eruption of pregnancy as the predominant pregnancy-specific dermatosis.[6,16-20] Such differences probably reflect regional, genetic, environmental, and methodological variations, as well as differences in diagnostic classification. The adoption of the Ambros-Rudolph classification in the present study facilitated standardized categorization of pregnancy-specific dermatoses and improved diagnostic consistency.

Infectious dermatoses constituted a smaller proportion of cases, with fungal infections being the most common infectious disorder, followed by bacterial and viral infections. These findings are consistent with studies by Khare and Singh and Shukla et al., although the prevalence of infections in the present study was lower than that reported by Panicker et al. and Shivakumar and Madhavamurthy.[8,21-23] Variations in hygiene practices, climatic conditions, healthcare accessibility, and socioeconomic factors may explain these differences.

Statistical analysis demonstrated that dermatological manifestations were not significantly associated with gravida status, trimester, socioeconomic status, place of residence, or family type. These findings suggest that pregnancy-related skin changes occur irrespective of parity or social background and primarily reflect physiological adaptations to pregnancy. However, a highly significant association was observed between dermatological manifestations and occupation, with unskilled women exhibiting a higher frequency of chloasma, linea nigra, and striae gravidarum. This observation may be attributable to greater occupational sun exposure, physical workload, and environmental influences. A significant association was also found between family history and dermatological manifestations, particularly atopic eruption of pregnancy, indicating a possible genetic predisposition.

The findings of the present study emphasize the importance of differentiating physiological skin changes from pregnancy-specific dermatoses requiring prompt evaluation and management. Although most dermatological manifestations observed were benign and self-limiting, early recognition of conditions such as intrahepatic cholestasis of pregnancy and pemphigoid gestationis is essential because of their potential maternal and fetal complications. Appropriate counseling regarding the benign nature of common physiological changes may also reduce anxiety and improve the quality of antenatal care.

The study has certain limitations. It was conducted at a single tertiary care center with a relatively small sample size, limiting the generalizability of the findings. The cross-sectional design precluded assessment of temporal changes in skin manifestations throughout pregnancy. Additionally, environmental, nutritional, occupational, and lifestyle factors that may influence dermatological manifestations were not evaluated in detail.

Despite these limitations, the study provides valuable region-specific data regarding the spectrum of dermatological manifestations among

pregnant women in South India. It highlights the predominance of physiological skin changes and identifies PUPPP as the most common pregnancy-specific dermatosis. These findings may assist dermatologists and obstetricians in improving the diagnosis, counseling, and management of dermatological conditions during pregnancy and contribute to more comprehensive antenatal care.

CONCLUSION

Physiological dermatological changes were highly prevalent among pregnant women, with striae gravidarum and linea nigra being the most common manifestations. Polymorphic eruption of pregnancy (PUPPP) was the predominant pregnancy-specific dermatosis, followed by pruritus gravidarum and atopic eruption of pregnancy. While most demographic variables showed no significant association with dermatological manifestations, occupation and family history of skin disease were significantly associated with specific dermatoses. These findings highlight the importance of recognizing both physiological and pathological skin changes during pregnancy to ensure accurate diagnosis, appropriate counseling, and timely management during antenatal care.

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