International Journal of Clinical Obstetrics and Gynaecology

ISSN (P): 2522-6614
ISSN (E): 2522-6622

www.gynaecologyjournal.com
2019; 3(4): 71-75
Received: 04-05-2019
Accepted: 08-06-2019

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Original Study

Clinical study of pregnancy associated cutaneous changes

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DOI: https://doi.org/10.33545/gynae.2019.v3.i4b.292

Abstract
Background: Pregnant women undergoes myriad of changes largely modulated by hormonal, immunologic, vascular and metabolic factors thus making them susceptible to various physiological and pathological changes.
Aim: Due to lack of detailed literature, especially from our region, this study was conducted to examine both physiological changes and specific dermatoses of pregnancy.
Material and Methods: 100 consecutive pregnant females attending the out-patient department between August 2018 to April 2019 for routine obstetric checkup irrespective of gestational age and parity were enrolled. General physical examination, cutaneous examination including mucosa, hair and nails was done. Cutaneous changes during pregnancy were divided into three categories, namely, physiological changes, Pregnancy Specific Dermatoses (PSD), and skin diseases affected by pregnancy.
Results: In this study, the mean age was 25 years (range: 18-33 years), of which primigravida were 32% and multigravida constituted 68% of the sample, maximum patients (48%) were in 3rd trimester. 100% cases presented with physiological skin changes of pregnancy, 2% had specific dermatoses of pregnancy, whereas 14% presented with other dermatosis associated with pregnancy. Among the physiological changes, hyperpigmentation was the most common cutaneous finding with linea nigra the commonest pattern in 82% followed by connective tissue changes of pregnancy that is striae gravidarum in 68% of cases. Among the specific dermatosis of pregnancy, 2 (2%) cases of Pruritic Urticarial Papules and Plaques of Pregnancy (PUPPP) were documented. The most common infectious dermatosis affected by pregnancy in this study group was vulvovaginal candidiasis (5 cases).
Conclusion: This study brings focus on pregnancy-specific and non-specific dermatoses.

Keywords: physiological, pregnancy specific dermatosis, pruritic urticarial papules, (PUPPP)

Introduction

During the course of pregnancy there are profound hormonal, vascular, metabolic, and immunological changes [1] which make pregnant women susceptible to various physiological and pathological cutaneous changes [2].

First are the physiological skin changes in pregnancy which includes changes in pigmentation, alterations of the connective tissue and vascular system as well as changes in hair and nails. Of these various physiological pregnancy-induced changes, increased pigmentation and striae gravidarum are found to be very common during pregnancy. This increase in pigmentation during pregnancy is thought to be due to the melanocytic stimulating effect of estrogen and progesterone [3]. Most of the changes are transient and regress after delivery but some may remain in less marked form.

Second, are the Pregnancy Specific Dermatoses (PSDs) where skin eruptions seem to be specifically related to pregnancy. The most recent rationalized classification of PSDs has been proposed by Ambros Rudolph *et al*. [4] in 2006, which includes pemphigoid gestationis (PG), polymorphic eruption of pregnancy (PEP), intrahepatic cholestasis of pregnancy (ICP) and the atopic eruption of pregnancy. Although most of these dermatoses are benign and resolve in post-partum period, few of the specific dermatosis are associated with increased risk of prematurity, intrapartum fetal distress (22%-33%), premature delivery (19%-60%) and still births (1%- 2%) [5, 6, 7, 8]. Hence, antenatal surveillance, recognition of these skin conditions, early diagnosis and prompt treatment is essential for improving maternal and fetal prognosis.

Finally, pregnancy may alter the course of certain infections and pre-existing dermatological conditions like candidiasis, herpes viral infections; immunological diseases like SLE, systemic sclerosis; metabolic diseases like, porphyria cutanea tarda; connective tissue disorders like Ehlers-Danlos syndrome, pseudoxanthoma elasticum etc.

Materials and Methods

Study was carried out in the Department of Dermatology and Department of Obstetrics & Gynaecology at Civil Hospital Theog, District Shimla from August 2018 to April 2019. A total of 100 consecutive pregnant females attending the out-patient department for routine obstetric checkup irrespective of gestational age and parity were enrolled in the study.

Inclusion criteria

- Pregnant women above 18 years of age;
- With skin lesions, either pre-existing or recently developed in pregnancy were included in the study, after obtaining the consent.

Exclusion criteria

- Patients having any underlying disorder or renal problems.
- Patients not willing to give consent.

Demographic data, detailed medical history including chief complaints related to presence of pruritus, onset of skin lesions in relation to duration of pregnancy, past or family history of similar lesions, jaundice, vaginal discharge, and associated medical or skin conditions was noted. General physical examination, cutaneous examination including mucosa, hair and nails was done and noted. If any specific dermatoses were present, the morphology of skin lesions, distribution, and sites involved were studied.

Pregnancy dermatoses were divided into three categories, namely, physiological changes, specific dermatoses of pregnancy, and skin diseases affected by pregnancy.

Results

A total of 100 patients were included in the study with a mean age of 25 years (range: 18-33 years) of which primigravida were 32% and multigravida constituted 68% of the sample. Maximum patients were in 3rd trimester (48%) followed by 2nd trimester (44%) and lastly in 1st trimester (8%) as shown in Fig.1.

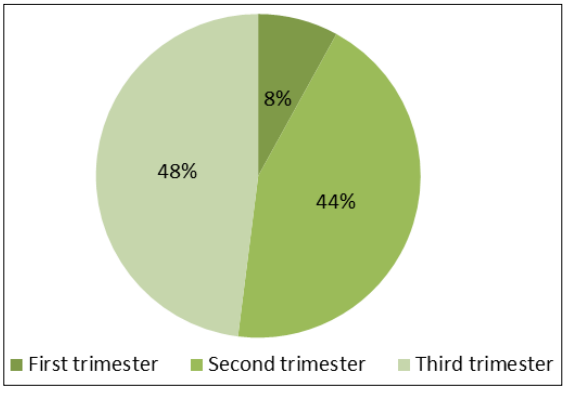

Fig 1: Trimester wise distribution of patients.

Majority was from rural background and mostly was engaged in household and agricultural work. All (100%) cases presented with physiological skin changes of pregnancy, 2% had specific dermatoses of pregnancy, whereas 14% presented with other dermatosis associated with pregnancy.

Of the physiological changes, the most common cutaneous manifestation was hyperpigmentation seen in 82% of the cases, Linea Nigra (Fig. 2) being the most common pattern, noted in 82% cases as shown in Table 1.

Table 1: Physiological skin changes in pregnancy

1	**Hyperpigmentation**	
1.1	Linea Nigra	82
1.2	Secondary Areola	62
1.3	Melasma	40
1.4	Pigmentation of flexures	16
1.5	Naevi Darkening	8
2	**Connective tissuse changes**	
2.1	Striae Gravidarum	68
2.2	Mollusca fibrosa	1
3	**Vascular Changes**	
3.1	Peripheral edema	4
3.2	Palmar erythema	3
4	**Glandular changes**	
4.1	Montgomery Tubercles	14
5	**Nail changes**	8

Fig 2: Linea Nigra

Other changes seen were secondary areola in 62%, Melasma (Fig. 3) in 40% patients with centro-facial pattern being the most common presentation, pigmentation of flexures (neck, axilla, groin) in 16%, and naevi darkening in 8% of cases. Most of the pregnant women with pigmentary changes were in the third trimester.

Fig 3: Melasma

Pigmentary changes were followed by connective tissue changes that include striae gravidarum as shown in Figure 4.

4. Striae gravidarum

This was seen in 68% of cases, more common in multigravida. The most common site of occurrence of striae was the abdomen (Seen in all cases with striae) though other sites like thighs, abdomen and breasts were also involved in a few patients. Mollusca fibrosa as shown in Figure 5 is another physiological connective tissue change seen in one (1%) patient.

Fig 5: Mollusca Fibrosa

Vascular changes included bilateral pitting pedal edema seen in 4% cases and palmar erythema was seen in 3% of the cases.

Among glandular changes, Montgomery's tubercles were seen in 14 cases.

Nail changes which included longitudinal melanonychia, transverse ridging and pterygium were seen in 8 cases however no hair changes were found in the study.

Specific dermatoses were seen in 2 % cases, both of the cases were of Pruritic Urticarial Papules and Plaques of Pregnancy (PUPPP)/ Polymorphic Eruptions of Pregnancy (Fig. 6), history of atopy could be elicited in 1 of these.

Fig 6: Pruritic urticarial papules and plaques of pregnancy in 2nd trimester of pregnancy

Among the diseases affected by pregnancy, most common were infections which included vulvovaginal candidiasis in 5% cases, scabies in 3%, genital wart and herpes genitalis in 1 (1%) patient each. One patient each of icthyosis, urticaria and angioedema as shown in figure 7 and 8 and discoid eczema was seen among other dermatological disorders.

Table 2: Distribution of pregnancy associated dermatological disorders.

Infections	**n**
Vulvovaginal candidiasis	5
Scabies	3
Genital warts	1
Herpes Genitalis	1
Others	
Icthyosis	1
Urticaria	1
Angioedema	1
Discoid Eczema	1

Fig 7: Urticaria

Fig 8: Angioedema

Discussion

Pregnancy is a period throughout which women undergo significant changes due to hormonal and/or mechanical alterations. Virtually all body systems are affected, including the skin. The concerns of the patient may range from cosmetic appearance, to the chance of recurrence of the particular problem in subsequent pregnancy.

In this study, 100 consecutive pregnant females were enrolled. The age range was 18-33 years with a mean age of 25 years which is similar to studies of Kumari *et al*. [9] Muzaffar *et al*. [10] Shivanand *et al*, [11].

In this study, physiological changes were documented in 100% of cases which is similar to the study by Kumari *et al*. [9] where physiological changes were noted in all women (100%) but is in contrast to Raj *et al*. [12] where only 9.7% patients experienced some skin changes.

Among the physiological changes, hyperpigmentation was commonest with linea nigra the most common pattern in 82% of the patients which is similar to study by Kumari *et al*. [9] and Meena *et al*. [13] where the most common pattern of hyperpigmentation was reported to be linea nigra in 91.4% and 88.5% of the patients respectively. Pigmentary changes predominated in second and third trimester because of surge of estrogen and progesterone, which are strong melanogenic stimulants, late in the pregnancy.

Other pigmentary changes seen were secondary areola in 62% which is comparable to results of Kumari *et al*. [9] and Meena *et al*. [13] i.e with 78.4% and 53.5% patients respectively; melasma in present study was documented in 40% of the patients with centro-facial pattern being the most common presentation which is in accordance with results of Wong and Ellis [14] with melasma in 50-70% patients and Muzzaffar *et al*. [10] found melasma in 46.4% patients. Melasma was found in 2.16% and 2.5% of the patients respectively in studies by Panicker *et al*. [15] and Kumari *et al*. [9] which is far less in comparison to our study.

Pigmentary changes were followed by connective tissue changes that include striae gravidarum which was seen in 68% of cases in our study which is close to results of Panicker *et al*. [15] and Meena *et al*. [13] documenting 72.8% and 76.5% of patients respectively with striae.

Increase in estrogen and angiogenic factors are believed to increase blood volume, vascular dilatation, capillary permeability, and neovascularization leading to vascular changes in pregnancy. Among vascular changes, pedal edema was seen in 4% of cases which are same as the results of Meena *et al*. [13] but Panicker *et al*. [15] noted it in 10.5% of the pregnant females and palmar erythema seen in 3% of the cases is similar to results of study by Hassan *et al*. [16] who documented it to be 6.5%. However, Muzaffar *et al.* [10] reported palmar erythema in 12% of their cases. No case of varicosities, gingival hyperplasia and spider naevi was reported in our study in contrast to studies by Panicker *et al*. [15] Raj *et al*. [12] and Tyler [3].

Among glandular changes, Montgomery's tubercles were seen in 14 (14%) cases which are in camparison to results of Meena *et al*. [13] of 10.5%.

Nails tend to grow faster during pregnancy and can become dystrophic, brittle, soft and/or pigmented [17]. In our study, nail changes which includes transverse ridging, longitudinal melanonychia, brittle nails were seen in 8 patients which is in contrast to study by Hassan *et al*. [16] where no nail changes were found.

In this study, the most common Specific Dermatoses of Pregnancy was pruritic urticarial papules and plaques of pregnancy (PUPPP) found in 2 (2%) cases which is similar to the results of study by panicker *et al*. [15] and shivakumar *et al*. [18] who documented PUPPP in 1.3% and 2.35% of the cases respectively. PUPPP usually affects primigravida in the third trimester of pregnancy or immediately in the postpartum period, initially presents with pruritic, erythematous papules commonly located within the abdominal striae and with characteristic periumbilical sparing. Mostly it resolves within 4–6 weeks from the time of onset.

Among the diseases affected by pregnancy, an increased frequency of infections was seen in our study, which is common during pregnancy and is probably related to low cellular immunity. In this study, we documented 5% cases of vulvovaginal candidiasis whereas panicker *et al*. [15] and shivakumar *et al*. [18] found it to be as high as 21% and 21.78% of cases respectively. Other infections included scabies in 3%, similar to the results by panicker in 2.8% of the cases, genital wart and herpes genitalis in 1% patient each.

Dermographism and urticaria are common in the last half of pregnancy [19], however, it is important to exclude other causes of pruritus. In our study, urticaria and angioedema were seen in one (1%) patient each.

Conclusion

Skin changes are common during pregnancy and are usually benign and self-limiting. However, pregnancy specific dermatoses though few are symptomatic can be associated with severe fetal outcomes such as fetal distress, stillbirth, and premature birth.

Differentiating physiological skin changes of pregnancy from pregnancy specific dermatosis/ other disease conditions can avoid unnecessary investigations and management and aid in better patient care and counseling. A detailed history and awareness of clinical presentation helps in confirmation of diagnosis and thus diminishes the maternal and foetal morbidity.

Further studies are needed to explore the impact of cutaneous changes on the psychosocial lives of pregnant women.

Funding: No funding sources.

Conflict of interest: None declared.

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