



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 2018 to August 2019 at Srinivas Institute of Medical Sciences and Research, Mukka, Mangalore, India 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; Pruritic urticarial papules and plaques of pregnancy; Pruritus gravidarum; Specific dermatoses of pregnancy; Striae gravidarum

Introduction

Pregnancy is characterized by altered endocrine, metabolic, and immunologic milieus. These dramatic alterations result in multiple cutaneous changes, both physiologic and pathologic. These alterations 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. 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. [2] 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. 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.[3] Moreover, pregnancy modifies the course of a number of preexisting dermatological conditions. 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. [4,5] The present study was undertaken to find out the prevalence of the physiological and pathological skin changes in pregnancy.

Materials And Methods: A cross-sectional study was conducted during the period of August 2018 to August 2019. Srinivas Institute of Medical Sciences and Research, Mukka, Mangalore, India. Five hundred pregnant women were randomly selected,

irrespective of the duration of pregnancy and gravidity. Informed consent was obtained before clinical examination. Detailed history including age, obstetric status, antenatal history, chief complaints related to skin, onset of skin changes / lesions in relation to duration of pregnancy, history of similar illness in previous pregnancies, family history of similar lesions, exacerbating factors, associated medical and skin diseases, etc were elicited and recorded. Detailed history and complete dermatological examination was done. Appropriate investigations were done if required to confirm the diagnosis. Bedside laboratory procedures like KOH mount, Gram's stain and Tzanck smear were carried out. To confirm diagnosis skin biopsy was 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 cases. Examination of the contact was done in all cases of sexually transmitted disease. Results were tabulated and analyzed. Statistical analysis of major cutaneous changes between primigravidas and multigravidas, and between various trimesters were done by Fisher's exact test and Chi square test respectively.

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 6 (1.2%) were fourth gravid. Cases seen in the I trimester were 9 (1.8%), II trimester were 87 (17.4%) and III trimester were 404 (80.8%). 98.2% were in the II and III trimester of pregnancy.

Table 1: Age distribution of the pregnant women in the study group.(n=500)

Age Group in Years	Total Number	Percentage
16-20	85	17.00%
21-25	250	50.00%
26-30	142	28.40%
31-35	20	4.00%

36-40	3	0.60%
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The youngest and oldest patients were aged 16 and 39 respectively. 50% (n=250) of them belonged to the age group 21-25 years. Majority of the cases had type IV and type V skin. Most of them belonged to lower socioeconomic status.

TABLE :2 COMMON SITES OF PIGMENTATION

Site of pigmentation	Number of Cases	Percentage
Areola	420	100
Genitalia	180	42.86
Axilla	18	4.28
Neck	23	5.47
Generalised	120	28.57

Linea nigra was noticed in 186 cases (37.2%). This was observed in 30.4% (n=152) in III trimester, and majority 26.6% (n=133) were primigravidas. This was seen as hyperpigmented midline streak extending from the pubis symphysis to the xiphoid process of the sternum. Melasma was seen in 130 cases (26%). This was noticed in the III trimester in 98 cases (19.6%), and most of them (n=97, 19.4%) were primigravidas. The cheeks and nose were the most commonly affected sites Other sites involved were the forehead and chin.

Table 3:Statistical analysis of association between pigmentary changes and gravidity.

Pigmentary changes	Present	Absent	Test of significance
Primigravida	254 (50.8%)	37 (7.4%)	P = 0.001
Multigravida	200 (40%)	9(1.8%)	

50.8% of primigravida and 40% of multigravida had pigmentary changes, this difference in proportion of pigmentary changes between primigravida and multigravida was statistically significant (p=0.001) by Fisher’s exact test.

Table 4:Statistical analysis of association between pigmentary changes and various trimesters

Pigmentary changes		Present	Absent	Test of significance
Trimester	I	7 (1.4%)	2 (0.4%)	P = 0.349
	II	78 (15.6%)	9(1.8%)	
	III	369 (73.8%)	35 (7%)	

No statistically significant difference in proportion of pigmentary changes between various trimesters was observed in our study by Chi square test (p=0.349)Vascular changes were seen in 118 cases (23.6%). Gingival hyperplasia was seen in 8 cases (1.6%), all were primigravidas seen in III trimester Vulval varicosities were

observed in 26 cases (5.2%). All were seen in III trimester. Majority of them were third gravida (n=13, 2.6%) Nonpitting pedal edema was noticed in 82 cases (16.4%). Most of them were primigravidas (n=58, 11.6%). All were seen in III trimester Abdominal wall edema was noticed in 2 cases (0.4%), both of them were second gravida seen in III trimester.

Table 5: Statistical analysis of association between vascular changes and gravidity

Vascular changes	Present	Absent	Test of significance
Primigravida	73(14.6%)	218 (43.6%)	P = 0.3935
Multigravida	45 (9%)	164 (32.8%)	

By Fisher's exact test, the difference in proportion of vascular changes between primigravida and multigravida was not statistically significant (p=0.3935).

TABLE :6 Statistical analysis of association between vascular changes and various trimesters.

Pigmentary changes		Present	Absent	Test of significance
Trimester	I	0	9 (1.8%)	P < 0.0001
	II	0	87(17.4%)	
	III	118 (23.6%)	286 (57.2%)	

The difference in proportion of vascular changes between various trimesters was statistically significant (p < 0.0001) by Chi square test. Connective tissue changes were observed in 402 cases (80.4%). Of these, striae gravidarum was seen in 398 cases (79.6%). 138 cases had striae due to previous pregnancies. 66% (n=330) were in III trimester. 40.8% (n=204) were primigravidas and 38.8% (n=194) were multigravidas. Among the multigravidas, 152 cases (30.4%) were second gravida , 38 cases (7.6%) were third gravida and 4 cases (0.8%) were fourth gravid. The abdomen was the most common site involved

Table 7: Statistical analysis of association between striae gravidarum and gravidity

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

The difference in proportion of striae gravidarum between primigravida and multigravida was statistically significant (p<0.0001) by Fisher's exact test.

Table 8 Statistical analysis of association between striae gravidarum and various trimesters.

Striae gravidarum		Present	Absent	Test of significance
Trimester	I	4 (0.8%)	5 (1%)	P = 0.007
	II	64 (12.8%)	23 (4.6%)	
	III	330 (66%)	74 (14.8%)	

Between various trimesters, statistically significant difference (p=0.007) in proportion of striae gravidarum was observed by Chi square test.

Acrochordons was observed in 4 cases (0.8%) and 2 cases (0.4%) were in III trimester 3 cases (0.6%) were second gravida and 1 case (0.2%) – primigravida. Hirsutism was seen in 3 cases (0.6%). 2 cases (0.4%) were primigravidas seen in III trimester. Diffuse hair loss was seen in 5 cases (1%). All were in III trimester. Nail changes were noted in 4 cases (0.8%). They included brittleness and leukonychia. Miliaria was observed in 68 cases (13.6%). The lesions were distributed over the trunk, neck and face .55 cases (11%) were in III trimester. Gravida 1 constituted 25 cases (5%), gravida 2 – 37 cases (7.4%), gravida 3 – 6 cases (1.2%). The specific dermatoses of pregnancy were observed in 70 cases (14%) exclusively in III trimester.

Table 9 Statistical analysis of association between specific dermatoses and gravidity.

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

By Fisher’s exact test, the difference in proportion of specific dermatoses between primigravida and multigravida was statistically significant (p<0.0001).

Table 10 Statistical analysis of association between specific dermatoses and various trimesters.

Specific dermatoses		Present	Absent	Test of significance
Trimester	I	0	9 (1.8%)	P < 0.0001
	II	0	87 (17.4%)	
	III	70 (14%)	334 (66.8%)	

By Chi square test, the difference in proportion of specific dermatoses between various trimesters was statistically significant (p< 0.0001). Pruritus gravidarum was the most common disease encountered (n=52, 10.4%). Of those affected, 44 (8.8%) were primigravidas and 8 were gravida 2 (1.6%). All had single gestation

pregnancies. Two of the 8 multigravidas reported identical symptoms in previous pregnancies. All the cases presented exclusively in III trimester. All had sudden onset of severe pruritus which started initially in the abdomen and later became generalized, which was followed by secondary skin lesions, namely excoriations and excoriated papules. None of these cases had clinical jaundice. The liver function tests were normal in all except two patients who had elevated alkaline phosphatase levels. Pruritic urticarial papules and plaques of pregnancy were observed in 8 cases (1.6%). Majority were primigravidas (n=7, 1.4%) and 1(0.2%) was a multigravida (G2). All had single gestation pregnancy. Skin lesions occurred in all cases in III trimester. The pruritic eruption started characteristically on the lower abdomen, particularly within or adjacent to the striae distensae in all cases. With disease progression, the eruption was seen to involve other parts of the body also. Vast majority of patients had erythematous urticarial papules and plaques.

Table 10 Statistical analysis of association between infections and gravidity

Infections	Present	Absent	Test of significance
Primigravida	77 (15.4%)	214 (42.8%)	P = 0.0142
Multigravida	77 (15.4%)	132 (26.4%)	

Fisher’s exact test showed statistically significant difference in proportion of infections between primigravida and multigravida (p=0.0142).

Table 11 Statistical analysis of association between infections and various trimesters

Infections		Present	Absent	Test of significance
Trimester	I	3 (0.6%)	6 (1.2%)	P = 0.059
	II	36 (7.2%)	51 (10.2%)	
	III	115 (23%)	289 (57.8%)	

Chi square test showed no statistically significant difference in proportion of infections between various trimesters (p=0.059).

Bacterial infections were observed in 1.2% (n=6). Of the bacterial infections, furunculosis was observed in 4 primigravidas (0.8%). They were in III trimester. Out of these 4 cases, one had gestational diabetes.

Hansen disease was seen in 2 cases (0.4%). One was a primigravida in III trimester who presented as lepromatous leprosy with healed trophic ulcer. Other was a primigravida in I trimester who presented as borderline tuberculoid leprosy. Viral infections were observed in 4% (n=20). Of the viral infections, wart was seen in 8 cases (1.6%). Condyloma acuminata

was noted in 5 cases (1%), all were primigravidas in III trimester. One of them had verrucous pinkish exuberant growth occupying the introitus. The other women had pinkish and verrucous papules over the labia minora and labia majora. 3 cases (0.6%) of verruca vulgaris was noticed. Of these, 2 cases were primigravidas and 1 was a second gravida.

Herpes simplex infection was noted in 5 cases (1%). Of these, herpes labialis (HSV 1) was seen in 3 cases (0.6%). They presented with multiple grouped vesicles and erosions around the mouth HSV II (genital herpes) was seen in 2 cases (0.4%), who presented with multiple painful erosions and ulcers over the labia majora and minora Tzanck smear

showed multinucleated giant cells. Herpes zoster was observed in 1.2% (n=6) of cases.

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% 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, relax in and physical factors such as stretching secondary to an increase in the abdominal girth, might explain the prevalence of striae in 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].

Conclusion: In this study, the prevalence of physiological skin changes in pregnant women was 94.8%, with pigmentary changes being the most common (90.8%), followed by striae gravidarum (79.6%), vascular changes (23.6%), miliaria (13.6%), hair changes (1.6%) and nail changes (0.8%). The prevalence of specific dermatoses of pregnancy was 14%. Pruritus gravidarum was the most common disease encountered (10.4%), followed by prurigo of pregnancy (1.8%), pruritic urticarial papules and plaques of pregnancy (1.6%) and pruritic folliculitis of pregnancy (0.2%). Compared to multigravidas, primigravidas had a statistically significant proportion of pigmentary changes, striae gravidarum and specific dermatoses of pregnancy. Significantly higher proportion of vascular changes, striae gravidarum and specific dermatoses of pregnancy was observed in third trimester.

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