Al-Nahrain University

College of Medicine

Department of medicine

A CLINICAL STUDY OF SKIN CHANGES DURING PREGNANCY

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Dedication

To

My father, who encourage me..

My mother, who taught me that even biggest tasks can be accomplished..

To all those who believe in the richest of learning..

Acknowledgment

In the name of Allah, the most beneficent, the most merciful

I would like to express my sincere gratitude to my supervisor Dr.kholood abbas for her continuous support in my research,and also for her patience, motivation, enthusiasm, and immense knowledge. Her guidance has helped me during the course of research.

My special thanks and sense of gratitude are due to my family.

Contents

Abbreviation

B-HCG	***Beta- human chorionic gonadotropin***
ICP	*Intrahepatic cholestasis of pregnancy*
PUPPP	*Pruritic urticarial papules and plaque of pregnancy*
HSV	*Herpes simplex virus*
HPV	*Human papilloma virus*

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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 aim of study to determine the frequency of skin changes during pregnancy according to gestational age and gravidity.

Materials and Methods: A cross-section study was conducted in AL-Imamein AL-Kadhemein medical city from the period of October 2018-march 2019. Twenty-five females were inrolled in this study, including all pregnant women regardless to the gravidity and duration of pregnancy and their diagnosis based on physical examination

Results: A total of 25 pregnant women were recruited in present study from October 2018 to march 2019. Of these, 6 (24%) were primi gravidas and 19 (76%) were multi gravida. Their age range from 20 to 40 years. Most of them presented in third trimester 14 (56%).

Among the Physiological changes,most common were pigmentory changes including : linea nigra 22(88%),breast changes 18(72%), Diffuse hyprpigmentation 16(64%), Melisma 10(40%) as seen in table(3).

Regarding connective tissue changes most common was striae gravidarum 16(64%).

Regarding glandular changes most common was Montgomery tubercle seen in 22(88%) then followed by hyperhidrosis seen in 19(76%).

Regarding vascular changes most common was pedal oedema seen in 12(48%) then varicose vein 7(28%) then palmar erythema 2(8%).

Regarding hair and nail changes most common hair and nail growth seen in 4(16%) and 8(32%) respectively as seen in table (3).

In specific dermatosis of pregnancy most common was pruritic gravidarum 10(40%) followed by PUPPP seen in 7(28%) as seen in table (4).

In dermatosis affected by pregnancy most common was acne 6(24%) then candidiasis and atopic dermatitis were seen in 2(8%) as seen in table (5).

Conclusion: This study emphasizes that the prevalence of physiological skin changes is much higher than specific dermatoses, 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… .

Introduction

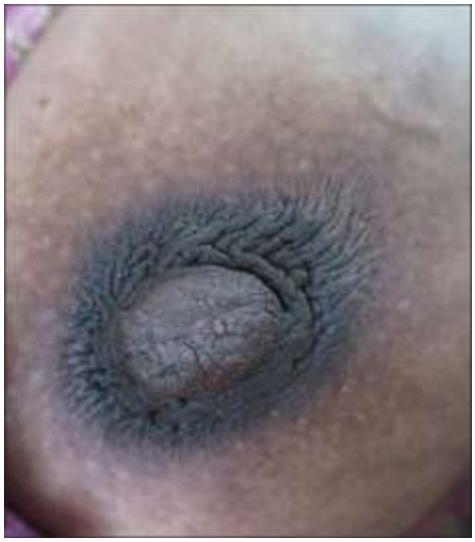
Pregnancy is a physiological state characterized by profound immunologic, metabolic, endocrine and vascular changes, the pregnant woman susceptible to changes of the skin and its appendages. Most changes in the female body are mechanical and/or hormonal. These are characterized by high elevations of estrogen, progesterone, beta-HCG (chorionic gonadotropin), prolactin and a variety of hormones and mediators that completely alter the body's functions [1]These alterations may range from Physiological skin changes that occur with almost all pregnancies, to-Dermatoses aggravated by pregnancy, and eruptions that appear to be specifically associated with pregnancy .[2] these changes include:

Physiological skin changes:

in pregnancy include changes in pigmentation, alterations of the connective tissue and vascular system as well as changes in hair and nails. [2]

A-pigmentory changes:

1-1 Hyperpigmentation is most common presentation of pregnancy due to elevated serum levels of MSH, estrogen or progesterone [3]. Estrogen increases the output of melanin by the melanocytes and effect of estrogen is augmented by progesterone, resulted from melanin deposition into epidermal and dermal macrophages [4]. It starts from the first trimester of pregnancy, and occurs in areas that are already pigmented particularly nipples, areola figure [1], and genital areas. Freckles, nevi, and recent scars become dark and even enlarge during pregnancy. [5] [6]

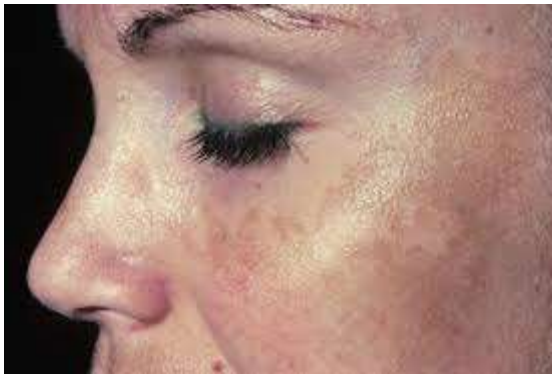


Figure(1):hyperpigmentation of nipple and areola [7]

1-2 Linea nigra is hyperpigmented line, found on the abdomen in pregnant women and noticed in the second trimester. Its vertical line typically runs from the pubic bone to the belly button figure(2), but can run all the way up to the chest and usually disappears a few months after delivery. [6]

Figure(2):linea nigra [8]

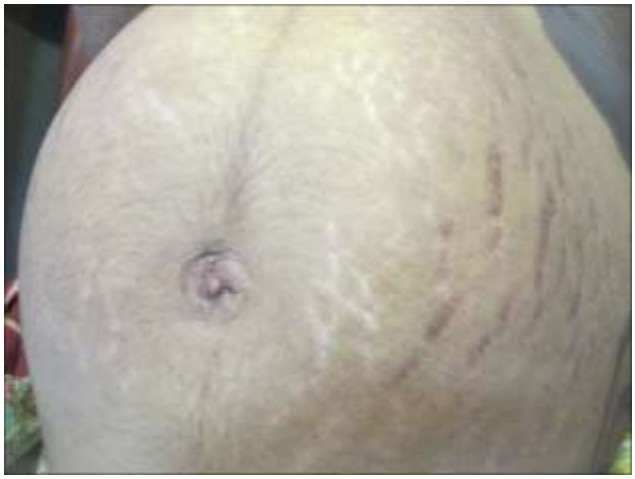
1-3 Chloasma **or melasma** is also known as mask of pregnancy, presented with irregular sharply demarcated brownish pigmentation of the face mainly over centrofacial or malar region and this is due to high level of estrogen stimulate melanocyte to produce melanin and cause pigmentation , figure(3) . [9]



Figure(3):chloasma [10]

2- connective tissue changes

Striae gravidarum: are partial tears in the structures of the skin, which appear as reddish or bluish depressed streaks, usually on the abdomen,figure(4). but also on the breasts and thighs [11].

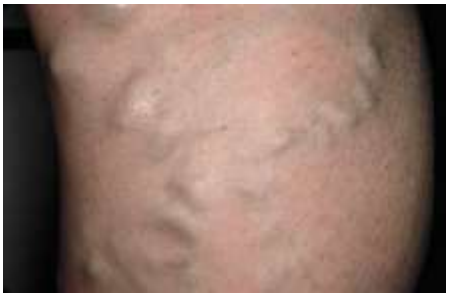


Figure(4): Striae gravidarum [12]

3-vascular changes :

3-1 Pedal oedema: Increased venous hydrostatic pressure can result in a nonpitting edema, which most commonly affects the lower extremities but involvement of the face and hands has also been described , edema can be relieved by bed rest, leg elevation, compression stockings, or sleeping in the left lateral decubitus position. [13]

*3-2 varicose vein:*Varicosities can arise throughout the body and most commonly involve the saphenous vein **,**The gravid uterus may compress the femoral and pelvic vessels, thereby increasing venous pressure and contributing to the development of varicose veins. Venous dilation typically returns to baseline in the postpartum period ,figure (5) . [14]



Figure(5): varicose vein [15]

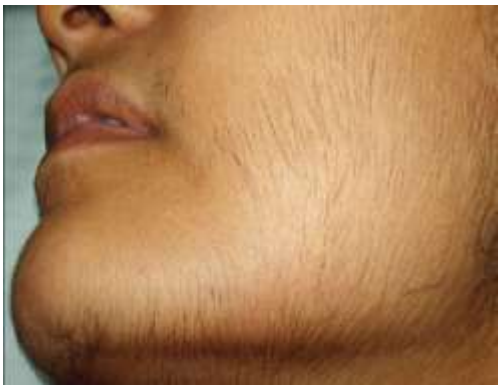
3-3 Palmar erythema: Within the first trimester, palmar erythema can present as a diffusely mottled appearance of the palm and this is due to hormonal changes during pregnancy causing estrogen level to rise and cause palmar erythema .[16]

4- hair and nail changes:

A mild to moderate **hirsutism** seen during pregnancy. After delivery it usually resolves. There is an increased proportion of anagen growing hairs due to estrogen and androgen stimulation in the second half of pregnancy,in some women hair loss can occur , figure(6). [17]

Nails often turn brittle during pregnancy.Nail changes are benign. Reassurances and promotion of good care, avoiding of any external nail sensitizer will take care of problems figure (7). [17]

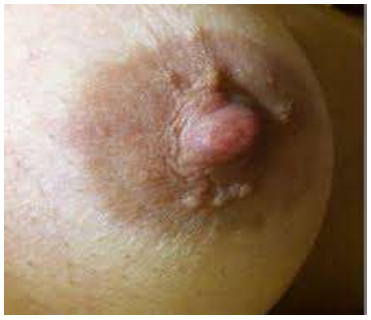
Figure(6):brittle nail [18]



figure(7):hirsutism [19]

5- glandular changes:

Increased eccrine glands function lead to **miliaria, hyperhidrosis**, and decreased apocrine gland function lead to improvement in hidradenitis suppurativa, Increased sebaceous function in third trimester lead to Acne (variant pruritic folliculitis of pregnancy) and enlargement of sebaceous glands on the areola (**called montgomery's gland or tubercles**) figure(8),[17]



Figure(8)[20]

Many of these alterations regress significantly within the 1st 6 months postpartum. while some persist in less marked form like strie gravidarum .

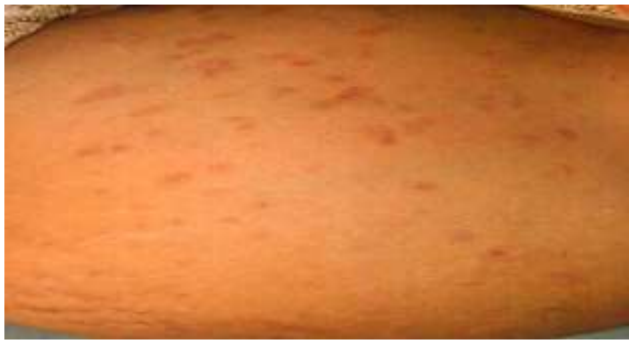
B -Specific skin changes: seem to be specifically related to pregnancy and are best known as pregnancy specific dermatoses (PSDs). These are most commonly seen during the third trimester of pregnancy, with pruritus being the leading symptom(4) like :

1-Pruritic gravidarum : pruritus gravidarum and (ICD)are classically associated with itching, without any skin lesions and occurs in the first trimester, ICP (also called obstetric cholestasis) is seen in third trimester and is characterized by pruritus with or without jaundice, absence of primary skin lesions, and with laboratory markers of cholestasis. The skin lesions are usually secondary linear excoriations and excoriated papules, which are caused by scratching and are localized on the extensor surfaces of the limbs, abdomen and back.[21]

2-pruritic urticarial papules and plaques of pregnancy:

pruritic urticarial papules and plaques(PUPPP) is the second most common skin dermatosis in pregnancy after atopic eczema. It is associated with multiple gestation and increased maternal weight gain. The exact etiology is not known. It has been proposed that stretching of the skin damages the connective tissue causing subsequent conversion of nonantigenic molecules to antigenic ones, leading to skin eruption, PUPPP usually occurs in primigravidas in the third trimester and recurrence in subsequent pregnancies is unusual. PUPPP has a marked

pruritic component and the onset of pruritis coincides with the skin lesions which are seen as polymorphous, erythematous, nonfollicular papules, plaques, and sometimes vesicles. The eruption begins over the abdomen, commonly involving striae gravidarum with sparing of the periumbilical region. It may spread to the breasts, upper thighs, and arms. The face, palms, soles, and mucosal surfaces are usually spared. The lesions resolve near term or in the early postpartum period figure(9).[22]



Figure(9):puppp [23]

3-Prurigo of pregnancy It is characterized by pruritic, often excoriated papules and nodules on the extensor surfaces of the legs and upper arms. The abdomen can also be involved. The etiology and pathogenesis is not

known, figure(10). (24)

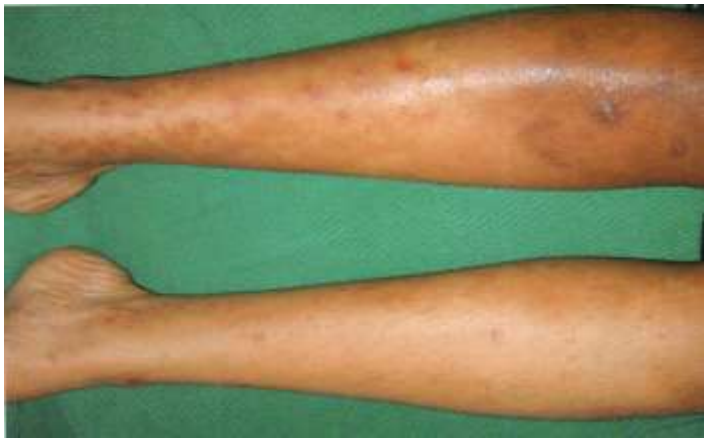
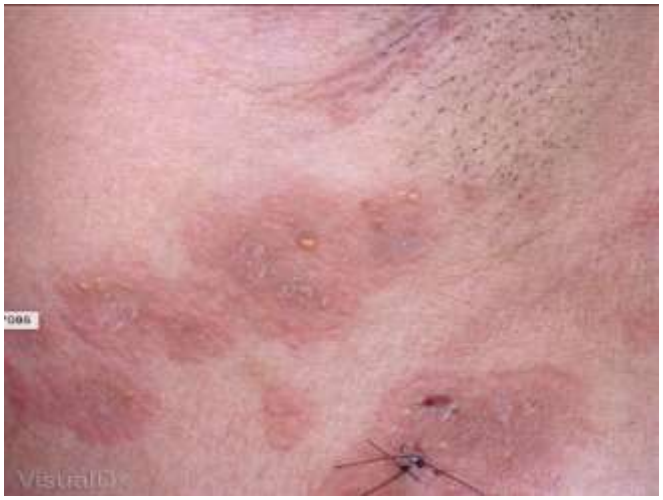


Figure (10):prurigo of pregnancy [25]

4-Pemphigoid gestationalis

is a rare autoimmune. The condition has been linked to the presence of HLA-DR3 and HLA-DR4 and has a rare association with molar pregnancies and choriocarcinoma has been reported. The skin lesions are

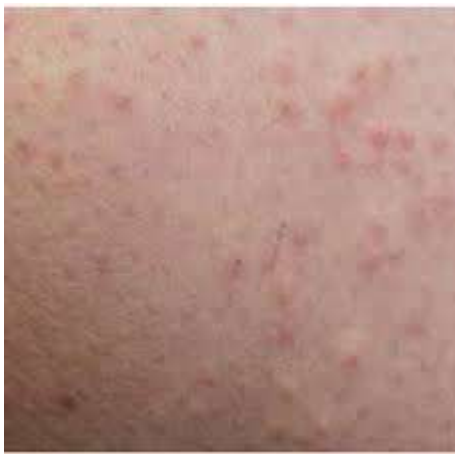
pruritic, urticarial and vesiculobullous, The condition may resolve late in pregnancy, but classically flares up again at delivery figure(11).[26]



Figure(11):pemphigoid gestationalis [27]

5- pruritic folliculitis:

This rare dermatosis ,Contrary to its name, pruritus is not a major feature and it may be mistaken for acne or microbial folliculitisIt, is characterized by an acneiform eruption consisting of multiple, pruritic, 2- to 4-mm, follicular papules or pustules typically on the shoulders, upper back, arms, chest, and abdomen. The diagnosis is made clinically after excluding other, more common rashes. The skin lesions usually resolve spontaneously one to two months following delivery figure(12).[28]



Figure(12):pruritic folliculitis [29]

C- Dermatoses affected by pregnancy

1-inflammatory changes :

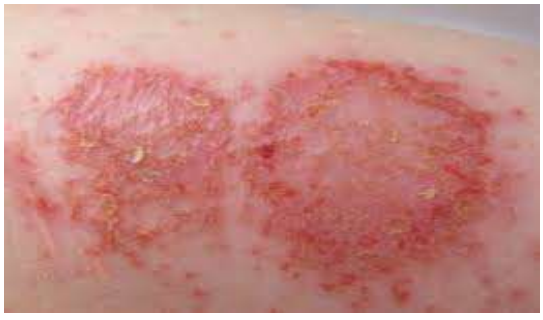
1-1 Atopic dermatitis

Atopic dermatitis (atopic eczema) is a chronic inflammatory skin condition with itching. There are no primary lesions, but secondarily, there is erythema, scaling, lichenification, and sometimes papules. With excoriations, there can be oozing, weeping, and secondary bacterial infection. While atopic dermatitis may be associated with hay fever and/or asthma, either in the patient or in a member of the family, there are no allergens to remove in atopic dermatitis. Atopic dermatitis may improve during pregnancy. Treatment involves the use of topical steroids. Soap should be limited to the critical areas: hands, face, axillae, and groin figure(13).[30]

Figure(13): Atopic dermatitis [31]

1-2 discoid eczema

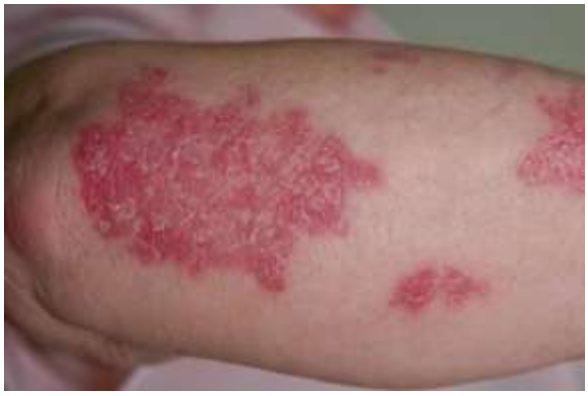
is a chronic condition that causes coin-shaped patch to develop on the skin. These patches are often itchy and well-defined. They may ooze clear fluid or become dry and crusty figure(14).[30]



Figure(14):discoid eczema [32]

1-3 Psoriasis

Psoriasis is a chronic inflammatory and proliferating skin condition that presents as sharply demarcated erythematous plaques with silvery scale. The effects of pregnancy on psoriasis are variable.Treatment options include topical corticosteroids, calcipotriol, and tar fig.(15).[33]



Figure(15):psoriasis [34]

1-4 Acne

Many women experience acne during pregnancy. It's most common during the first and second trimesters. An increase in hormones called androgens can cause the glands in your skin to grow and produce more sebum — an oily, waxy substance figure(16).[35]

Figure(16):Acne [36]

2- fungal infection

candida vaginalis

Most fungal vaginitis is caused by *C. albicans* (candidiasis), which colonizes 15 to 20% of nonpregnant and 20 to 40% of pregnant women.presentation is Vaginal vulvar pruritus, burning, or irritation (which may be worse during intercourse) and dyspareunia are common, as is a thick, white, cottage cheese–like vaginal discharge that adheres to the vaginal walls. Symptoms and signs increase the week before menses. Erythema, edema, and excoriation are common figure(17). [37]

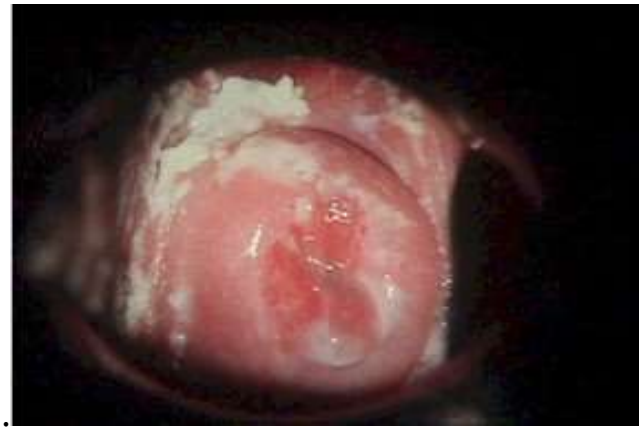


Figure (17): candida vaginalis [38]

tinea corporis

is a superficial fungal infection(dermatophytosis) of the arms and legs, especially on glabrous skin; however, it may occur on any part of the body presented as a variety of appearances; most easily identifiable are the enlarging raised red rings with a central area of clearing , Most cases are treated by application of topical antifungal creams to the skin,figure (18).[39]

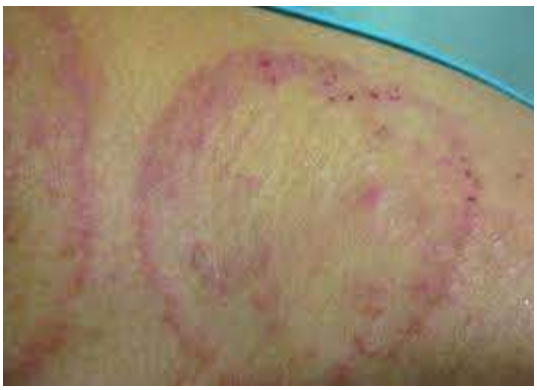
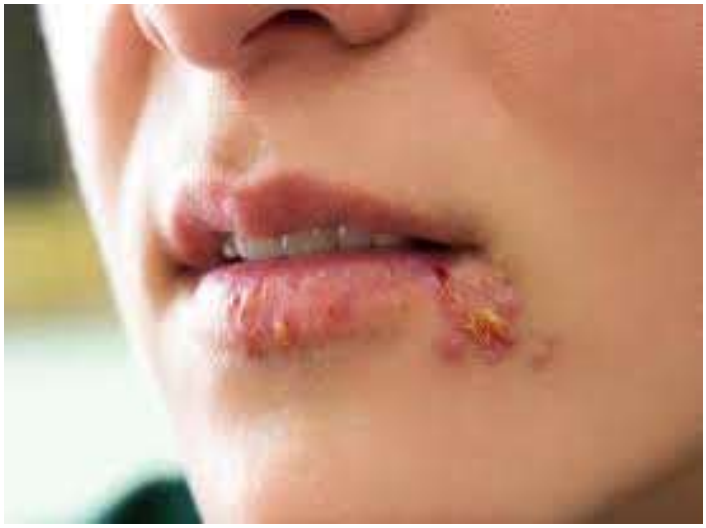


figure (18): **tinea corporis** [40]

3- viral infection

Herpes simplex virus infection

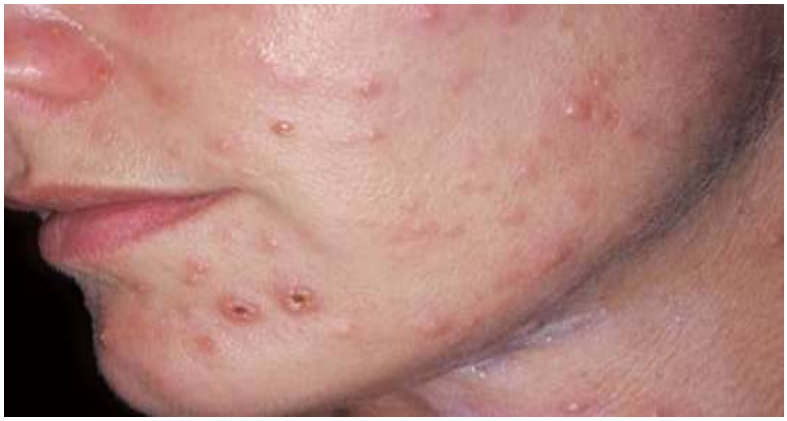
Herpes simplex virus (HSV) is a common cause of viral infections worldwide. HSV-1 and HSV-2 cause both primary and recurrent infections; primary infections are more severe. Infection clinically presents as grouped vesicles on an erythematous base that may erode and form ulcerations. Lesions frequently occur around the month, where they are referred to as cold sores, fever blister, or more properly herpes simplex labialis. Asymptomatic shedding of the herpesvirus has also been shown in the absence of any skin findings. Genital herpes infection (herpes progenitalis) at the time of delivery is associated with a high risk of neonatal infection. Even in the absence of skin lesions in infected newborns, neurologic and visceral organ damage can be severe. Recognition and treatment of herpes infection during pregnancy is very important. Patients considered high risk for HSV infection should be tested weekly with viral cultures, and if there is evidence of active infection or viral shedding, cesarean delivery should be performed .Acyclovir is a pregnancy category C antiviral agent that is used for primary or symptomatic infections. Valacyclovir (pregnancy category B) is also used in the treatment of HSV during pregnancy figure(19) .[41]



Figure(19):herpes simplex virus [42]

Varicella

varicella is an **itchy**, **red**, **lumpy rash** that is caused by the **varicella virus,** The lesions are small (less than 1 cm in diameter) and begin development as clear vesicles (fluid filled blisters) on an erythematous or "red" base. The vesicles then progress to pustules (pus filled blisters) and then crust over. The rash is highly contagious until all the lesions have crusted over.last for 21 days figure(20). [43]



figure(20):varicella [44]

Wart

The human papillomavirus (HPV) is a large virus, of which over 40 types are pathologic in humans. Warts can occur in any part of the body and may be referred to as verrucae vulgaris. In the anogenital area, these are commonly called condylomata acuminata, which often present as flesh-colored, exophytic, cauliflower-like masses. The amount of viral DNA is also greatly increased during pregnancy. Recognition of HPV infection is important because certain strains can be transmitted to the fetus through an infected birth canal, with subsequent association with juvenile respiratory papillomatosis in infants born to infected mothers. Respiratory papillomatosis in infants is rare compared with the extent of condylomas in childbearing women; thus, performance of cesarean section in this situation is controversial due to the inherent risks of the procedure itself. Treatment options during pregnancy include trichloroacetic acid or salicyclic acid topical preparations, cryotherapy, cautery, or laser ablation. Other topical agents such as podophyllin are contraindicated during pregnancy. No treatment is more than 70% effective, because the virus remains within the body for a lifetime **figure (21).** [45]

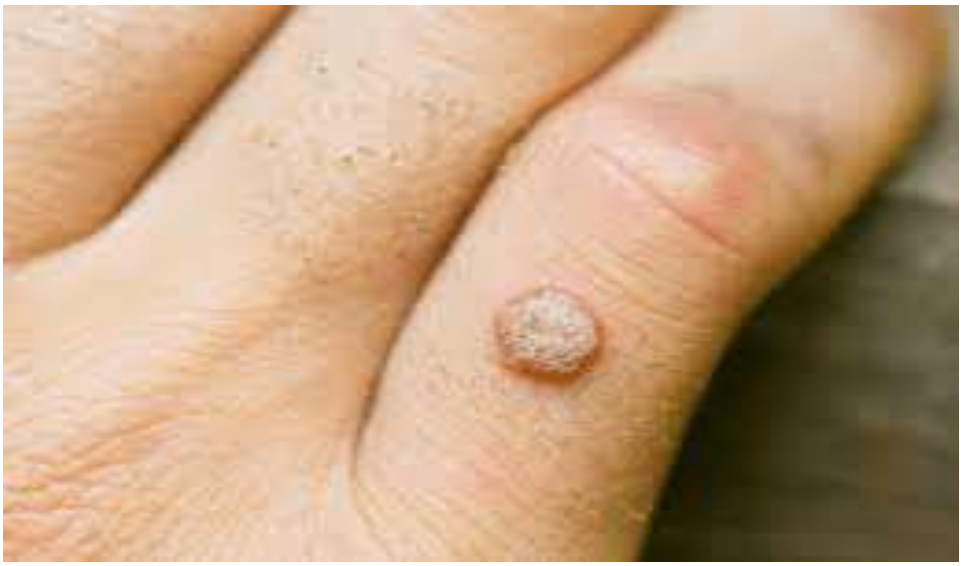


figure (21): wart.[46]

table(1): Skin changes during pregnancy

Physiological skin changes	Specific dermatosis	Dermatosis affected by pregnancy
1-pigmentory changes: Areola and nipple hyperpigmentation Linea nigra Melisma diffuse hyperpigmentation	Pruritic gravidarum	**1-infamatory dermatosis** Atopic dermatitis Discoid eczema Psoriasis Acne
2-striae gravidarum	PUPPP	**2-infection**
3-vascular changes: Varicose vein Palmar erythema Pedal oedema	pruritic foliculitis	a-fungul Candida vaginalis Tinea corporis
4- hair changes Hirsutism Hair loss Hair growth	Pemphigoid gestationalis	b-viral Varicella Wart hsv
5- nail change Nail growth Brittle nail	Prurigo of pregnancy	**3-arthropod:** scabies
6- glandular changes montgomery's tubercles hyperhidrosis millaria		

Aim of the study

The aim of study to determine the frequency of skin changes during pregnancy according to gestational age and gravidity.

Method

A cross-section study was conducted in AL-Imamein AL-Kadhemein medical city from the period of October 2018- march 2019. Twenty-five females were inrolled in this study, including all pregnant women regardless to the gravidity and duration of pregnancy and their diagnosis based on physical examination.

For purpose of research , aquestionnaire formula was prepare to cover the following points:

A detailed history including demographic data, parity, chief dermatological complaints, onset in relation to the duration of pregnancy, presence of itching, history of atopy, jaundice, similar complaints in previous pregnancies, family history, exacerbating factors, associated medical or skin disorders, was elicited. General physical, systemic and complete cutaneous examination was carried out in all patients. The physiological changes of skin and its appendages were noted. In patients presenting with specific dermatoses of pregnancy, the morphology and distribution of lesions was recorded..

Results

A total of 25 pregnant women were recruited in present study from October 2018 to march 2019. Of these, 6 (24%) were primi gravidas and 19 (76%) were multi gravida. Their age range from 20 to 40 years. Most of them presented in third trimester 14 (56%).

Among the Physiological changes,most common were pigmentory changes including : linea nigra 22(88%),breast changes 18(72%), Diffuse hyprpigmentation 16(64%), Melisma 10(40%) as seen in table(3).

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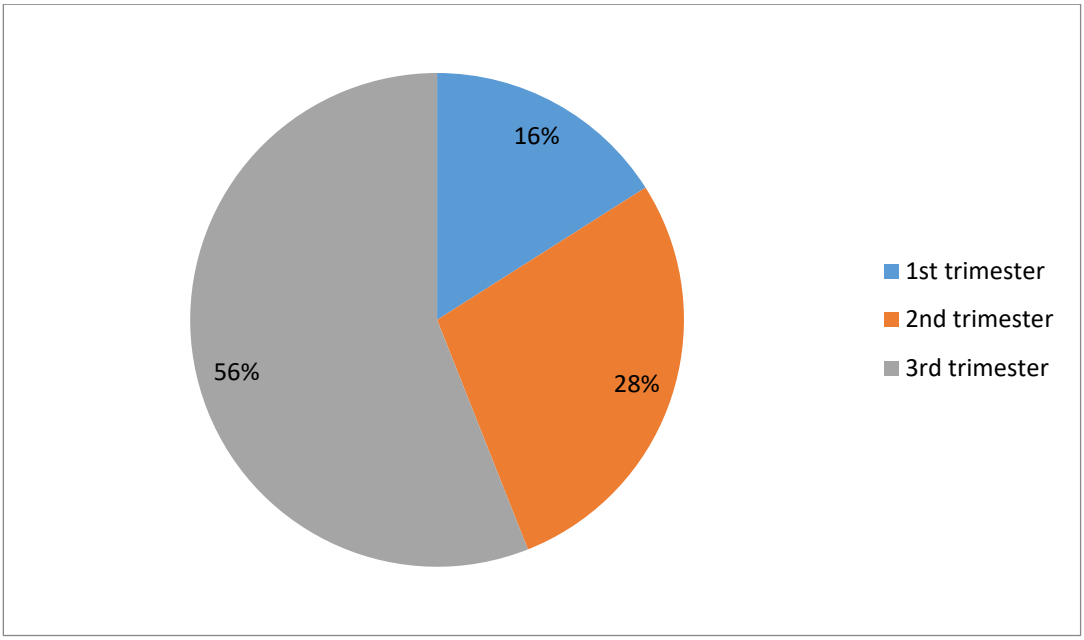
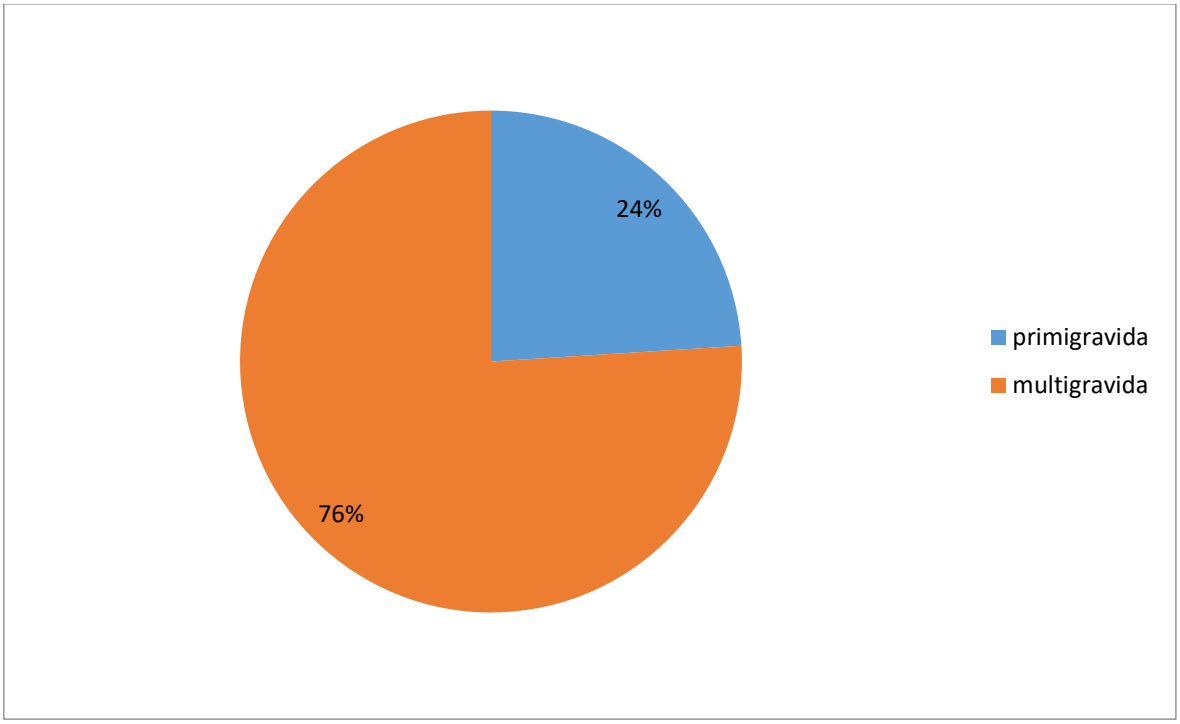


Figure(22) Percentage of present study according to trimesters



Figure(23) Percentage of present study according to gravidity

Table (2): Age intervals

Age intervals (yr)	No.	Percentage
20-24	7	28%
25-29	6	24%
30-34	5	20%
35-39	4	16%
40-44	3	12%

Table (3): Physiological cutaneous manifestations according to trimester and gravida

Manifestations	1st trimester		2nd trimester		3rd trimester		Total
	Primi	Multi	Primi	Multi	Primi	Multi	
Linea nigra	0	1	2	5	3	11	22 (88%)
Montegmry	1	2	1	5	3	11	22 (88%)
hyperhidrosis	0	0	0	5	3	11	19 (76%)
Areolar and nipple hyperpigmentatio	0	0	0	4	3	11	18 (72%)
Striae gravidarum	0	0	0	2	3	11	16 (64%)
Diffuse hyperpigmentation	0	0	0	3	3	10	16 (64%)
Pedal oed	0	0	0	1	2	9	12 (48%)
melisma	0	0	0	2	1	7	10 (40%)
Hair loss	0	0	1	3	2	3	9 (36%)
Nail growth	0	0	1	1	2	4	8 (32%)
Brittle nails	0	0	0	2	0	5	7 (28%)
Varicose vein	0	0	0	2	0	5	7 (28%)
Hair growth	0	0	0	0	2	2	4 (16%)
Palmar erythema	0	0	0	1	0	1	2(8%)

Table (4): Pregnancy specific dermatosis according to trimester and gravida

Manifestations	1st trimester		2nd trimester		3rd trimester		Total
	Primi	Multi	Primi	Multi	Primi	Multi	
Pruritic gravidarum	0	0	0	2	1	7	10 (40%)
Puppp	0	0	0	1	0	6	7 (28%)

Table (5): Dermatosis affected by pregnancy according to trimester and gravida

Manifestations	1st trimester		2nd trimester		3rd trimester		Total
	Primi	Multi	Primi	Multi	Primi	Multi	
Atopic dermatitis	0	0	0	0	0	2	2 (8%)
Acne	0	0	0	3	0	3	6 (24%)
Candida infection	0	0	0	0	0	2	2 (8%)

Discussion

Skin lesions are a frequent problem of pregnant women. They are caused by hormonal, immunological and metabolic factors.

In the present study majority of pregnant women had physiological changes which include pigmentory changes, striae gravidarum, vascular changes , ,and hair and nail and appendages.

Regarding pigmentory changes the most common was linea nigra , seen in 22 (88%) , then hyperpigmentation of areola and nipple seen in 18 (72%),then diffuse hyperpigmentation seen in 16 (64%), then melisma (40%) and this compare to K.Kannambal and G.K.Tharini study in india that found diffuse hyperpigmentation the most seen in 84% then linea nigra 37% then melisma 26%.

this pigmentory changes may due to elevated serum level of melanocyte stimulating hormone ,estrogen and possibily progesterone. [47]

Regarding striae gravidarum our study seen in 16 (64%), but in Kumari R et al in india seen in (79.7%) and this is more common in 3rd trimester , and also more in muti-gravida than primi-gravida this is due to adrenocortical hormone,estrogen and physical factors such as stretching secondary to increase abdominal girth and weight gain and cause striae.[47]

Regarding vascular changes ,pedal odema was most common in the present study 12(48%), but in

K. Kannambal and G.K.Tharin seen in (16.40%)

These vascular changes due to sustain high level of circulating estrogen resulting in distention and proliferation of vessels, this vascular changes more in 3rd trimester this may due to increase venous pressure in femoral and pelvic vessel due to gravid uterus.[10]

Regarding glandular changes in the present study motegmeroy tubercle more common seen in 88% but in india 30% this is due to hypertrophy of sebaceous glands in the breast these changes do not persist postpartum then followed by hyperhidrosis seen in 76% and this may due to increase in eccrine activity and cause this.

Regarding hair and nail changes ,these changes may due to hormonal changes

In the present study, the most common of specific dermatosis of pregnancy was pruritic gravidarum seen in 10(40%),followed by puppp seen in 7(28%) and more common in 3rd trimester , but in india Rashmi kumari T.J the most common PUPPP seen in (63.6%) followed by pruritic gravidarum (22.7%).puppp may due to that rapid abdominal wall distension may cause damage to connective tissue in the striae with conversion of nonantigenic molecules to antigenic ones, triggering an inflammatory response. [48]

in dermatosis affected by pregnancy,in the present study the most common was acne in 6(24%) followed by vaginal candidiasis 2(8%), but in K. Kannambal and G.K.Tharini in india acne 10% and candida 8% , acne may due to increase in hormones called androgens can cause the glands in your skin to grow and produce more sebum — an oily, waxy substance. [49]

Infection like candida may 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. [49]

Conclusion

This study emphasizes that the prevalence of physiological skin changes is much higher than specific dermatoses , 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

References

1. Kroumpouzos G, Cohen LM. Dermatoses of pregnancy. J Am Acad Dermatol. 2001;45:1–19. [PubMed]

2. Shornick JK. Dermatoses of pregnancy. Semin Cutan Med Surg. 1998;17:172–81. [PubMed]

3- Martin AG, Khouri LS. Physiological skin changes associated with pregnancy. Int [9] J Dermatol. 1992;31:375-78.

4-. Holmes RC, Black MM. The specific dermatoses of pregnancy: A reappraisal with special emphasis on a proposed simplified clinical classification. Clin Exp Dermatol. 1982;7:65–73. [PubMed]

5-. Alves GF, Varella Dermatology and pregnancy. An Bras Dermatol. 2005;80:179–186.

6-Kar S, Krishnan A, Shivkumar PV. Pregnancy and skin. J Obstet Gynecol India. 2012;62:268–75.[PMC free article] [PubMed]

7- https://www.scopus.com/home.uri

8-https://www.mamanatural.com/linea-nigra/

9- Barankin B, Silver SG, Carruthers A. The skin in pregnancy. J Cutan Med Surg. 2002;6:236–40.[PubMed]

10-http://sdfertilityacupuncture.com

11--. Thomas RG, Liston WA. Clinical associations of striae gravidarum. J Obstet Gynaecol. 2004;24:270–1.[PubMed]

12-http://knowledge.statpearls.com/chapter/spex/29544/

13-(Rathore
et al., 2011; Soutou and Aractingi, 2015; Van Onselen, 2012)

14-Tyler KH. Physiological skin changes during pregnancy. Clin Obstet Gynecol 2015;58:
119–24
15-https://blog.pregistry.com/varicose-veins-2/

16- https://www.healthline.com/health/skin-disorders/palmar-erythema

17- Kroumpouzos G, Cohen LM. Dermatoses of pregnancy. J Am Acad Dermatol. 2001;45:1–19. [PubMed]

18-https://www.thewoodruffinstitute.com/brittle-nails/

19-https://www.indiamart.com/proddetail/hirsutism-treatment-8919714873.html

20- https://healthmaza.com/montgomery-glands/

21- Roger D, Vaillant L, Fignon A, Pierre F, Bacq Y, Brechot JF, *et al* . Specific pruritic diseases of pregnancy: A prospective study of 3192 pregnant women. Arch Dermatol 1994;130:734-9

22- Matz H, Orion E, Wolf R. Pruritic urticarial papules and plaques of pregnancy: Polymorphic eruption of pregnancy (PUPPP). Clin Dermatol 2006;24:105-8

23-
https://en.wikipedia.org/wiki/Pruritic_urticarial_papules_and_plaques_of_pregnancy

24-Kroumpouzos G, Cohen LM. Dermatoses of pregnancy. J Am Acad Dermatol 2001;45:1-19.

25- https://www.dermnetnz.org/topics/prurigo-of-pregnancy/

26-Engineer L, Bhol K, Ahmed AR. Pemphigoid gestationis: A review. Am J Obstet Gynecol 2000;183:483-91

27https://www.healthline.com/health/pregnancy/pemphigoid-gestationis#pictures

28- Kroumpouzos G, Cohen LM. Pruritic folliculitis of pregnancy. J Am Acad Dermatol 2000;43:132-4.

29-
https://www.researchgate.net/publication/228599585_Dermatological_disorders_unique_to_pregnancy

30-Roth MM: Pregnancy dermatoses: diagnosis, management, and controversies. Am J Clin Dermatol. 2011 Feb 1;12(1):25-41.

31- https://www.mayoclinic.org/diseases-conditions/atopic-dermatitis-eczema/symptoms-causes/syc-20353273

32- https://www.dermnetnz.org/topics/discoid-eczema/

33-Landau JL, Moody MN, Kazakevich N, Goldberg LH. Psoriasis and the pregnant woman: what are the key considerations? Skin Therapy Lett 2011;16:1-3

34-https://www.nhs.uk/conditions/psoriasis/symptoms/

35- https://www.healthline.com/health/pregnancy/acne-remedies

36-https://www.mayoclinic.org/diseases-conditions/acne/symptoms-causes/syc-20368047

37-Locksmith G, Duff P: Infection, antibiotics, and preterm delivery. Semin Perinatol. 2001 Oct;25(5):295-309.

38-http://school-series.com/sti/61-vaginitis

39- https://en.wikipedia.org/wiki/Tinea_corporis

40-https://www.msdmanuals.com/en-sg/home/quick-facts-skin-disorders/fungal-skin-infections/body-ringworm

41-Locksmith G, Duff P: Infection, antibiotics, and preterm delivery. Semin Perinatol. 2001 Oct;25(5):295-309.

42-https://www.findatopdoc.com/Healthy-Living/herpes-simplex-virus

43-https://www.myvmc.com/diseases/chicken-pox-varicella-zoster-virus/

44-https://www.webmd.com/skin-problems-and-treatments/picture-of-varicella-zoster-virus-infection

45--Hamouda T, Freij MA, Saleh M: Management of genital warts in pregnancy. Clin Exp Obstet Gynecol 2012;39:242-244

46-https://www.quickanddirtytips.com/health-fitness/mens-health/4-common-ways-to-get-rid-of-warts

47- Kroumpouzos G, Cohen LM. Dermatoses of pregnancy. J Am Acad Dermatol. 2001;45:1-19.

48- Kroumpouzos G, Cohen LM. Specific dermatoses of pregnancy: An evidence – [13] based systematic review. Am J Obstet Gynecol. 2003;188: 1083-92

49- Gupta U. Sexually transmitted diseases in pregnancy and neonate. In: Sharma [16] VK. A textbook of Indian association for the study of sexually transmitted diseases and AIDS, 2ndedn. Viva Publications, 2009;171-80

Questionnaire of skin changes in pregnancy

-Name:

-Age:

-Occupation:

-Address:

-History of smoking:

Current : exsmoker: never:

Past medical history:

Hypertention diabetic mellitus epilepsy

Heart disease heamatological disease

Drug history:

Trimester: first second third

Primigravida:

Multigravida:

G1	G4	G8
G2	G5	G9
G3	G6	G10

Physiological changes of pregnancy

1-pigmentory changes:

Linea nigra	Breast
Melisma	Hyperpigmentation

2-striae gravidarum

3-vascular changes:

Palmar erythema Varicose vein

Pedal oedema

4-hair changes

Hirsutism

Hair loss Hair growth

5-nail changes

Brittle nail Nail growth

6-glandular changes

montgomery's tubercles hyperhidrosis

millaria

Specific skin disorders of pregnancy

Pruritic gravidarum PUPPP pruritic foliculitis

Pemphigoid gestationalis Prurigo of pregnancy

Dermatoses affected by pregnancy

1-infamatory dermatosis

Atopic dermatitis Discoid eczema

Psoriasis Acne

2-infection: fungal

Candida vaginalis Tinea corporis

viral

Varicella wart hsv