

## A clinical study of skin changes in pregnancy

Rashmi Kumari, T. J. Jaisankar, Devinder Mohan Thappa

Department of Dermatology and STD, Jawaharlal Institute of Postgraduate Medical Education and Research (JIPMER), Pondicherry - 605 006, India.

**Address for correspondence:** Dr. Devinder Mohan Thappa, Department of Dermatology and STD, JIPMER, Pondicherry - 605 006, India.  
E-mail- dmthappa@satyam.net.in

### ABSTRACT

**Background:** During pregnancy profound immunologic, metabolic, endocrine and vascular changes occur, that are responsible for the changes of the skin and its appendages, both physiologic and pathologic. **Aims:** We undertook a clinical study to find out the frequency and pattern of skin changes in pregnant women. **Methods:** All consecutive pregnant women were included in the study. **Results:** A total of 607 pregnant women were included in this study. Of these, 303(49.9%) pregnant women were primigravida and 304(51.1%) were multigravida. Skin changes grouped into: physiological changes (all cases), specific dermatoses (22 cases) and other dermatoses affected by pregnancy (125 cases). Most common physiological changes were pigmentary alterations seen in 555 (91.4%) followed by striae seen in 484(79.7%) cases. Of the various specific dermatoses of pregnancy, pruritic urticarial papules and plaques of pregnancy (PUPPP) was the most common disorder (14 cases) followed by pruritus gravidarum (5 cases). The most common dermatoses affected by pregnancy were candidal vaginitis (17 cases), acne vulgaris (15 cases), skin tags (15 cases), eczemas (14 cases). **Conclusion:** This study brings into focus various skin changes during pregnancy in south India.

**Key Words:** Physiologic changes, Pregnancy dermatoses, Specific dermatoses

### INTRODUCTION

During pregnancy profound immunologic, metabolic, endocrine and vascular changes occur, which make the pregnant woman susceptible to changes of the skin and appendages, both physiologic and pathologic.<sup>[1]</sup> These alterations may range from normal cutaneous changes that occur with almost all pregnancies, to common skin diseases that are not associated with pregnancy, to eruptions that appear to be specifically associated with pregnancy. Likewise, the concerns of the patient may range from cosmetic appearance, to the chance of recurrence of the particular problem during a subsequent pregnancy, to its potential effects on the fetus in terms of morbidity and mortality.<sup>[2]</sup> Moreover, pregnancy modifies the course of a number of preexisting dermatological conditions.<sup>[3]</sup> We undertook this

study to know the frequency and pattern of skin changes in pregnant women and various clinical parameters affecting them in south India.

### METHODS

The study was conducted in the out-patient department of Obstetrics and Gynecology, JIPMER, Pondicherry. Ethical committee clearance was obtained. All pregnant women seen between September 2003 and June 2005 were included in the study irrespective of the duration of pregnancy and gravidity. Informed consent was obtained before the interview and clinical examination. A total of 607 pregnant women were included in the study. Detailed history including demographic data, chief complaints related to skin, presence of itching, skin lesions, onset in relation to duration of pregnancy,

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jaundice, vaginal discharge, past or family history of similar lesions, exacerbating factors, associated medical or skin disorders etc. was elicited and recorded.

Complete cutaneous examination was done in all cases to study all the physiological changes of skin and its appendages. If any specific dermatosis of pregnancy was present, the morphology of skin lesions, distribution and the sites involved were studied. Relevant systemic examination was carried out. If any preexisting skin disease was present, any evidence of exacerbation or remission was recorded.

Appropriate investigations were done to confirm diagnosis if required. Bedside laboratory procedures like Tzanck smear, KOH mount and Gram's stain were carried out. To confirm diagnosis skin biopsy and DIF were done in a few cases. In all cases with history of pruritus related to specific disorders of pregnancy, liver function tests were done. Screening with VDRL and ELISA for HIV was done in all the cases. Examination of the 'contact' was done in all cases of sexually transmitted disease. Results were tabulated and analyzed.

**RESULTS**

A total of 607 pregnant women were recruited in our study from September 2003 to June 2005. Of these, 303 (49.9%) were primi gravidas and 304 (51.1%) were multi gravidas. Their age range was 18 to 36 years with a mean of 23 years. Most of them presented in the second (139 cases, 22.9%) or third trimester (444 cases, 73.1%). Most of them (597 cases, 98.4%) were native of South India and majority belonged to skin type IV (425 cases,70%) and V (182 cases,30%).

Pregnancy dermatoses were divided into three categories

- Physiological skin changes
- Specific dermatoses of pregnancy
- Skin diseases affected by pregnancy

Physiological changes were seen in all cases (607). Twenty two cases of specific dermatoses of pregnancy were seen. Other dermatoses affected by pregnancy were seen in 125 cases.

Majority of these pregnant women 546 (89.9%) had no skin related complaints. In those who had primary complaints, itching was the most common primary complaint (68, 11.2%) followed by complaints of presence of skin lesions (52, 8.6%), vaginal discharge (19, 3.1%), melasma (15, 2.5%), miliaria (10, 1.6%) and vulval growth (3, 0.5%).

Past history of striae and pigmentary changes was observed in

204 multi gravidas. None of them had used oral contraceptive pills. A history of extramarital sexual exposure was obtained in 2 pregnant women and six of their respective partners.

**PHYSIOLOGICAL SKIN CHANGES**

Among the physiological skin changes observed, most common were pigmentary changes in 555 (91.4%) cases including hyperpigmentation of skin, melasma, linea nigra, development of secondary areola followed by striae in 484 (79.7%) cases [Table 1].

**SPECIFIC DERMATOSES OF PREGNANCY**

Out of 607 pregnant women seen during the study, 22 pregnant women had specific dermatoses of pregnancy [Table 2].

**Pruritic urticarial papules and plaques of pregnancy (PUPPP)**

In this study, 14 pregnant women were found to have pruritic

**Table 1: Physiological changes in pregnancy**

Physiological changes seen	No. of cases	Percentage of cases
Pigmentation		
Linea nigra	555	91.4%
Secondary areola	476	78.4%
Melasma	15	2.5%
LSCS scar pigmentation	13	2.1%
Naevi darkening	2	0.33%
Pigmentary demarcation line	2	0.33%
Striae	484	79.7%
Hair changes		
Increased hair loss	11	1.8%
Improvement in hair growth	5	0.82%
Glandular		
Montgomery's tubercles	220	36.2%
Miliaria	10	1.65%
Vascular		
Non pitting edema of feet	59	9.7%
Abdominal wall edema	3	0.49%
Varicosities of legs	2	0.33%
Vulval edema	3	0.49%
Spider telangiectasias	2	0.33%
Mucosal		
Jacquemier-Chadwick sign	607	100%
Goodell's sign	607	100%
Gingivitis	9	1.5%
Nail changes	4	0.66%

Note: LSCS-Lower segment caesarean section

**Table 2: Specific disorders of pregnancy**

Specific dermatoses of pregnancy	Number	Percentage
PUPPP	14	63.6
Pruritus gravidarum	5	22.7
Pemphigoid gestationis	1	4.5
Prurigo gestationis of Besnier	1	4.5
Pruritic folliculitis	1	4.5

urticarial papules and plaques of pregnancy (PUPPP). Of these fourteen, 12 (85.7%) were primigravidas and 2 were multi gravidas (14.3%). One patient had fetal complications with IUGR and preterm delivery of a male infant weighing 2.2 kgs.

### Pruritus gravidarum

Five cases of pruritus gravidarum were seen in this study. Of these five, three (60%) were primi gravidas and 2 were multi gravidas (40%). Liver function tests were normal except for raised alkaline phosphatase in 3 patients (60%). No adverse fetal outcome was seen in the five pregnant women.

### DERMATOSES AFFECTED BY PREGNANCY [TABLE 3]

Certain dermatoses like atopic dermatitis (4 cases),

Table 3: Skin diseases affected by pregnancy		
Diseases	No. of cases	Course
<b>Inflammatory disorders</b>		
Atopic dermatitis	4	No change
Eczemas		
• Discoid	5	Exacerbated
• Pompholyx	2	New onset
PMLE	7	No change
Psoriasis	1	Exacerbated
Acne vulgaris	12	Exacerbated
	1	Remission
	2	No change
<b>Infections</b>		
Fungal		
• Candidal vaginitis	17	New onset
• Tinea versicolor	11	New onset
• Tinea corporis	5	New onset
• Pityrosporum folliculitis	2	New onset
Bacterial vaginosis	2	New onset
Condyloma acuminata	3	Exacerbated
Latent syphilis	4	No change
HIV infection	2	Repeated abortions
Herpes labialis	1	New onset
Herpes genitalis	2	Exacerbated
Molluscum contagiosum	1	No change
Verruca vulgaris	2	Exacerbated
Leprosy (BT)	1	No change
<b>Tumors</b>	12	New onset
Skin tags	3	Exacerbated
Neurofibromatosis	1	Exacerbated
Seborrhoeic keratoses	2	No change
<b>Melanocytic nevus</b>	2	Exacerbation
<b>Keloids</b>	1	New onset
<b>Autoimmune</b>		
Vitiligo	1	New onset
SLE	1	Exacerbation
Pemphigus	1	New onset
<b>Ichthyosis vulgaris</b>	1	Exacerbation
<b>Miscellaneous</b>		
Retracted nipple	4	New onset
Accessory nipple	1	No change
Navus achromicus	1	No change
Café au lait macule	4	No change
Nevus of Ota	1	No change
Milia en plaque	1	New onset

polymorphous light eruption (7 cases), latent syphilis (4 cases), molluscum contagiosum (one case), leprosy (one case), seborrhoeic keratoses (2 cases), retracted nipple (4 cases), Café au lait macule (4 cases), accessory nipple, nevus achromicus and nevus of Ota (one case each) did not show any change.

### DISCUSSION

Many of the symptoms and signs are so common that they are not usually considered as being abnormal, but regarded as physiological and can sometimes provide contributory evidence of pregnancy. The commonly encountered physiological changes include striae distensae (occurring in up to 90% of pregnant women), hormonal alterations resulting in melasma (occurring in up to 75% of women during pregnancy) and generalized hyperpigmentation. Vascular alterations result in edema, palmar erythema, spider nevi, varicosities, cutis marmorata, gingival edema and redness. Some women also notice hair and nail changes. Similarly the activity of eccrine and sebaceous glands increases, while that of apocrine gland decreases.<sup>[4]</sup> In addition, pregnancy can modify a number of concomitant dermatoses and there are some pathological skin conditions that are virtually pregnancy specific.

The most common physiological changes are pigmentary alterations, stretch marks, vascular spiders and telogen effluvium.<sup>[5]</sup> In our study, 91.4% of cases had hyperpigmentation, the most common being linea nigra seen in 91.4% cases. Secondary areola developed in 78.4% cases. The other sites of increased localized pigmentation were seen over the abdomen, face, buttocks, scar pigmentation, breasts, axillae, neck in that order. Generalized darkening of skin was reported in 4 (0.66%) cases. These findings are comparable to other studies.<sup>[4,6,7]</sup>

Type b pigmentary demarcation lines are known to appear for the first time during pregnancy.<sup>[8]</sup> James *et al.*<sup>[9]</sup> in their study found 7 pregnant women who developed pigmentary demarcation line for the first time on the posteromedial aspect of lower limb. In our study, one woman developed pigmentary demarcation lines on the posterior aspect of lower limbs for the first time. Another woman reported it for the first time on the medial aspect of both forearms.

Melasma was seen in 15/607 (2.5%) of our cases. It has been reported to occur in 50-75% of pregnant women.<sup>[10]</sup> The onset in 12 (80%) cases was in the first trimester whereas Martin and Leal-Khoury<sup>[5]</sup> reported an onset of melasma mostly during the second trimester. Wong and Ellis<sup>[11]</sup> reported melasma in 50-70 % of pregnant women with an onset during the 2nd

trimester. Of these, 72% cases were epidermal, 13% dermal and 5% were of the mixed type. In 30 % of cases, melasma tends to persist post partum.<sup>[10]</sup> Muzaffer *et al*<sup>[4]</sup> found melasma to be present in 65 (46.4%) of their cases. Raj *et al*<sup>[6]</sup> observed melasma in 10/1175 (8.5%) cases, which is closer to what is seen in our study. This difference may be due to the fact that pigmentary changes are more discernible in the fair skinned individuals.

Striae distensae (striae gravidarum) develop in up to 90% of women during the sixth and seventh month of pregnancy.<sup>[11]</sup> In our study, striae were seen in 484 (79.7%) cases of which 217 (44.8%) were primi gravidas and 267 (55.2%) were multi gravidas. Onset was most commonly seen during the second trimester. The most common site seen in primigravidas was lower abdomen and pink shiny striae were most common. Multi gravidas showed mostly white atrophic striae. Muzaffar *et al.*<sup>[4]</sup> found 77.1% (108/140) of their cases developed striae gravidarum. Raj *et al.*<sup>[6]</sup> also found striae distensae in 75% of pregnant women which is closer to that seen in our study. Chang *et al.*<sup>[12]</sup> found incidence of striae gravidarum in their survey to be 55%.

Striae are uncommon in Asian and African-American women and there seems to be a familial tendency.<sup>[11]</sup> Physical factors (stretching secondary to increase in the abdominal girth) play a role in the development of the striae.<sup>[11,13]</sup> Lower birth weight and smaller babies as compared to Caucasian women may be related to 123/607 (20.3%) pregnant women not developing striae in our study. Poindevin *et al.*<sup>[14]</sup> in 1959, observed that women with lighter complexions had a greater tendency to develop striae compared with women of darker complexions.

Of the 607 women, 11 gave a history of increased hair loss and only 5 patients noticed lengthening and improvement in their scalp hair, whereas 591 (97.4%) gave history of no change in hair density. Muzaffar *et al.*<sup>[4]</sup> reported hair changes in 18 (12.8%) cases. Out of those 18 cases, diffuse thinning of scalp hair was noted in 7 (38.9%) cases. Nine (50%) patients noticed lengthening and improvement in their scalp hair. Frontoparietal recession and hypertrichosis was seen in one case each.

Increased appearance of Montgomery's tubercles is well known during pregnancy in 30-50% of pregnant women.<sup>[5]</sup> In our study, Montgomery's tubercles were seen in 220 (36.3%) cases. This was found to be consistent with other studies.<sup>[5]</sup>

Vascular changes result from distention, instability and

proliferation of vessels and regress postpartum. Non pitting edema of legs, eyelids, face and hands is present in about 50% of women during the third trimester.<sup>[10]</sup> The edema decreases during the day and is thought to be due to secondary sodium and water retention in conjunction with increased capillary permeability.<sup>[5]</sup> Vascular changes seen in our study include nonpitting edema of feet in 59 (9.8%) cases and abdominal wall edema in 3 cases.

Vascular spiders (spider angiomas, nevi aranei) appear in 67% of white and 11% of black women between the 2nd and 5th month of pregnancy. Palmar erythema occurs in 66% of white and 33% of black women beginning in first trimester.<sup>[5]</sup> No cases of palmar erythema were seen in our study which may be related to less visibility in darker skin. In a recent study by Muzaffar *et al.*,<sup>[4]</sup> palmar erythema was seen in 12.1% of cases, varicosities of lower legs in 2.8%, vascular spiders in 1.4% and cutis marmorata in 0.7% cases. Varicosities are most common in anus and legs, appearing in 40% of pregnant women during the 3rd trimester.<sup>[10]</sup> Raj *et al.*<sup>[6]</sup> noted varicose veins in 6 out of 1,175 women. Esteve *et al.*<sup>[7]</sup> observed vascular changes in 50 women including vascular spiders in 32 out of the 60 women.

During pregnancy, the gingivae enlarge, darken and become red and swollen in up to 80% of women. Edema and hyperemia due to hormonal changes as well as local irritation and nutritional deficiencies may be responsible.<sup>[5]</sup> Gingivitis not attributable to bad oral hygiene was seen in 9 out of 607 pregnant women. In a study by Muzaffar *et al.*<sup>[4]</sup> 23/140 (16.4%) had gingival edema and redness. Raj *et al.*<sup>[6]</sup> had seen 3 cases of pyogenic granulomas in their study.

Specific dermatoses of pregnancy are almost always associated with pruritus and an eruption of variable severity. Holmes and Black<sup>[15]</sup> proposed a simplified clinical classification of the specific dermatoses of pregnancy. This classification basically subdivided the specific dermatoses of pregnancy into four groups: (i) pemphigoid (herpes) gestationis (PG); (ii) polymorphic eruption of pregnancy (PEP); (iii) prurigo of pregnancy; and (iv) pruritic folliculitis of pregnancy (PF).<sup>[15]</sup> The incidence of these specific disorders of pregnancy is 0.5 to 3.0%.<sup>[16]</sup> In our study of 607 pregnant women, 22 (3.6%) cases of specific dermatoses of pregnancy were seen. Of these the most common was PUPPP (also known as polymorphic eruption of pregnancy) with a total of 63.6% (14/22) cases followed by 5 (22.7%) cases of pruritus gravidarum. In an Indian study, Shivakumar and Madhavamurthy<sup>[17]</sup> found pruritus to be the commonest symptom (58.82%). Candidiasis (21.78%) was the commonest cause of white discharge per

vagina, Condylomata acuminata (4.70%) was the commonest sexually transmitted disease. Of the disorders specific to pregnancy, 16 (9.41%) had prurigo of pregnancy, 6 (3.52%) had pruritus gravidarum and 4 (2.35%) had polymorphic eruption of pregnancy.

This study brings into focus various skin changes during pregnancy. Clinicians need to distinguish between physiological skin changes and specific dermatoses of pregnancy for better patient care.

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