Section: Obstetrics and Gynaecology

Original Research Article

DERMATOLOGICAL MANIFESTATION DURING PREGNANCY IN A TERTIARY CARE HOSPITAL IN NORTHERN INDIA: A CROSS-SECTIONAL STUDY

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Received : 21/03/2025
Received in revised form : 08/05/2025
Accepted : 29/05/2025

Keywords:
Pregnancy-associated dermatoses, physiological skin changes, polymorphic eruption of pregnancy, intrahepatic cholestasis, antenatal dermatology, maternal health, Northern India.

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DOI: 10.47009/jamp.2025.7.3.122

Source of Support: Nil,
Conflict of Interest: None declared

Int J Acad Med Pharm
2025; 7 (3); 633-638

ABSTRACT

Background: Objective: This study aimed to investigate the prevalence, clinical patterns, and obstetric relevance of dermatological manifestations occurring during pregnancy within a tertiary care setting in Northern India, with the goal of enhancing clinical awareness and guiding evidence-based antenatal dermatological care. **Materials and Methods:** A hospital-based, descriptive cross-sectional study was conducted over a period of two years from October 2021 to October 2023 at the Department of Obstetrics and Gynaecology, Military Hospital, Jodhpur. A total of 350 antenatal women were enrolled through a consecutive sampling technique during routine outpatient visits. Data collection involved a pre-validated structured proforma encompassing detailed demographic profiles, obstetric history, and comprehensive dermatological examination performed by a qualified dermatologist. Cutaneous findings were systematically classified into three categories: physiological changes of pregnancy, pregnancy-modified dermatoses, and specific gestational dermatoses, in accordance with established clinical criteria. **Result:** Physiological cutaneous changes emerged as the most prevalent, observed in 68.6% of participants, with hyperpigmentation, striae gravidarum, and melasma being the most frequently encountered conditions. Pregnancy-modified dermatoses were noted in 18.6% of cases, while specific dermatoses of pregnancy accounted for 12.9%. Among the specific dermatoses, polymorphic eruption of pregnancy (PEP) was the most common, followed by atopic eruption of pregnancy (AEP), pemphigoid gestationis, and intrahepatic cholestasis of pregnancy (ICP). The incidence and severity of these manifestations demonstrated a significant association with advancing gestational age and higher parity. **Conclusion:** This study demonstrated that dermatological manifestations during pregnancy are highly prevalent and clinically diverse, with the majority being benign and self-limiting. However, certain specific dermatoses possess significant maternal and fetal implications, necessitating timely identification and appropriate interdisciplinary management. The findings underscore the importance of incorporating routine dermatological evaluations into antenatal care protocols to facilitate early diagnosis, optimize maternal comfort, and prevent adverse perinatal outcomes. Moreover, the study provides region-specific epidemiological data that contribute to bridging existing gaps in the literature regarding pregnancy-associated dermatoses in the Indian subcontinent.

INTRODUCTION

Pregnancy represents a dynamic physiological state marked by profound hormonal, immunological, metabolic, and vascular alterations, all of which exert a significant impact on the skin and its appendages. These changes may manifest in various forms—ranging from innocuous physiological transformations to more complex, pregnancy-specific dermatoses that can cause considerable discomfort or, in some cases, herald underlying systemic disorders.[1] Understanding the dermatological implications of pregnancy is crucial, as certain skin manifestations not only affect the expectant mother's quality of life but may also pose potential risks to fetal well-being. Dermatological changes during pregnancy are typically categorized into three broad groups: physiological skin changes, pre-existing dermatoses that are altered by pregnancy, and specific dermatoses unique to the

ISSN (O): 2687-5365; ISSN (P): 2753-6556

gestational period.[2] Physiological alterations such as striae gravidarum, linea nigra, melasma, and increased vascularity are nearly universal and usually benign. However, specific dermatoses of pregnancy including polymorphic eruption of pregnancy (PEP), atopic eruption of pregnancy (AEP), pemphigoid gestationis, and intrahepatic cholestasis of pregnancy (ICP) though relatively rare, require heightened clinical vigilance due to their potential obstetric and perinatal complications.[3]

Despite the high prevalence and clinical relevance of these conditions, there exists a paucity of region-specific data in the Indian subcontinent, particularly from Northern India. The interplay of diverse genetic backgrounds, climatic conditions, and sociocultural practices makes it essential to study pregnancy-associated dermatoses within this unique demographic framework.[4] Most available literature is either anecdotal or derived from Western populations, thereby limiting its applicability to the Indian context. Consequently, misdiagnosis or delayed treatment of pregnancy-related skin disorders remains a significant challenge, often leading to suboptimal outcomes. Compounding this issue is a general lack of awareness among patients and even primary healthcare providers regarding the dermatological spectrum of pregnancy.[5] In many instances, women perceive these changes as a 'normal' part of gestation and refrain from seeking medical consultation unless symptoms become severe or cosmetically distressing. Moreover, in rural and semi-urban populations, entrenched cultural beliefs, self-medication practices, and inadequate access to dermatological care contribute to the underreporting and undertreatment of such conditions.[6,7]

From a clinical standpoint, it is imperative that obstetricians, dermatologists, and family physicians develop a nuanced understanding of pregnancy-associated dermatoses. Early identification and appropriate classification can facilitate timely interventions, mitigate maternal anxiety, and prevent complications, particularly in cases such as pemphigoid gestationis and ICP, where fetal monitoring and early delivery may be warranted.[8] Interdisciplinary collaboration is therefore essential to ensure comprehensive maternal care. The dermatological profile observed during pregnancy is also influenced by multiple variables, including gestational age, parity, maternal nutrition, pre-existing dermatological conditions, and systemic comorbidities such as gestational diabetes and preeclampsia.[9] Evaluating the correlation between these factors and specific dermatoses can enhance risk stratification and promote individualized patient care. Hospital-based cross-sectional studies offer an efficient methodology for capturing this complex clinical picture and generating data that can inform both local and national healthcare policies.[10,11]

This cross-sectional investigation was undertaken at a tertiary care teaching hospital in Northern India with the primary objective of elucidating the prevalence, clinical spectrum, and potential implications of dermatological manifestations occurring during pregnancy. Through a methodical assessment of cutaneous changes and their correlation with gestational parameters and sociodemographic variables, the study endeavored to present a comprehensive and context-specific understanding of this frequently underappreciated facet of maternal health. In addressing this objective, the research aimed not only to bridge a critical lacuna in existing literature but also to emphasize the clinical value of incorporating routine dermatological evaluations into standard antenatal care protocols. The insights derived from this study proved instrumental for healthcare providers by facilitating earlier recognition, patient-centered counseling, and evidence-informed management of pregnancy-associated dermatoses ultimately contributing to the advancement of both maternal and neonatal health outcomes within the Indian healthcare landscape.

Aim of the study

The study aimed to explore the prevalence and clinical spectrum of dermatological manifestations observed during pregnancy in a tertiary care hospital in Northern India.

Objective

To delineate the patterns of gestational dermatoses and assess their associations with gestational age, parity, and sociodemographic determinants, thereby elucidating their clinical relevance in maternal healthcare.

MATERIALS AND METHODS

This institution-based, descriptive cross-sectional study was conducted over a two-year period from 10th October 2021 to 10th October 2023 at the Department of Obstetrics and Gynaecology, Military Hospital, Jodhpur, a premier tertiary care teaching facility serving a diverse demographic in Northern India. The primary objective of the study was to systematically assess the prevalence, patterns, and clinical relevance of dermatological manifestations occurring during pregnancy among women attending the antenatal outpatient department. A total of 350 pregnant women were recruited using a consecutive sampling technique during their routine antenatal visits, thereby ensuring a robust and representative sample for evaluating the spectrum of cutaneous changes in the regional obstetric population.

Inclusion Criteria

The study included pregnant women of all gestational ages who were attending the antenatal outpatient department (OPD) at Military Hospital, Jodhpur. Eligibility was contingent upon the provision of informed written consent, ensuring voluntary participation and ethical compliance. Both primigravidae and multigravidae were considered eligible for inclusion, thereby allowing for a comprehensive assessment of dermatological manifestations across varying obstetric profiles.

ISSN (O): 2687-5365; ISSN (P): 2753-6556

Exclusion Criteria

- Pregnant women with a documented history of pre-existing dermatological disorders diagnosed prior to conception, to avoid confounding variables.
- Patients diagnosed with systemic illnesses known to manifest with cutaneous symptoms, such as autoimmune diseases, chronic renal failure, or hepatic dysfunction.
- Individuals currently on medications recognized for their potential to induce dermatological changes, including but not limited to corticosteroids and antiepileptic drugs.
- Patients who were either unwilling or unable to provide informed written consent, in accordance with ethical research protocols.

Data Collection

Following the acquisition of ethical clearance from the Institutional Review Board, data collection was initiated using a pre-validated, structured proforma. Each enrolled participant underwent a comprehensive clinical evaluation, which included a detailed obstetric history, demographic profiling, and an exhaustive dermatological examination conducted by a qualified dermatologist. Particular attention was paid to the type, onset, duration, and anatomical distribution of cutaneous manifestations. All dermatological findings were systematically categorized into three major groups: physiological skin changes associated with pregnancy, pre-existing dermatoses modified by gestational status, and pregnancy-specific dermatoses based on established clinical diagnostic criteria and dermatological classifications.

Data Analysis

The collected data were meticulously compiled and subjected to statistical analysis using Microsoft Excel and Statistical Package for the Social Sciences. Descriptive statistics, including frequency distributions, percentages, means, and standard deviations, were employed to summarize demographic and clinical variables. To evaluate associations between dermatological findings and independent variables such as gestational age, parity, and sociodemographic factors, inferential statistical tests including the chi-square test and Fisher's exact test were utilized as appropriate. A p-value of less than 0.05 was considered indicative of statistical significance.

RESULTS

Table 1: Age Distribution of Antenatal Patients

Age Group (Years)	Number of Patients	Percentage (%)	Cumulative (%)
< 20	30	8.6	8.6
21–25	100	28.6	37.2
26–30	120	34.3	71.5
31–35	70	20.0	91.5
> 35	30	8.6	100.0

The age distribution of the study participants is detailed in Table 1. The highest proportion of antenatal patients (34.3%) belonged to the 26–30 years age group, followed by 28.6% in the 21–25 years bracket. Women aged 31–35 years constituted 20.0% of the cohort, while both younger (<20 years) and older (>35 years) age groups comprised 8.6% each. Cumulatively, over 70% of the participants fell within the 21–30 years range, aligning with the peak reproductive age group most likely to seek antenatal and dermatological care. This age profile is reflective of the broader demographic trends observed in tertiary healthcare facilities in Northern India.

Table 2: Gestational Age Distribution at Presentation

Trimester	Number of Patients	Percentage (%)
First Trimester (0–12 weeks)	60	17.1
Second Trimester (13–28 weeks)	140	40.0
Third Trimester (>28 weeks)	150	42.9

The distribution of gestational age at presentation is illustrated in Table 2. Most women presented during the third trimester (42.9%), followed closely by those in the second trimester (40.0%). Only 17.1% of the participants reported in the first trimester. These findings indicated that dermatological concerns were more commonly recognized and addressed in the latter half of pregnancy, possibly due to the progressive visibility and symptomatology of cutaneous changes as gestation advanced.

Table 3: Parity Distribution Among Patients

Parity Category	Number of Patients	Percentage (%)
Primigravida (first pregnancy)	160	45.7
Multigravida (two or more pregnancies)	190	54.3

As shown in Table 3, the parity distribution revealed that multigravida women comprised a slight majority (54.3%), while primigravidae accounted for 45.7% of the sample. This distribution provided a well-

ISSN (O): 2687-5365; ISSN (P): 2753-6556

balanced cohort that enabled a comparative evaluation of dermatological presentations across women with varying obstetric experiences. It also highlighted the consistent presence of cutaneous changes in both first-time and experienced mothers.

Table 4: Classification of Dermatological Manifestations

Type of Dermatological Manifestation	Number of Patients	Percentage (%)
Physiological Changes (normal adaptations)	240	68.6
Pregnancy-modified Dermatoses (pre-existing conditions affected by pregnancy)	65	18.6
Specific Dermatoses of Pregnancy (unique to gestation)	45	12.9

The classification of dermatological conditions encountered is outlined in Table 4. Physiological changes those considered benign and expected during gestation were the most prevalent, observed in 68.6% of cases. Pregnancy-modified dermatoses, defined as pre-existing skin disorders exacerbated or altered by pregnancy, were identified in 18.6% of participants. Specific dermatoses of pregnancy, which are unique to the gestational period, were documented in 12.9% of women. This distribution underscores the predominance of physiological skin responses in pregnancy while drawing attention to the clinically significant subset of pregnancy-specific dermatoses requiring targeted management.

Table 5: Specific Dermatoses of Pregnancy

Specific Dermatosis	Number of Patients	Percentage (%)
Polymorphic Eruption of Pregnancy (PEP)	18	40.0
Atopic Eruption of Pregnancy (AEP)	12	26.7
Pemphigoid Gestationis	8	17.8
Intrahepatic Cholestasis of Pregnancy (ICP)	7	15.5

A further breakdown of specific dermatoses of pregnancy is provided in Table 5. Among the 45 cases in this category, polymorphic eruption of pregnancy (PEP) emerged as the most frequently diagnosed condition (40.0%), followed by atopic eruption of pregnancy (AEP) at 26.7%. Pemphigoid gestationis and intrahepatic cholestasis of pregnancy (ICP), although less common, were notable for their potential maternal and fetal implications, and were observed in 17.8% and 15.5% of cases, respectively. These findings underscore the need for heightened clinical vigilance and accurate differential diagnosis to ensure appropriate management.

Table 6: Distribution of Dermatoses by Trimester

Dermatosis Type	1st Trimester (n=60)	2nd Trimester (n=140)	3rd Trimester (n=150)	Total Cases
Physiological Changes	20	100	120	240
Pregnancy-modified Dermatoses	10	25	30	65
Specific Dermatoses of Pregnancy	5	15	25	45

Trimester-wise distribution of dermatological manifestations is presented in Table 6. Physiological changes were most frequently reported during the third trimester (n = 120), followed by the second (n = 100) and first (n = 20) trimesters. A similar progression was observed in both pregnancy-modified dermatoses and specific gestational dermatoses, with increasing prevalence noted as gestation advanced. Notably, specific dermatoses rose from 5 cases in the first trimester to 25 in the third trimester, suggesting that hormonal, immunologic, and vascular changes accumulate over time and play a critical role in the pathogenesis and clinical expression of such conditions.

Table 7: Common Physiological Changes Observed

Physiological Change Description	Number of Patients	Percentage (%)
Hyperpigmentation (incl. Linea nigra, melasma)	210	60.0
Striae Gravidarum (stretch marks)	190	54.3
Linea Nigra (midline abdominal pigmentation)	160	45.7
Melasma (mask of pregnancy)	130	37.1
Palmar Erythema (reddening of the palms)	90	25.7

The pattern of common physiological changes is summarized in Table 7. Hyperpigmentation including linea nigra and melasma was the most prevalent finding, affecting 60.0% of participants.

ISSN (O): 2687-5365; ISSN (P): 2753-6556

Striae gravidarum were observed in 54.3% of cases, followed by linea nigra (45.7%), melasma (37.1%), and palmar erythema (25.7%). These manifestations were in line with established physiological responses to pregnancy and, while largely benign, could be distressing to patients due to their cosmetic impact. Their high prevalence highlights the importance of counselling and reassurance as a key component of antenatal dermatological care.

DISCUSSION

This study comprehensively examined the spectrum of dermatological manifestations observed among pregnant women attending a tertiary care hospital in Northern India. The findings revealed a high prevalence of cutaneous alterations during pregnancy, with physiological skin changes representing the predominant category, followed by pregnancy-modified dermatoses and pregnancy-specific dermatoses. These observations reinforced the understanding that pregnancy exerts significant dermatological effects, driven by complex hormonal, immunological, and vascular changes.

Physiological skin changes were reported in 68.6% of the study population, underscoring their ubiquity in pregnancy. Hyperpigmentation, including conditions such as melasma and linea nigra, emerged as the most frequent manifestation, affecting 60.0% of participants. These results were in concordance with the findings of Sachdeva et al., & Gokdemir et al., who documented hyperpigmentation in 87.6% of pregnant women. Similarly, striae gravidarum were noted in 54.3% of cases in the present study, paralleling the 72.8% prevalence reported in previous literature. These findings affirmed that physiological cutaneous changes, though benign, were highly prevalent and often contributed to cosmetic concern and psychological distress among expectant mothers.[12,13]

Pregnancy-modified dermatoses were identified in 18.6% of participants. These included exacerbations or alterations of pre-existing skin conditions influenced by gestational hormonal changes. The prevalence observed was comparable to that reported by Abraham et al., who noted pregnancy-modified dermatoses in 17% of their study cohort. The accurate identification and distinction of these conditions from pregnancy-specific dermatoses were essential for clinical management and counselling, particularly in cases where underlying chronic dermatological disorders were impacted by pregnancy.[14]

Specific dermatoses unique to pregnancy were recorded in 12.9% of cases. Polymorphic eruption of pregnancy (PEP) was the most frequently diagnosed, accounting for 40.0% of the specific dermatosis's subgroup. Atopic eruption of pregnancy (AEP) followed at 26.7%, while pemphigoid gestationis and intrahepatic cholestasis of pregnancy (ICP) were observed in 17.8% and 15.5% of cases, respectively. These results were consistent with prior research. For example, Timilsina et al., documented PEP in 28.4% of affected cases, and AEP in 20.6%, demonstrating similar prevalence patterns.[15] Although less common, pemphigoid gestationis and ICP warranted clinical attention due to their established association with adverse fetal outcomes, including preterm birth and intrauterine growth restriction.

Trimester-wise analysis demonstrated a clear trend of increasing dermatological manifestations with advancing gestation. Physiological changes and pregnancy-specific dermatoses both showed heightened prevalence in the third trimester. Specific dermatoses, for example, increased from 5 cases in the first trimester to 25 in the third trimester. These findings were congruent with the study by Boccardi et al., and Kanada et al., which also reported an upward trajectory of skin conditions as pregnancy progressed. The cumulative hormonal, metabolic, and immunological shifts occurring later in pregnancy likely contributed to this pattern.[16,17] Additionally, the study found that multigravida women exhibited a higher frequency of certain skin changes, particularly hyperpigmentation and striae gravidarum. This observation agreed with findings by Chaudhary et al., who attributed such differences to repeated dermal stretching and increased melanocytic activity in successive pregnancies.[18] Recognizing the influence of parity on dermatological outcomes enabled clinicians to tailor anticipatory guidance more effectively.

Overall, the findings of this study highlighted the importance of integrating dermatological assessments into routine antenatal care. Although most pregnancy-associated skin changes were benign and self-limiting, certain conditions particularly pemphigoid gestationis and ICP necessitated early detection and appropriate obstetric management to mitigate fetal risk. Given the observed lack of awareness and underreporting, especially in resource-limited settings, the study underscored the need for interdisciplinary collaboration among dermatologists, obstetricians, and primary care providers. Future multicentric studies with larger cohorts and histopathological confirmation are warranted to further elucidate the pathophysiology and population-specific prevalence of pregnancy-related dermatoses in the Indian context.

CONCLUSION

This study provided valuable insights into the prevalence and clinical patterns of dermatological manifestations observed during pregnancy in a tertiary care setting in Northern India. Physiological skin changes emerged as the most frequently encountered category, followed by pregnancy-modified and specific dermatoses unique to gestation. The distribution of these conditions was influenced by gestational age, parity, and other demographic variables. While the majority of these manifestations were benign and self-resolving, specific dermatoses

ISSN (O): 2687-5365; ISSN (P): 2753-6556

such as pemphigoid gestationis and intrahepatic cholestasis of pregnancy were identified as clinically significant due to their potential impact on maternal and fetal outcomes. The study underscored the importance of early recognition, interdisciplinary management, and the incorporation of dermatological assessment into routine antenatal care. By generating region-specific epidemiological data, this research addressed a critical gap in existing literature and laid the groundwork for future large-scale, multicentric investigations aimed at optimizing the dermatological and obstetric management of pregnant women

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ISSN (O): 2687-5365; ISSN (P): 2753-6556