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Original Research Article

Dermatological changes in pregnant women treated in public health units

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ABSTRACT

Background: Pregnancy, particularly its second and third trimesters, causes intense physical, emotional, and psychological changes in women, including the skin, hair, and nails. Objectives were to describe the association between dermatological changes and sociodemographic conditions, anthropometric nutritional status, and previous and gestational diseases.
Methods: This cross-sectional study was conducted in Brazilian public health units, including women in the third trimester of pregnancy with or without dermatological lesions. They answered a questionnaire with sociodemographic data, health history, and dermatological changes. The researchers photographed the lesions and recorded the dermatological and anthropometric assessment results on a form. They used statistical tests (e.g., ANOVA and chi-square) and Spearman's correlation, with a 5% significance level.
Results: The study analyzed 100 pregnant women with a mean age of 26.35±6.49 years and a mean income of 1.68±0.72 Brazilian minimum wages; 30 (30%) women had previous diseases, and 64 (64%) did not report obstetric history. Phototype II was the most common, in 41 (41%) women, and hyperchromia and stretch marks were the most frequent dermatoses. Pre-gestational BMI correlated significantly with the number of dermatological changes-which had a higher prevalence in obese pregnant women. Thin pregnant women had a mean of 2.75±0.95^{a} dermatological changes; normal-weight women, 2.50±1.34^{ab}; overweight, 3.16±1.34^{a}; and obese, 3.55±1.21^{ac} (p=0.014). Furthermore, 82.8% of patients with stretch marks had inadequate weight gain.
Conclusions: The study highlights the complexity of obstetric care in this population, requiring a multidisciplinary approach in prenatal care, focusing on managing metabolic and cardiovascular comorbidities, weight control, and prevention of dermatological complications.

Keywords: Maternal and child health, Dermatosis, Pregnant women, Public health

INTRODUCTION

Pregnancy is a physiological process that intensely changes several systems of the woman's body, including their skin. These are mainly hormonal and mechanical changes essential for adapting the body to the fetus' needs and birth.[1] The hormonal increase beginning with the hormone production by the corpus luteum and the

placenta, changes, for instance, the cardiovascular, respiratory, and gastrointestinal systems, preparing the body to sustain the pregnancy.[2]

In addition to hormonal changes, metabolic and circulatory changes directly affect pregnant women's skin. With the blood volume increase and uterine growth, the body undergoes changes that affect not only the woman's comfort but also her physical appearance with edema, weight gain, and so on.[3] Physical changes, such as abdominal growth and breast enlargement, are often accompanied by changes in self-image, affecting their emotional wellbeing.[4]

The skin, the largest organ in the human body, is also directly impacted during pregnancy. It performs essential functions such as protection, thermal regulation, and vitamin D synthesis, and its integrity is crucial for the overall body balance.[5] However, the hormonal changes of pregnancy significantly affect its appearance and functioning. Hyperpigmentation is one of the most common changes, especially in women with high phototypes, causing melasma and darkening areas such as the nipples and linea alba.[6-7]

Other dermatologic changes, such as stretch marks, are also frequently observed.[8] These marks, along with varicose veins and palmar erythema, result from increased blood volume and skin stretching as the uterus expands. Acne, hirsutism, and increased hair growth are other common manifestations related to hormonal imbalance.[6-7]

These dermatological changes are relevant from aesthetic and clinical perspectives since they can cause physical and emotional discomfort. Dermatological semiology during pregnancy requires detailed attention from health professionals, who must base the diagnosis on clinical observation of the lesions and each patient's particularities.[9] Thus, the skin, being greatly sensitive to internal and external changes, plays a crucial role in the gestational experience.

The scarcity of research on dermatological changes during pregnancy limits our understanding of the prevalence and impact of these conditions on pregnant women's quality of life. Neglect of this area of reproductive health prevents the implementation of effective clinical protocols to manage these changes. Therefore, the scientific community must invest in such research to develop preventive and therapeutic strategies for pregnant women. Hence, this study aimed to describe the association between dermatological changes and sociodemographic conditions, anthropometric nutritional status, and previous and gestational diseases.

METHODS

This cross-sectional, analytical, quantitative study was carried out between March and June 2024 in the health units of a city in the central region of Rio Grande do Sul, Brazil.

The sample consisted of pregnant women in the third trimester, treated at four urban health units with the most prenatal consultations the previous year. The units are part of the unified health system (SUS).

The study used consecutive probabilistic sampling-i.e., pregnant women were included according to the order in which they were scheduled at the health service. The sample size calculation was based on an average of 135 monthly consultations, with a 5% sampling error and a minimum 45% prevalence of dermatological diseases during pregnancy, as described by Pinheiro et al., totaling 100 pregnant women.[6]

The study included pregnant women with or without dermatological lesions in the third trimester of pregnancy (between the 29th and 42nd weeks, according to the last menstrual period or ultrasound). It excluded pregnant women who did not agree to be photographed or who for any reason could not respond to the interview, and women who were not in the third trimester of pregnancy.

Pregnant women were initially identified by gestational age using the Pregnant Woman's Personal Health Record.[10] After signing an informed consent form, they answered a questionnaire covering sociodemographic aspects, health history, obstetric data, and the occurrence of dermatological changes before or during pregnancy.

Personal morbid history was grouped into metabolic disorders (diabetes mellitus, obesity, dyslipidemia, thyroid disease, and hypovitaminosis), cardiovascular diseases (systemic arterial hypertension, heart disease, vasculitis, deep vein thrombosis, and pulmonary thromboembolism), hematological disorders (sickle cell anemia, thrombocytopenia, thrombocytopenic purpura, and antiphospholipid antibody syndrome), pulmonary disorders (asthma and COPD), previous dermatological disorders (reported psoriasis and hidradenitis suppurativa), renal disorders (renal calculi, acute renal failure, chronic renal failure), neoplastic disorders (adnexal mass), neurological disorders (epilepsy), infectious disorders, and previous psychiatric disorders.

Obstetric antecedents were grouped into cardiovascular diseases (gestational hypertension and heart disease), gestational diabetes, obstetric complications (pre-eclampsia, placental abruption, stillbirth, miscarriage, and postpartum complications), infectious diseases during pregnancy, psychiatric disorders, twinning, and nutritional deficiencies (hypovitaminosis and anemia).

After routine prenatal consultations with doctor or nurse, they underwent a thorough dermatological assessment including the skin, hair, mucous membranes, and nails. The information was recorded in a research checklist with data on phototypes, dermatological changes before

pregnancy, dermatological changes during pregnancy and total number of dermatological changes.

In cases of diagnostic doubt, photographs of the lesions were taken to ensure confidentiality and preserve the pregnant women's images. The photos were taken only of the affected areas, respecting their privacy, and not revealing their faces, names, or other identifiable information. The images were captured with a Nikon Coolpix P610® digital camera in macro mode, 1 to 20 cm away from the lesion. After analysis, the photos were deleted from the camera and the researcher's computer.

The nutritional anthropometric assessment was performed using pre-gestational weight and height to calculate their pre-gestational body mass index (BMI). The current weight gain was assessed according to the curves of Kac et al., present in the Pregnant Woman's Personal Health Record.[11]

The collected data were stored in Microsoft Excel and statistically analyzed using the statistical package for the social sciences (SPSS), version 23.0, with a 5% significance level ($p<0.05$). The results are presented in absolute and relative frequencies, mean and standard deviation, or median and 25th and 75th percentiles. The study used the ANOVA test and post hoc Tukey test to associate the pre-gestational BMI classification with the number of dermatological changes; the chi-square test to associate the pre-gestational BMI classifications and weight gain with the presence of dermatoses; and the Spearman correlation to analyze the obstetric variables and dermatological changes.

This study was submitted to the research ethics committee, following the Brazilian national health council's resolution No. 466/2012, which regulates human research, and was approved under evaluation report number: 6.768.382.

RESULTS

The study analyzed 100 pregnant women treated at public health units, with the following results: mean age of 26.35±6.49 years; mean income of 1.68±0.72 Brazilian minimum wages; 57 (57%) unemployed, 21 (21%) working in the tertiary sector, 13 (13%) self-employed, and nine (9%) students.

They had a median of two (one-three) pregnancies, a median of one delivery (zero-one), and a maximum of 11 deliveries (one patient). The mean gestational age at the time of collection was 32.72±3.82 weeks.

Moreover, 30 (30%) pregnant women had some previous pathology, of which half had some metabolic disorder, three (10%) had cardiovascular diseases, three (10%) had hematological disorders, three (10%) had pulmonary disorders, three (10%) had concomitant cardiovascular and metabolic diseases, two (6.6%) had previous dermatological disorders (reported psoriasis and hidradenitis suppurativa), one (3.3%) had renal disorders, one (3.3%) had neoplastic disorders, and one (3.3%) had neurological disorders (epilepsy). No previous infectious or psychiatric disorders were reported.

Also, 64 (64%) had no history of obstetric morbidity. Of those who had such history, 11 (30.5%) had obstetric complications; six (16.6%) had cardiovascular diseases; four (11.1%) had infectious diseases; four (11.1%) had gestational diabetes and pre-eclampsia; two (5.5%) had a history of twins; two (5.5%) had concomitant gestational hypertension, gestational diabetes, and renal disease; two (5.5%) had gestational hypertension, gestational diabetes, and infectious diseases; two (5.5%) had gestational diabetes and obstetric complications; one (2.7%) had gestational hypertension, gestational diabetes, and renal disease; and one (2.7%) had nutritional deficiencies.

As for phototype, 11 (11%) pregnant women were classified with phototype I; 41 (41%) with phototype II; 12 (12%) with phototype III; 20 (20%) with phototype IV; and 16 (16%) with phototype V.

The frequency of dermatoses in pregnant women is shown in Figure 1. Hyperchromia and stretch marks were the most frequent, followed by vascular and glandular changes. No patient had infectious dermatoses, dermatological neoplasms, collagenosis, pemphigoid gestationis, or polymorphic eruption of pregnancy.

The study also summed pregnant women's dermatoses, obtaining a mean of 3.02±1.34 changes. The correlation between demographic, obstetric, and metabolic variables and the sum of dermatological changes is presented in Table 1. The pregnant women's pregestational BMI was weakly correlated with their number of changes.

Pre-gestational BMI classification was statistically significantly associated only with the number of dermatological changes, through the ANOVA, post-hoc Tukey test. Thin pregnant women had a mean of 2.75±0.95^{a} dermatological changes; normal-weight women, 2.50±1.34^{ab}; overweight, 3.16±1.34^{a}; and obese, 3.55±1.21^{ac} ($p=0.014$).

Table 2 shows that vascular changes were statistically significantly associated with pregestational BMI classification. There was a higher percentage of obese patients with vascular changes (24 women, 44.4%). Pre-gestational BMI was also statistically significantly associated with stretch marks-24 (37.5%) patients with stretch marks were classified as obese, according to their pre-gestational BMI.

Moreover, weight gain during pregnancy was statistically significantly related to the presence of stretch marks-53 (82.8%) patients with stretch marks had inadequate weight gain during pregnancy. The other associations in Table 2 were not statistically significant.

Table 1: Correlation between women's demographic, obstetric, and metabolic variables and number of dermatological changes in the third trimester of pregnancy.

Obstetric variables/dermatological changas	R	P
Age (in years)	0.022	0.832
Pregnancies	0.037	0.714
Births	-0.026	0.797
Abortions	0.046	0.649
Gestational age	0.030	0.765
Pre-gestational BMI	0.346	<0.01*
Weight gain	0.150	0.137
Fasting blood glucose	0.120	0.240

Spearman correlation. *p<0.05. BMI, body mass index.

Table 2: Association between pre-gestational BMI and dermatoses in the third trimester of pregnancy.

Variables	Dermatoses, N (%)															
PG BMI (kg/m²)	**Skin**		**Hyperchromia**		**Glandular**		**Vascular**		**Hair**		**Nails**		**Oral mucosa**		**Stretch marks**	
	Yes, (n=76)	**No, (n=24)**	**Yes, (n=88)**	**No, (n=12)**	**Yes, (n=44)**	**No, (n=56)**	**Yes, (n=54)**	**No, (n=46)**	**Yes, (n=7)**	**No, (n=93)**	**Yes, (n=15)**	**No, (n=85)**	**Yes, (n=4)**	**No, (n=96)**	**Yes, (n=64)**	**No, (n=36)**
Underweight (n=4)	4 (5.3)	0 (0)	2 (2.3)	2 (16.7)	2 (4.5)	2 (3.6)	2 (3.7)	2 (4.3)	0 (0)	4 (4.3)	0 (0)	4 (4.7)	0 (0)	4 (4.2)	2 (3.1)	2 (5.6)
Normal (n=36)	28 (36.8)	8 (33.3)	34 (38.6)	2 (16.7)	16 (36.4)	20 (35.7)	10 (18.5)	26 (56.5)	1 (14.3)	35 (37.6)	3 (20)	33 (38.8)	0 (0)	36 (37.5)	18 (28.1)	18 (50)
Over weight (n=31)	19 (25)	12 (50)	26 (29.5)	5 (41.7)	14 (31.8)	17 (30.4)	18 (33.3)	13 (28.3)	4 (57.1)	27 (29)	51 (33.3)	26 (30.6)	2 (50)	29 (30.2)	20 (31.3)	11 (30.6)
Obesity (n=29)	25 (32.9)	4 (16.7)	26 (29.5)	3 (25)	12 (27.3)	17 (30.4)	24 (44.4)	5 (10.9)	2 (28.6)	27 (29)	7 (46.7)	22 (25.9)	2 (50)	27 (28.1)	24 (37.5)	5 (13.9)
P value	0.084		0.059		0.984		<0.01*		0.400		0.273		0.426		0.050*	
Weight gain	Adequate-19 (25), 6 (25), 22 (25), 3 (25), 12 (27.3), 13 (23.2), 10 (18.5), 15 (32.6), 1 (14.3), 24 (25.8), 3 (20), 22 (25.9), 1 (25), 24 (25), 11 (17.2), 14 (38.9).															
	Inadequate-57 (75), 18 (75), 66 (75), 9 (75), 32 (72.7), 43 (76.8), 44 (81.5), 31 (67.4), 6 (85.7), 69 (74.2), 12 (80), 63 (74.1), 3 (75), 72 (75), 53 (82.8), 22 (61.1),															
	p=1.00, 1.00, 0.642, 0.105, 0.497, 0.628, 1.00, 0.016*															

*PG BMI: pre-gestational body mass index. Chi-square test. *p<0.05.

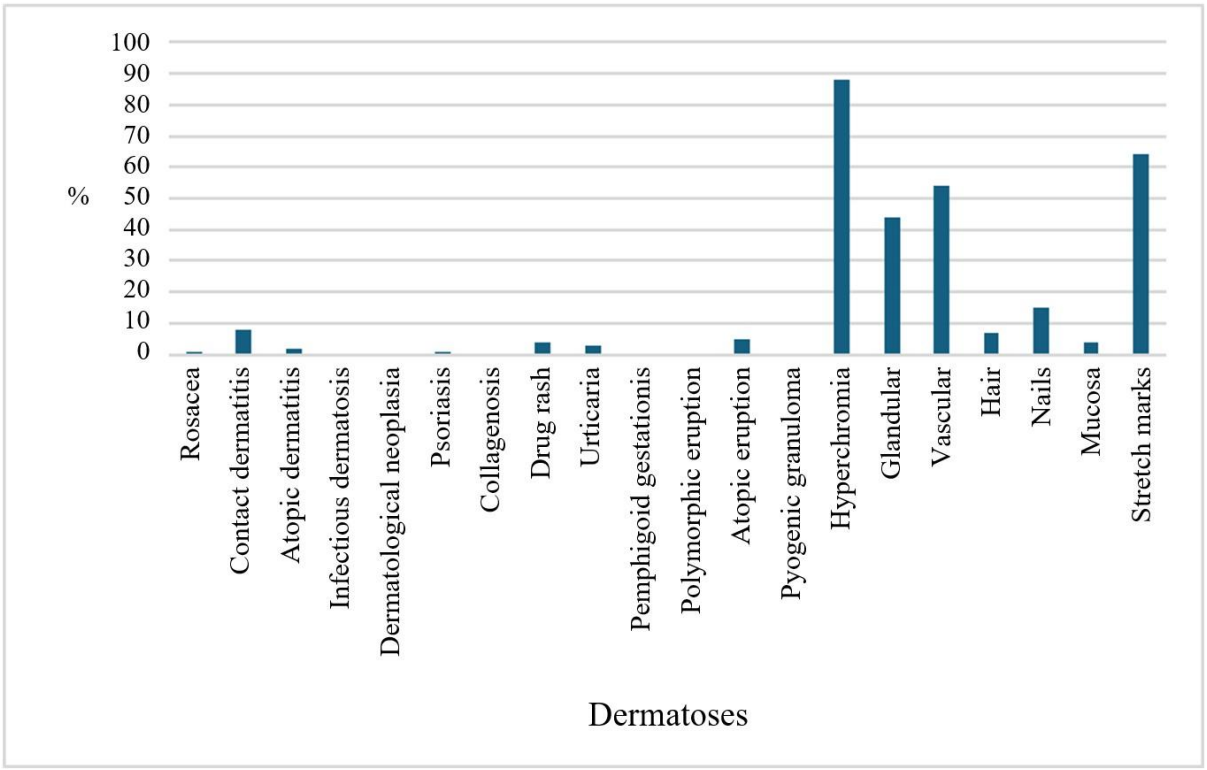

Figure 1: Frequency of dermatoses in women's third trimester of pregnancy monitored in the Brazilian public health system.

DISCUSSION

Data analysis from 100 pregnant women treated at public health units reveals important aspects of their sociodemographic and clinical profile and dermatological health conditions, helping to understand their characteristics and needs.

Regarding sociodemographic and obstetric aspects, the mean age of 26.35 years and the mean income of 1.68 minimum wages reflect a young and low-income profile, factors commonly associated with difficulties obtaining healthcare and education. The unemployment of 57% of pregnant women and the fact that only 21% worked in the tertiary sector and 9% were students reinforces their socioeconomic vulnerability, which can affect their health during pregnancy and access to quality care. Purim et al's study found a similar profile, with a mean age of 24.4 years and mostly stay-at-home wives.[12] The high rate of unemployed pregnant women reinforces their need for greater social and economic support.

The demographic transition in Brazil, reflected in fewer children per woman on average, has been well documented. A study published by Carvalho et al revealed that the fertility rate in Brazil has decreased to around 1.7 children per woman, following a global trend of declining fertility rates in upper-middle-income countries. This agrees with the median number of pregnancies (two) and births (one) mentioned in the text, reflecting the country's current demographic reality.[13]

A study by Borges et al highlighted that low-income and less-educated women tend to have more children, due to limited access to reproductive health services and information about contraceptive methods. This reflects the challenges many Brazilian women face in family planning, as in the case of the patient with 11 births.[14] Similarly, Berquó et al analyzed the lack of access to modern contraceptive methods in rural and poorer urban areas, associating this with the higher prevalence of unwanted pregnancies. They emphasize lingering inequalities that affect family planning, despite advances in health coverage.[15]

The analysis also shows that most pregnant women belong to phototype II (41%), which may be related to the study population's demographic context. It contrasted with another study on pregnant women's sociodemographic profile in Southern Brazil (Purim et al), with a prevalence of women with phototype III.[12]

The comorbidities observed in 30% of pregnant women, with emphasis on metabolic (50%) and cardiovascular (10%) disorders, indicate the importance of managing chronic diseases in prenatal care. Metabolic disorders (e.g., diabetes mellitus and obesity) are risk factors for both mother and baby and can lead to obstetric complications (e.g., pre-eclampsia and gestational diabetes). These conditions must be adequately monitored to prevent adverse outcomes.

The scientific literature widely discusses pregnant women's comorbidities, especially metabolic and cardiovascular disorders. Studies show that gestational diabetes mellitus and obesity are prevalent conditions that increase the risk of complications such as pre-eclampsia and premature birth. Furthermore, women with cardiovascular disorders are at a greater risk of obstetric and fetal complications, highlighting the importance of appropriate management of these conditions in prenatal care.[16,17]

The absence of previous infectious and psychiatric disorders in the pregnant women analyzed is notable since population studies commonly report infections and mental disorders.[18] The low prevalence of conditions such as neurological (3.3%) and renal (3.3%) disorders is consistent with the literature, which indicates these pathologies as less frequent among pregnant women.[19]

Hyperchromia and stretch marks were the most evident dermatological changes (considered physiological changes), followed by vascular and glandular changes, as described by Pinheiro et al., Snarskaya et al and Ciechanowicz et al.[6-8] In contrast, the absence of infectious dermatoses, dermatological neoplasms, and other more serious conditions indicates that, despite the changes, their dermatological conditions were mostly physiological.

The study highlights the correlation between pre-gestational BMI and the number of dermatological changes. Obese pregnant women had a higher mean of changes (3.55), suggesting that excess weight may be a predisposing factor for developing skin changes during pregnancy, such as stretch marks and vascular changes, as described by Lolis et al.[20] The significant relationship between obesity and stretch marks (present in 37.5% of obese pregnant women) reinforces the importance of adequate weight control during pregnancy to prevent dermatological and vascular complications. The association between inadequate weight gain during pregnancy and stretch marks (82.8%) indicates the need for nutritional and educational interventions during prenatal care.[21] Controlling weight gain is essential not only to prevent stretch marks but also to minimize gestational risks, such as gestational diabetes and hypertension, which can affect both the mother and the fetus.

The prevalence of metabolic and cardiovascular comorbidities among these pregnant women highlights the importance of adequate prenatal care, especially to prevent obstetric complications. Control of chronic conditions, such as obesity and diabetes mellitus, is crucial for maternal and fetal health. The relationship between high pre-gestational BMI and the number of dermatological changes highlights the negative impact of excess weight during pregnancy, as obesity was associated with a higher occurrence of stretch marks and vascular changes.

The complexity of prenatal care in a vulnerable population is therefore evident, reinforcing the need for a multidisciplinary approach, with special attention to the management of metabolic and cardiovascular comorbidities, control of weight gain, and prevention of dermatological complications. The results also suggest the importance of public policies to provide pregnant women with healthcare and family planning in the public health system.

The limitations of the study are related to the fact that it was carried out only with patients from the municipality's public health network, with patients of greater socioeconomic vulnerability, revealing data from a portion of the population that does not represent all pregnant women in the region.

CONCLUSION

In short, the analysis reveals the importance of a multidisciplinary approach in the care of pregnant women, considering clinical, dermatological, socioeconomic, and nutritional conditions that directly affect these women's and their babies' health. It is crucial to implement specific care protocols for pregnant women in vulnerable situations to improve maternal-fetal outcomes and ensure more comprehensive and humanized care.

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