

Skin in Pregnancy: A Study

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Abstract

Background: Birth is viewed as natural event, trust in God and nature. Baby starts labour, fighting his way out of womb, labour pains are just reaction. Pregnancy is associated with various endocrinal and metabolic changes which cutaneous changes of pregnancy but also influence certain pre-existing skin diseases [37] during pregnancy a part from being implicated as a cause of pregnancy specific dermatoses.

Materials and Methods: The material for the study constituted of 100 patients selected from antenatal out patient clinic and antenatal ward at Government Maternity Hospital, Hyderabad, 2007-2008.

Results: They have been tabulated in Tables form in main manuscript.

Conclusion: Out of the total number of 100 pregnant women, 84 belonged to low socioeconomic status: 15 to middle socioeconomic and status, one pregnant women to high socioeconomic status. Most of the women were multipara and (76) the remaining were primies (24). Multipara women in our study belonged to more than 30 years of age group, out of which 3 were Hindus and 7 were Muslims. Pigmentation of the skin was the commonest physiological change seen more in multipara women (100%) than in primies (93%).

Key words: Physiological changes, Pregnancy-specific dermatoses, Skin

INTRODUCTION

Birth is viewed as a natural event, trust in God and nature. Baby starts labor, fighting his way out of womb, labor pains are a just reaction.¹⁻³

Pregnancy is associated with various endocrinal and metabolic changes which cutaneous changes of pregnancy but also influence certain pre-existing skin diseases during pregnancy apart from being implicated as a cause of pregnancy-specific dermatoses.

Pregnancy is a period of significant and complex physiological changes. Some of these changes are due to the *de novo* production of a variety of protein and steroid pituitary, thyroid, and adrenal glands. Hormonal changes induced by normal pregnancy may have profound influence on skin.

Foeto-placental production, stimulation, or alteration of clearance of these hormones from circulation may increase the plasma availability of estrogens, progesterone, androgens, adrenal steroids, and pituitary hormones especially melanocyte stimulating hormone. These increased hormonal levels immunologically mediated dermatoses such as herpes gestationis also occur during pregnancy.

Pregnancy may influence and exacerbate pre-existing conditions such as porphyria cutanea tarda, melanoma, neurofibromatosis, and various autoimmune dermatoses such as systemic lupus erythematosus, dermatomyositis, and systemic sclerosis apart from many other dermatoses. These disorders not only influence the outcome of pregnancy but also have profound effect on the health of the fetus.⁴⁻¹⁰

Infections of genital tract especially sexually transmitted diseases effect millions of people worldwide. Studies have indicated that the prevalence of such infections is high during pregnancy. Bacterial and candidal vaginosis when severe may occasionally result in adverse outcome of pregnancy.

Above observations highlight the importance of diagnosing and treating these infections to decrease the morbidity and mortality of the mother and child.

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In this study, we have attempted to study all the types of dermatoses effecting the pregnant women. We have also undertaken a mycological study of the vaginal discharge of these pregnant women to assess the prevalence of candidiasis.

MATERIALS AND METHODS

Material

The material for the study constituted of 100 patients selected from the antenatal outpatient clinic and antenatal ward at Government Maternity Hospital, Hyderabad, 2007-2008.

Methodology

The patients visiting antenatal OP and antenatal ward during the period of 1 year between 2007 and 2008 were included in the study. Special case pro forma was prepared which was used to record complaints, history, clinical features, and results of investigations.

Inclusion Criteria

1. Antenatal cases attending antenatal OP and antenatal ward
2. Pregnancy confirmed by gravindex test
3. Primies and multigravidae
4. Pregnant women with abortions and fetal deaths.

Clinical Examination

All the patients had a complete dermatological examination including physiological and pathological changes. All the systems were examined. Vaginal swabs were taken in patients, who complained of vaginal discharge and pruritus.

Investigations

Routine antenatal investigations were performed such as complete urine analysis, blood sugar, blood urea, blood grouping and typing enzyme-linked immunosorbent assay for human immunodeficiency virus (HIV), and venereal disease research laboratory. hepatitis B surface antigen (HbsAg) was done in all patients as a part of antenatal screening. Liver function test (LFT) was done for patients who complained of pruritus and who had icterus. Vaginal swabs were taken in all the patients complaining of vaginal discharge and pruritus of vulvae. These swabs were submitted for direct microscopy and culture for candidiasis.

Skin biopsy was done in patients presenting with cutaneous lesions. All the biopsy specimens were sent for histopathological examination.

Gram-staining

1. Smear was heat fixed and stained with 1% gentian violet for 1 min
2. Stain was thrown and slide washed with distilled water and Gram's iodine was poured onto the smear and

allowed to act for 1 min. Composition of Gram's iodine – iodine 1 g, potassium iodine 2 g in 300 ml of distilled water

3. Slide was washed with distilled water after throwing away the iodine and decolorized with absolute alcohol for 15 s
4. The smear was counterstained with dilute carbol fuchsin for 30 s
5. The slide is washed and blotted dry and observed under oil immersion lens after putting a drop of cedarwood oil.

And examined for Gram-negative oval, budding yeast cell and Gram-positive pseudohyphae.

Collection of Specimen for Candidiasis

The specimen collected was high vaginal swab. After thorough local cleansing, a sterile speculum was introduced into the vagina, and a sterile swab inserted into the upper part of vagina and rotated. The procedure was repeated with another vaginal swab. After withdrawing the swabs, they were submitted aseptically to the microbiology laboratory for processing, one swab was used for culture which inoculated onto the sabourauds dextrose agar with added antibiotics (chloramphenicol) and incubated at 37°C for 48-72 h.

Second swab was used for making smears for staining by Gram's method.

Culture

Sabourauds dextrose agar.

Composition:

- Glucose: 20 g
- Peptone: 10 g
- Agar: 15 g
- Water: 1 L
- Chloramphenicol: 5 mg.

Steam to dissolve glucose, peptone, agar and adjust pH to 5.4. Autoclave at 115°C for 15 min and chloramphenicol is added. 20 ml amounts dispensed into Petri dishes and Mac Cartney's bottles and stored at 4°C.

After 48-72 h, incubation at 37°C opaque and pale colored growth suggesting yeast colonies was observed. *Candida* was confirmed microscopically by Gram-staining from the growth.

Confirmation

Germ tube test

Germ tube test was done to confirm the *Candida albicans*. For this test, single colony was emulsified in 0.5 m serum in a small test tube and incubated at 37°C in a water bath

for 2 h. After 2 h, loop full of the growth taken on sterile slide and observed under the microscope after applying cover slip. Observe under low power and look for finger-like extension of the parent cell. Positive germ tube test is taken as confirmatory test for *C. albicans*.

Skin Biopsy

Procedure

After selecting the biopsy site, the area was cleaned with a swab of cotton ball dipped in 70% alcohol. One CC of 2% xylocaine solution was infiltrated into the skin at the selected site. After five minutes when the area injected had become completely anesthetic, an elliptical incision was made in such a way as to follow in natural folds and wrinkles. The incision was about 10-12 mm long and at a depth 4-6 mm so as to reach subcutis. For taking biopsy, a sharp knife with a detachable blade (size 15) was used. The skin with subcutaneous tissue was dissected out, and the specimen was dropped into the fixative.

The bottle containing the specimen was labelled with name, OP number of the patient and sent for histopathological processing.

The biopsy site was sutured with cotton thread and the area covered by sterile dressing gauge.

The fixative for skin biopsy specimen

FMA fixative was used as fixative, after 2-3 h the specimen was transferred to 70% alcohol.

- 40% formaldehyde: 10 ml
- Mercuric chloride: 2 g
- Acetic acid: 3 ml
- Water: 100 ml.

Processing of biopsy specimen

The skin biopsy specimen was processed and stained for histopathological examination.

1. 70% alcohol: 1 h
2. 95% alcohol: 2 h
3. Absolute alcohol I: 2 h
4. Absolute alcohol II: 2 h
5. Cedar wood oil I: 3 h
6. Cedar wood oil II: Overnight
7. Cedar wood oil III
8. Cedar wood oil IV
9. Xylol: 20 min
10. Wax I: 3 h
11. Wax II: Overnight.

Using a good microtome with a wedge knife, the sections are cut from dermis to epidermis at 4 or 5 mm for tissue stain and 6 mm for staining acid-fast bacilli.

Stating methods for skin specimen

Hematoxylin and Eosin:

1. Bring section to water
2. Remove mercury with iodine and sodium thiosulphate and wash
3. Stain in celestine blue, 3 min
4. Rinse in tap water than distilled water
5. Stain in Ehrlich's hematoxylin 20 min
6. Rinse in tap water
7. Differentiate in 1% acid alcohol and blue in tap water
8. Counterstain with eosin
9. Rinse in water
10. Dehydrate, clear and mount.

RESULTS

In this study, a total number of 100 patients were examined for skin changes and dermatoses during the 2nd and 3rd trimester of pregnancy at Government Maternity Hospital, Hyderabad between 2007 and 2008.

Out of these 100 patients, 24 were primies and 76 were multipara women (Table 1).

Out of the total number of 100 patients, 84 belong to low socioeconomic status whereas 15 women belong to middle socioeconomic status. Only one patient of high socioeconomic status was present in this study (Table 2).

In this study, out of 100 patients, 62 patients were Hindus and 38 patients were Muslims (Table 3).

In Hindus multipara, women were 44 out of 62 patients, i.e., 71% and among Muslims 30 out of 38 patients (78.8%). Multigravidae women with >3 pregnancies were higher among Muslims than Hindus. Among Muslims 12 out of 38 women had >3 pregnancies, i.e., about 31.5%, whereas in Hindus the number was only 4 out of 62 patients (6.4%).

When the age group of the pregnant women under the study was correlated with the patients among the two religious communities (Table 4).

The following observations were made. The majority of the primies in both groups were between 15 and 20 years age group (66%), whereas the majority of multipara belong to 20-25 years of age group (above 60%). Only one primi was more than 30 years of age among both the groups. However,

Table 1: Compative study between Primies and Multies

Number of cases	Primies	Multies
100	24	76

Table 2: According to economic status

Socioeconomic status	Primies		Multies		Total number of pregnant women
	Hindus (18)	Muslims (8)	Hindus (44)	Muslims (30)	100
Low	14	7	37	26	84
Middle	3	1	7	4	15
High	1	-	-	-	1

Table 3: The parity in two religious group of patients

Parameters	Primies	Multies	2 nd	3 rd	>3 rd
			gravida	gravida	gravida
Hindus	18	44	26	14	4
Muslims	8	30	8	10	12

Table 4: Age groups (years)

Parameters	<15	15-20	20-25	25-30	>30
Hindus primies (18)	1	12	3	1	1
Multies (44)	-	5	26	10	3
Muslims primies (8)	-	5	2	1	-
Multies (30)	-	1	15	7	7

Table 5: Number of cases in different trimester

Number of cases	Number of cases in 2 nd trimester	Number of cases in 3 rd trimester
Primies (24)	8	16
Multies (76)	35	41
Total (100)	43	57

10 multipara women belong to more than 30 years of age group, out of which 3 were Hindus and 7 were Muslims. On the whole, most number of pregnant women under the study were between 15 and 25 years of age group (73%).

When all the pregnant women were allocated into 2nd and 3rd trimester of pregnancy, the following findings were observed (Table 5).

Majority of the pregnant women under study were in 3rd trimester, i.e., 57 out of 100 women (57%). This observation was made in both primi and multipara women.

We have examined all the patients under the study for changes of skin which are physiological pregnancy such as pigmentary and vascular changes apart from other changes.

Dermatological disorders associated with pregnancy (but which are not specific to pregnancy alone) were also recorded and charted.

Specific pregnancy associated dermatoses were looked for and recorded. The results are as follows:

Pigmentation of skin was the most common change observed in 98% of the cases. Pigmentation of the areola

Table 6: Physiological changes in pregnancy

Conditions	Primies (24)	Multies (76)	% of		
			Primies	Multies	Total
Pigmentation					
Breast	22	76	91.6	100	98
Abdomen	19	66	79.1	86.8	85
Melasma	5	19	20.8	25	24
Striae					
Abdomen	16	72	66.6	94.7	88
Breast	12	61	50	80.2	73
Miscellaneous	4	28	16.6	36.8	32
Skin tags					
Vascular	1	2	4.1	2.6	3
Palmar erythema	6	2	2.5	2.6	8
Varicose veins	1	2	4.1	2.6	3
Pedal edema	1	2	4.1	2.6	3
Gum hypertrophy	1	1	4.1	1.3	2

of the breast was the most common pigmentary change among primies and multies. *Linea nigra* was the second common pigmentary change followed by Melasma. Melasma was observed to be more common among multipara than primies (Table 6).

Striae

Striae were observed in about 94.7% of all multipara women on abdomen, whereas they were observed in only 66.6% of primies. Striae were also observed on breast and other sites such as thighs, legs, and buttocks. Overall, striae were more commonly observed in multipara than primies.

Vascular Changes

Palmar erythema was observed in 25% of primies, whereas it was present only in 2.6% of multipara. Varicose veins and pedal edema were, however, more common in multipara (2.6% and 2.6%) compared to primies (4.1%).

Skin tags (achrochordons) were observed in only three women under study, out of which 2 were multipara.

Changes such as gum hypertrophy were observed in more than 1% of the study group (Table 7).

Infections and infestations of skin were the most common dermatological afflictions observed during this study of pregnant women, and they were present in 24 out of 100 patients under the study (24%). Patient with herpes zoster was HIV reactive. Scabies was observed in four out

of 100 patients under study. Eczema was observed in one patient. Mucosal lesions were observed in two patients. Miscellaneous such as neurofibromatosis, acne, pregnancy in multiple lentigenes, and lichen planus was observed one in each.

Specific Dermatoses and Nonspecific Dermatoses

The specific dermatoses and nonspecific dermatoses of pregnancy were found only in total of 12 out of 100 patients (12%) under our study, and they were equally distributed among primies and multiparous women.

Specific Dermatoses

Pruritus gravidarum the most frequent dermatoses occurring in 5 out of 12 patients (41.6%) of pregnancy specific dermatoses out of 100 (5%). Two patients of pruritus gravidarum had icterus. Their HbsAg (-) ve LFT was raised both these patients, especially alkaline phosphatase (800 I.U.).

Table 7: Infections - Bacterial, Fungal, etc

Infections	Primies	Multies	% primies	% multies
Bacterial				
Hansen's disease		1		1.3
Viral				
Mollusum contagiosum	3	1	12.5	1.3
Warts (genital)	3	1	12.5	1.3
Herpes zoster	2	1	8.3	1.3
Herpes genitalis	-	1	-	2.6
HIV	1	-	4.1	
Parasitic				
Scabies	4	2	2	8.3
Fungal				
Pityriasis versicolor	1	-	1	-
Candidiasis	4	1	3	4.1
Eczema				
Irritant dermatitis	1	-	1	-
Immunological				
DM	1	-	4.1	-
Oral mucosal	1	1	4.1	1.3
Miscellaneous				
NF	-	-	-	-
Acne	1	-	4.1	-
Pregnancy in multiple lentigenosis	1	-	4.1	-
Pregnancy in lichen planus	-	1	-	1.3

HIV: Human immunodeficiency virus, DM: Diabetes mellitus

Pruitic urticarial papules and plaques of pregnancy were observed in 1 out of 12 patients (8.3%) and out of 100 patients (1%). Prurigo of pregnancy was observed in 3 out of 12 patients (25%) and out of 100 patients (3%).

Non-specific Dermatitis

Papular dermatitis was observed in 2 out of 12 patients (16.6%) and out of 100 patients (2%).

Impetigo herpetiformis was observed in 1 out of 12 patients (8.3%) and out of 100 patients (1%) (Tables 8-10).

Smears were collected only from patients with vaginal discharge. Of these four patients, three were multipara and one was primi.

Of these four patients, three were (75%) symptomatic (pruritus and burning sensation) whereas one was asymptomatic (25%). In these, one smear was positive for *Candida*, out of which one was of patients of low socioeconomic status. The culture positivity for *Candida* was higher 3 out of 4 patients (75%) compared to the smear positivity, 1 out of 4 (i.e., 25%) (Table 11).

Culture positivity of *Candida* was also observed to be higher among pregnant women of low socioeconomic status (2/4 women, 50%).

In the culture positive for *Candida*, when the type of *Candida* species was looked for, all the culture isolates belonged to *C. albicans* species (100%).

Other Species of Candida

1. *C. albicans*
2. *Candida glabrata*
3. *Candida krusei*
4. *Candida tropicalis*
5. *Candida kefyr*.

DISCUSSION

In this study of 100 pregnant women, all the patients belonged either to 2nd or 3rd trimester which is incidental. Few 1st trimester women attend the antenatal clinics, and this has been general observation.

Table 8: Specific dermatoses of pregnancy

Parameters	Primi (24)	Multi (76)	Primi (%)	Multi (%)	Total (%)
Pruritus gravidarum (recurrent intrahepatic cholestasis)	3	2	12.5	2.6	15.1
PUPPP	-	1	-	1.3	1.3
Prurigo of pregnancy	2	1	8.3	1.3	9.6
Herpes gestationis	-	-	-	-	-
Pruritic folliculitis of pregnancy	-	-	-	-	-

PUPPP: Pruritic urticarial papules and plaques of pregnancy

Table 9: Nonspecific dermatoses of pregnancy

Parameters	Primi (24)	Multi (76)	Primi (%)	Multi (%)	Total (%)
Papular dermatitis	-	2	-	2.6	2.6
Autoimmune progesterone dermatitis	-	-	-	-	-
Linear IgM dermatosis	-	-	-	-	-
Impetigo herpeticiformis	-	1	-	1.3	1.3
Prurigo anularis	-	-	-	-	-

IgM: Immunoglobulin M

Table 10: Vaginal candidiasis in different social strata

Socioeconomic status	Number of pregnant women with vaginal discharge (from where swabs were taken)	Smear+ve	Culture+ve
Low	3	1	2
Middle	1	-	1
Total	4	1	3

Table 11: Vaginal swabs for candida

Number of vaginal swabs for <i>Candida</i>	Smear positive	Smear negative	Culture positive	Culture negative
4	1	3	3	1

Most of the patients in our study belonged to low socioeconomic strata as have been observed in other studies based at government hospitals.

Hindus constituted the majority of the patients followed by Muslims in all the groups. The percentage of women with >3 pregnancies was higher among Muslims (31.5%) than in Hindus (6.4%).

The multipara women >30 years of age were 11 (one in primies and 10 in multiparous women). The majority of the patients were Muslims, i.e., 7 out of 11 patients. These results indicate that the frequency of >3 pregnancies and pregnancies after 30 years of age are more in Muslim women.¹¹⁻¹⁵

In programs such as family planning, religion plays an important role. It was observed that up to 1962 majority of Goan population were not aware of family planning as the state religion being Catholic. Religious bias and fear of prosecution are observed in all religions though more in certain communities.

Physiological changes in pregnancy were looked for in the study group. One or more physiological changes of skin were observed in all the patients under the study.

Pigmentation of the skin was the most common physiological change observed in 100% of Multipara and

93% primies. Similar high incidence of pigmentary change was observed in the study based at Bombay.

Melasma was observed in only 24% of the patients under the study. This is in contrast to the observation made by Winton and Lecins (1982) in a study based at the USA where the incidence was 50%. Other Indian studies showed a lower incidence (8.8%) of Melasma which was also observed in our study.

Striae were most commonly observed on abdomen and more frequently in multipara than primies.

Vascular effects such as palmar erythema, varicose veins, and pedal edema were observed in a total of 14 out of 100 patients (i.e., 14%), of which palmar erythema was the most frequent. Similar observations were made by Raj *et al.* in their study.

The percentage of pregnant women affected by various dermatoses 8% out of 100 patients.

Infections and infestations constituted a major part of dermatoses (24%). Similar observations were made by Raj *et al.* Overall the incidence of infections were higher among primies than multipara in our study.

Vaginal discharge was observed in 4/100 patients in our study (4%). In a study by Kumar (1998), vaginal discharge was present in 21.7% of pregnant women with skin disorders. Only 3.8% of pregnant women under the study had vaginal candidiasis in the study of Raj *et al.* candidal vaginitis occurs more frequently during pregnancy, as altered hormonal status favors the infection Dotz *et al.* (1991).

The specific dermatoses of pregnancy were seen in 7.5% (9 out of 12) of patients in our study. The incidence of prurigo pregnancy was the most frequent with an incidence of 3%. Winton *et al.* (1982) reported the incidence of prurigo gestationis as 2% Kumar in the study based at Karnataka observed prurigo pregnancy to account for 9.4% of all dermatological conditions.

Two patients of pruritis gravidrum had associated icterus but were negative for HbsAg with raised LFT values.

Obstetric cholestasis by far is the most common cause of jaundice in pregnant women. Cholestasis might be the cause of icterus in both pregnant women as indicated by the high alkaline phosphatase levels (>800 IU).

The nonspecific dermatosis was seen in 3 out of 12 (25%). Many workers report that the incidence of prurigo pregnancy is the most frequent among nonspecific dermatoses specific of pregnancy. Similar observations were found in our study.

Sexually transmitted diseases (STD's) observed in our study were genital warts and herpes simplex and molluscum contagiosum. Condyloma accuminata is a common STD encountered in various studies of pregnant women. Moreover, most of these patients were primigravid. Similar observation of exclusive occurrence of condyloma accuminata was observed in the present study in primigravida.

Mycological Studies

Vaginal swabs for *Candida* in 4 patients confirmed *Candida* with smear positivity in 1 (25%) patients. The positivity of candidiasis increased when discharge was inoculated on sabouraud agar and 3 out of 4 inoculated turning positive for *Candida* (i.e., about 75%). This is in contrast to the observation made by Kumar (1998) wherein candidiasis constituted only 21% of all vaginal discharges.

Candidal infection on the whole was observed in (4 out of 100 patients) 4% of patients in our study. Similar overall incidences of 3.8% was observed by Raj *et al.* of vaginal candidiasis in their study.

When *Candida* isolates were subjected to germ tube test, all isolates were shown to be *C. albicans*. In a study by Sobel *et al.*, *C. albicans* was isolated in only 69% of pregnant women with vaginitis. However, in our study, in all the patients (100%) *C. albicans* was isolated.

Most of the patients with candidal vaginitis belonged to low socioeconomic status.¹⁶⁻²⁰

CONCLUSION

1. A total number of 100 pregnant women were examined for dermatological changes.
2. Out of the total number of 100 pregnant women, 84 belonged to low socioeconomic status: 15 to middle socioeconomic and status, one pregnant women to high socioeconomic status.
3. Most of the women were multipara and (76) the remaining were primies (24). In the study, most of the patients were Hindus (62), remaining being Muslims (38).

4. Among Muslims 30 out of 38 were multipara (78.9). Multiparous women with >3 pregnancies were more frequent among Muslims (31.5%).
5. Whereas in Hindus the incidence of 3 pregnancies is 4 out of 62 (6.4%).
6. 10 Multipara women in our study belonged to more than 30 years of age group, out of which 3 were Hindus and 7 were Muslims.
7. Pigmentation of the skin was the commonest physiological change seen more in multipara women (100%) than in primies (93%).
8. Palmar erythema, varicose veins and pedal edema were observed in 1 out of 100 patients (14%), out of which palmar erythema was most common.
9. The percentage of pregnant women affected by various dermatoses was 8% (8 out of 100).
10. Infections and infestations constituted a major part of dermatosis (24%).
11. In our study 12 out of 100 patients had specific dermatoses of pregnancy, of which the pruritus gravidarum was the most common followed by prurigo gravidarum.
12. Vaginal discharge was observed in 4 out of 100 pregnant women. The positivity for *Candida* species on culture was 3 out of 4 patients (75%).
13. On subtyping, by the germ tube method, *C. albicans* was isolated from all the candida positive cultures (100%).

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