

A Screening Study on Dermatoses in Pregnancy

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ABSTRACT

Introduction: Pregnancy produces many cutaneous changes, some of which are specifically related to pregnancy (dermatoses of pregnancy), some are modifiable by pregnancy and others that are common are named physiologic. These physiologic skin changes, usually do not impair the health of the mother or the fetus but some of them can be cosmetically significant and of importance to the dermatologist.

Aim: The present study was undertaken to find out the prevalence of the physiological and pathological skin changes in pregnancy, and to correlate the prevalence of the major cutaneous changes and diseases in relation to different trimesters of pregnancy and with gravidity.

Materials and Methods: A cross-sectional study was conducted during the period of August 2008 to August 2010. Ethical clearance was sought from Institutional Ethical Committee. Five hundred pregnant women were randomly selected, irrespective of the duration of pregnancy and gravidity. Detailed history and complete dermatological examination was done. Results

were tabulated and analysed. Statistical analysis was done by Fisher's exact test and Chi square test.

Results: Physiological skin changes were seen in 94.8% of cases, with pigmentary changes being more common (90.8%). Specific dermatoses of pregnancy were observed in 14% of cases with pruritus gravidarum being the most common (10.4%). Prevalence of infection was found to 30.8% with fungal infection being the most common (23.8%). Exacerbations of systemic lupus erythematosus and neurofibromatosis was observed. Pigmentary changes, striae gravidarum and specific dermatoses of pregnancy were observed in statistically significant proportion in primigravidas and during third trimester.

Conclusion: This study emphasizes that the prevalence of physiological skin changes (94.8%) was much higher than specific dermatoses (14%), stressing the fact that in most instances, the skin problems during pregnancy needs only reassurance. But meticulous observation and examination should be done, as pregnancy can influence many dermatological diseases and infections.

Keywords: Impetigo herpetiformis, Pruritus gravidarum, Pruritic urticarial papules and plaques of pregnancy, Specific dermatoses of pregnancy, Striae gravidarum

INTRODUCTION

Pregnancy, an endocrine storm, is characterized by altered endocrine, metabolic, and immunologic milieu. These alterations result in both multiple physiologic and pathologic cutaneous changes that may range from normal cutaneous changes to eruptions that appear to be specifically associated with pregnancy [1]. Moreover, pregnancy may modify the course of a number of dermatological conditions.

The present study was undertaken to find out the prevalence of the physiological and pathological skin changes -specific dermatoses of pregnancy, various infective and miscellaneous cutaneous diseases in pregnancy and to correlate the prevalence of the major cutaneous changes and diseases in relation to different trimesters of pregnancy and with gravidity.

MATERIALS AND METHODS

A cross-sectional study was conducted during the period of August 2008 to August 2010. Ethical clearance was sought from Institutional Ethical Committee. After acquiring informed consent, about 500 pregnant women who attended the Outpatient Department of Maternity Hospital, Madras Medical College, Chennai, Tamil Nadu, India during the time period were randomly selected, irrespective of the duration of pregnancy and gravidity. Pregnant women in active labour were excluded from the study. Detailed history and complete dermatological examination was done in all cases to study the physiological and pathological changes of skin and its

appendages. Relevant systemic examination and investigations like KOH mount, Gram's stain, Tzanck smear, and liver function test were done if required to confirm the diagnosis. Venereal Disease Research Laboratory (VDRL) and enzyme linked immune sorbent assay for Human Immunodeficiency Virus (HIV) were done in all the cases. Results were tabulated and analysed.

STATISTICAL ANALYSIS

Statistical analysis of major cutaneous changes between primigravidas and multigravidas, and between various trimesters was done by Fisher's-exact test and Chi-square test. Statistical analysis was done using software SPSS version 16. A p-value less than 0.05 were considered significant.

RESULTS

A total of 500 pregnant women were studied from August 2008 to August 2010. Of these, 291 (58.2%) were primigravidas, 209 (41.8%) were multigravidas. Among the multigravidas, 164 (32.8%) were second gravida, 39 (7.8%) were third gravida, and six (1.2%) were fourth gravida. Cases seen in the 1st trimester were nine (1.8%), 11th trimester were 87 (17.4%) and 11th trimester were 404 (80.8%).

The distribution of physiological skin changes observed during pregnancy (n =500) is shown in [Table/Fig-1].

Physiological skin changes were seen in about 474 cases (94.8%). Pigmentary changes were noticed in 454 cases (90.8%). Of the

Physiological Changes	I st Trimester				II nd Trimester				III rd Trimester				Total	Percentage (n=500)
	G1	G2	G3	G4	G1	G2	G3	G4	G1	G2	G3	G4		
Pigmentation													454	90.80%
Linea nigra	1	1	2	0	18	12	0	0	114	30	8	0	186	37.20%
Melasma	0	2	0	0	22	8	0	0	75	21	2	0	130	26.00%
Diffuse pigmentation	0	2	0	0	22	30	6	4	209	118	29	0	420	84.00%
Naevi	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00%
Vascular													118	23.60%
Gingival hyperplasia	0	0	0	0	0	0	0	0	8	0	0	0	8	1.60%
Varicose veins	0	0	0	0	0	0	0	0	5	8	13	0	26	5.20%
Pedal oedema	0	0	0	0	0	0	0	0	58	22	2	0	82	16.40%
Abdominal wall oedema	0	0	0	0	0	0	0	0	0	2	0	0	2	0.40%
Cherry angioma	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00%
Connective Tissue													402	80.40%
Striae gravidarum	0	2	2	0	21	32	7	4	183	118	29	0	398	79.60%
Acrochordon	0	1	0	0	0	1	0	0	1	1	0	0	4	0.80%
Hair													8	1.60%
Hirsutism	0	0	0	0	0	0	1	0	2	0	0	0	3	0.60%
Hair loss	0	0	0	0	0	0	0	0	2	3	0	0	5	1.00%
Eccrine													68	13.60%
Miliaria	0	2	0	0	0	9	2	0	25	26	4	0	68	13.60%
Nail													4	0.80%
Nail changes	0	0	0	0	2	0	0	0	2	0	0	0	4	0.80%

[Table/Fig-1]: Distribution of physiological changes during pregnancy(n=500).
G1 - Primigravida, G2 - Gravida 2, G3 - Gravida 3, G4 - Gravida 4

pigmentary changes, diffuse pigmentation was noted in 420 cases (84%). About 254 cases (50.8%) were primigravidas. About 369 cases (73.8%) were observed in IIIrd trimester. The difference in proportion of pigmentary changes between primigravida and multigravida was statistically significant (p < 0.001) and that between various trimesters was not statistically significant (p = 0.349), is shown in [Table/Fig-2,3]. Vascular changes were seen in 118 cases (23.6%), all were seen in IIIrd trimester, the difference in proportion of vascular changes between various trimesters was statistically significant (p < 0.0001), is shown in [Table/Fig-4]. Connective tissue changes were observed in 402 cases (80.4%). Of these, striae gravidarum was seen in 398 cases (79.6%). The difference in proportion of striae gravidarum between primigravida and multigravida was statistically significant (p<0.0001) and between various trimesters was also statistically significant (p = 0.007), as shown in [Table/Fig-5,6] respectively.

The specific dermatoses of pregnancy were observed in 70 cases (14%) exclusively in IIIrd trimester in this study, the distribution of cases were shown in [Table/Fig-7]. The difference in proportion of specific dermatoses between primigravida and multigravida was statistically significant (p<0.0001), and between various trimesters

Pigmentary changes	Present	Absent	Test of Significance
Primigravida	254(50.8%)	37(7.4%)	p≤0.001
Multigravida	200(40%)	9(1.8%)	

[Table/Fig-2]: Statistical analysis of association between pigmentary changes and gravidity (n=500).
Statistical analysis done by Fisher's exact test.

Pigmentary changes	Present	Absent	Test of Significance
Trimester	I st	7(1.4%)	p=0.349
	II nd	78(15.6%)	
	III rd	369(73.8%)	

[Table/Fig-3]: Statistical analysis of association between pigmentary changes and various trimesters (n=500).
Statistical analysis done by Chi-square test.

Vascular changes		Present	Absent	Test of Significance
Trimester	I st	0	9(1.8%)	p<0.0001
	II nd	0	87(17.4%)	
	III rd	118(23.6%)	286(57.2%)	

[Table/Fig-4]: Statistical analysis of association between vascular changes and various trimesters (n=500).
Statistical analysis done by Chi-square test.

Striae gravidarum	Present	Absent	Test of Significance
Primigravida	204 (40.8%)	87 (17.4%)	p<0.0001
Multigravida	194 (38.8%)	15 (3%)	

[Table/Fig-5]: Statistical analysis of association between striae gravidarum and gravidity (n=500).
Statistical analysis done by Fisher's exact test.

Striae gravidarum		Present	Absent	Test of Significance
Trimester	I st	4 (0.8%)	5 (1%)	p=0.007
	II nd	64 (12.8%)	23 (4.6%)	
	III rd	330 (66%)	74 (14.8%)	

[Table/Fig-6]: Statistical analysis of association between striae gravidarum and various trimesters (n=500).
Statistical analysis done by Chi-square test.

was also statistically significant (p<0.0001), is shown in [Table/Fig-8,9] respectively. Pruritus gravidarum was the most common disease encountered (n=52, 10.4%), followed by prurigo of pregnancy (1.8%) and Pruritic Urticarial Papules and Plaques of Pregnancy (PUPPP) (1.6%).

The distribution of infections observed during pregnancy was shown in [Table/Fig-10]. The distribution of miscellaneous dermatoses observed during pregnancy was shown in [Table/Fig-11].

DISCUSSION

In our study, majority of the pregnant women had physiological skin changes (n=474, 94.8%). Hyperpigmentation is common during pregnancy and may be seen in up to 90% of pregnant women [1]. Kumari R et al., reported hyperpigmentation in 91.4%

Infections	I st Trimester				II nd Trimester				III rd Trimester				Total	Percentage (n=500)
	G1	G2	G3	G4	G1	G2	G3	G4	G1	G2	G3	G4		
Pruritus gravidarum	0	0	0	0	0	0	0	0	44	8	0	0	52	10.40%
PUPPP	0	0	0	0	0	0	0	0	7	1	0	0	8	1.60%
Prurigo of pregnancy	0	0	0	0	0	0	0	0	6	3	0	0	9	1.80%
Pruritic folliculitis	0	0	0	0	0	0	0	0	1	0	0	0	1	0.20%
Pemphigoid gestationis	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00%

[Table/Fig-7]: Distribution of specific dermatoses observed during pregnancy (n=500).

PUPPP – Pruritic urticarial papules and plaques of pregnancy.

G1 - Primigravida, G2 – Gravida 2, G3 – Gravida 3, G4 – Gravida 4

Specific dermatoses	Present	Absent	Test of Significance
Primigravida	58 (11.6%)	233 (46.6%)	p<0.0001
Multigravida	12 (2.4%)	197 (39.4%)	

[Table/Fig-8]: Statistical analysis of association between specific dermatoses and gravidity (n=500).

Statistical analysis done by Fisher's exact test.

Specific dermatoses	Present	Absent	Test of Significance	
Trimester	I st	0	9 (1.8%)	p<0.0001
	II nd	0	87 (17.4%)	
	III rd	70 (14%)	334 (66.8%)	

[Table/Fig-9]: Statistical analysis of association between specific dermatoses and various trimesters (n=500). Statistical analysis done by Chi-square test.

of pregnant women [2]. Muzaffar F et al., observed pigmentary changes in 90.7% of cases [3]. Fernandes LB et al., reported pigmentary changes in 87.95% of cases [4]. Panicker W et al., observed hyperpigmentation in 87.67% of cases [5]. In this study, we observed pigmentary changes in 90.8% which is consistent with above mentioned studies. The most common pigmentary change was diffuse pigmentation seen in 420 cases (84%). The sites of increased pigmentation observed in the order of frequency were areolae, genitalia, neck and axilla. Secondary areolae developed in all 420 cases (100%). In this study, linea nigra (LN) was seen in 186 cases (37.2%), whereas LN was observed as the most common pigmentary changes in studies conducted by Panicker W et al., (87.67%) and Hassan I et al., (80%) [5,6].

Melasma has been reported to occur in up to 70% of pregnant women [7]. Muzaffar F et al., found melasma to be present in 46.4%

of their cases and Raj S et al., observed melasma in 8.8% of cases, whereas in this study, melasma was seen in 26% (n=130) of cases [3,8]. Cheeks and nose were the common sites involved. Martin AG et al., reported an onset of melasma during IInd trimester, whereas in this study, the onset of melasma in most (n=98, 19.6%) of the cases were in early third trimester [9].

The increased prevalence of pigmentary changes may be related to elevated serum levels of melanocyte stimulating hormone, oestrogen and possibly progesterone [7].

Muzaffar F et al., reported vascular changes in 34.2% of cases, with non-pitting pedal oedema in 48.5% of cases [3]. In our study, vascular changes were noticed in 23.6% (n=118) of cases, with non-pitting pedal oedema in 16.4% of cases. Vascular changes were thought to be due to sustained high levels of circulating oestrogen resulting in distension and proliferation of vessels [10].

In IIIrd trimester, higher proportion of vascular changes was observed (23.6%), which was statistically significant (p<0.0001), this may be due to increased venous pressures in the femoral and pelvic vessels caused by the gravid uterus.

Kumari R et al., Muzaffar F et al., Panicker W et al., and Raj S et al., reported striae gravidarum in 79.7%, 77.1%, 72.83% and 75.4% respectively [2,3,5,8]. In our study, the prevalence of striae gravidarum was found to be 79.6% (n=398) of cases, with the onset being more common during third trimester (n=330, 66%), which was statistically significant (p=0.007). In primigravidas, higher proportion of striae gravidarum was observed (40.8%), which was statistically significant (p<0.0001). Adrenocortical hormones, oestrogen, relaxin and physical factors such as stretching secondary to an increase in the abdominal girth, might explain the prevalence of striae in

Infections	I st Trimester				II nd Trimester				III rd Trimester				Total	Percentage (n=500)
	G1	G2	G3	G4	G1	G2	G3	G4	G1	G2	G3	G4		
Bacterial														
Furunculosis	0	0	0	0	0	0	0	0	4	0	0	0	4	0.80%
Hansen's disease	1	0	0	0	0	0	0	0	1	0	0	0	2	0.40%
Viral														
Wart	0	0	0	0	1	0	0	0	6	1	0	0	8	1.60%
HSV	0	1	1	0	0	0	0	0	1	2	0	0	5	1.00%
Herpes zoster	0	0	0	0	0	0	0	0	2	4	0	0	6	1.20%
HIV	0	0	0	0	1	0	0	0	0	0	0	0	1	0.20%
Fungal														
Candidiasis	0	0	0	0	1	3	1	0	13	18	4	0	40	8.00%
Tinea versicolor	0	0	0	0	13	4	1	0	19	12	4	0	53	10.60%
Dermatophyte	0	0	0	0	3	2	0	2	9	8	2	0	26	5.20%
Protozoal														
Trichomoniasis	0	0	0	0	0	3	0	0	2	3	0	0	8	1.60%
Arthropod														
Scabies	0	0	0	0	0	1	0	0	0	0	0	0	1	0.20%

[Table/Fig-10]: Distribution of infections observed during pregnancy (n = 500).

G1 - Primigravida, G2 – Gravida 2, G3 – Gravida 3, G4 – Gravida 4

Dermatoses	I st Trimester				II nd Trimester				III rd Trimester				Total	Percentage (n=500)
	G1	G2	G3	G4	G1	G2	G3	G4	G1	G2	G3	G4		
Acne	0	0	0	0	9	6	0	0	23	13	1	0	52	10.40%
Insect bite allergy	0	0	1	0	2	2	0	0	9	12	4	0	30	6.00%
SLE	0	0	0	0	1	1	1	0	0	0	0	0	3	0.60%
Acanthosis nigricans	0	0	0	0	0	0	0	0	0	1	1	0	2	0.40%
Pityriasis rosea	1	1	0	0	0	0	0	0	0	0	0	0	2	0.40%
Neurofibromatosis	0	0	0	0	0	0	0	0	2	0	0	0	2	0.40%
Antiphospholipid antibody syndrome	0	0	0	0	0	0	2	0	0	0	0	0	2	0.40%
Psoriasis	0	1	0	0	0	0	0	0	0	0	0	0	1	0.20%
Impetigo herpetiformis	0	0	0	0	0	0	0	0	0	0	0	1	1	0.20%
Urticaria	0	0	0	0	0	1	0	0	0	0	0	0	1	0.20%

[Table/Fig-11]: Distribution of miscellaneous dermatoses observed during pregnancy (n=500).
G1 - Primigravida, G2 - Gravida 2, G3 - Gravida 3, G4 - Gravida 4

IIIrd trimester. There also seems to be an association between the maternal weight gain, foetal birth weight and the development of striae [7].

The changes in hair growth such as hirsutism (0.6%), telogen effluvium (1%) are in accordance with other studies [2].

Miliaria was observed in 13.6% (n=68) of cases. This may be due to the increased eccrine function during pregnancy.

Specific dermatoses of pregnancy are almost always associated with an eruption of variable severity and pruritus. It includes conditions that occur exclusively during pregnancy and results directly from the state of gestation or the products of conception. Kumari R et al., reported 22(3.6%) cases of specific dermatoses of pregnancy [2]. Fernandes LB et al., reported specific dermatoses in 8.72% of cases and Panicker W et al., reported specific dermatoses in 2% of cases [4,5].

Raj S et al., reported specific dermatoses in 16.3% of cases [8]. The specific dermatoses of pregnancy observed in our study was 14% (n=70) and was seen exclusively in third trimester, which was statistically significant (p<0.0001). This may be possible because in IIIrd trimester placental hormonal levels will be highest and spontaneous remission occurs at delivery, when hormone concentrations normalize [1]. Higher proportion of specific dermatoses was observed in primigravida (11.6%), which was statistically significant (p<0.0001). Pruritus gravidarum (10.4%) was the most common disease observed in our study, whereas atopic eruption of pregnancy was the most common disease observed by Fernandes LB et al., (70.88%) and Hassan I et al., (50%) [4,6].

In literature, pruritus gravidarum is seen in the third trimester of pregnancy in 70% of cases, with the incidence varying from 0.02% to 2.4% of pregnancies [7,11]. Fernandes LB et al., reported 18.98% of cases of pruritus gravidarum [4]. Hassan I et al., reported 25% of cases of pruritus gravidarum [6].

In our study, PUPPP was observed in eight cases. Majority were primigravidas (1.4%). The parity (primigravida) and the onset in IIIrd trimester is consistent with other studies [2,12]. Furthermore, the onset in IIIrd trimester and the primigravida being affected more was supported by the hypothesis that rapid abdominal wall distension in primigravidas may cause damage to connective tissue in the striae with conversion of nonantigenic molecules to antigenic ones, triggering an inflammatory response [13,14].

Kumari R et al., Raj S et al., and Shivakumar V et al., reported prurigo of pregnancy in 0.16%, 1.2% and 9.41% of cases respectively [2,8,12]. In this study, prurigo of pregnancy was seen in 1.85% of cases. Pruritic folliculitis of pregnancy was noticed in 0.2%, which is consistent with other studies [2].

The infections observed in our study was 30.8%. Statistically significant proportion of infections were observed in multigravidas (15.4%, p=0.0142). The most common infection observed in our study was fungal infection, seen in 23.8%, followed by viral (4%), trichomoniasis (1.6%) and bacterial (1.2%) infections. Pityriasis versicolor was seen in 10.60% of cases, the high prevalence may be attributed to warm humid environment in addition to the influence of pregnancy [15]. Candidiasis was seen in 8% of cases, this may be due to the higher glycogen content in the vaginal environment and oestrogen mediated enhanced adherence of Candida species to vaginal epithelial cells resulting in an increased risk of symptomatic vaginitis in pregnancy [16]. The most prevalent viral infection was wart (1.6%). Accelerated viral replication with advanced pregnancy has been hypothesized. Certainly the moistness offered by vaginal mucus throughout pregnancy offers ideal moist conditions for viral growth [17]. The prevalence of HIV infection in pregnant women in India is about 0.3%. In our study, HIV was seen in 0.2% of cases. Pregnancy does not alter disease progression in asymptomatic women and those with early disease, although there may be a more rapid progression in women with late stage HIV infection [18]. Hansen's disease was seen in 0.4% of cases. One had lepromatous leprosy and the other had borderline tuberculoid leprosy. Both the patients noticed the disease onset during pregnancy, which clearly shows the worsening of the disease during pregnancy, as described in literature [19].

Psoriasis was observed in one individual (0.2%), without any worsening during pregnancy, which is consistent with literature [20]. Impetigo herpetiformis was observed in 0.25 of cases (n=1) during IIIrd trimester. The onset of the disease is consistent with other studies [7]. The patient was a known case of psoriasis vulgaris, who presented as generalized pustular psoriasis during pregnancy with typical features. As described in literature, this may be due to the hormonal influence of pregnancy over the disease, as an endocrine cause is being suspected for impetigo herpetiformis [10].

Exacerbation of neurofibromatosis with increased number of cutaneous neurofibromas during pregnancy in IIIrd trimester was seen in two cases (0.4%). This is in accordance with literature, that neurofibroma may enlarge or arise de novo during pregnancy [7].

These three cases (0.6%) of systemic lupus erythematosus was observed with cutaneous flares and arthritis, which is consistent with literature. Complement activation is associated with disease flares during pregnancy [21].

LIMITATION

This study lacks generalisation to the entire population of pregnant women because it was carried out in a tertiary health care centre. Further the study setting being a referral centre there is a possibility that the prevalence of the pregnancy specific dermatoses could have been over estimated.

CONCLUSION

In this study, the prevalence of physiological skin changes (94.8%) was much higher than specific dermatoses (14%), stressing the fact that in most instances, the skin problems during pregnancy needs only reassurance. But meticulous observation and examination should be done, as pregnancy can influence many dermatological diseases and infections.

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