PREVALÊNCIA DE DISTÚRBIOS TIREOIDIANOS NAS GESTAÇÕES DE ALTO RISCO DE UMA MATERNIDADE PÚBLICA DO DISTRITO FEDERAL E COMORBIDADES ASSOCIADAS

PREVALENCE OF THYROID DISORDERS IN HIGH-RISK PREGNANCIES AT A PUBLIC MATERNITY HOSPITAL IN THE FEDERAL DISTRICT AND ASSOCIATED COMORBIDITIES

PREVALENCIA DE TRASTORNOS TIROIDEOS EN GESTANTES DE ALTO RIESGO EN UNA MATERNIDAD PÚBLICA DEL DISTRITO FEDERAL Y COMORBILIDADES ASOCIADAS

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RESUMO

A função tireoidiana é regulada pelo eixo hipotálamo-hipofisário-tireoide. Durante a gestação, ocorrem diversos mecanismos que estimulam esse eixo, podendo desencadear ou piorar os distúrbios tireoidianos maternos e gerar repercussões materno-fetais. O hipertireoidismo é relativamente incomum durante a gravidez, ocorrendo em 0,1 a 0,4% de

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todas as gestações. O hipotireoidismo, por sua vez, apresenta uma variação geográfica muito ampla na sua prevalência durante a gravidez, de 2,5% a 11%, e é maior em países asiáticos em comparação com países ocidentais. Diante disso, este estudo objetivou avaliar a prevalência dos distúrbios tireoidianos na gestação em um ambulatório de pré-natal de alto risco de um hospital público do Distrito federal durante o período de 2023 e 2024 e a associação desse distúrbio com outras comorbidades maternas. Os resultados encontrados foram uma prevalência de distúrbios da tireoide na gestação de 19,8%, dos quais 15,5% eram hipotireoidismo e, 4,3%, hipertireoidismo. Ao avaliar a associação entre hipotireoidismo e comorbidades apresentadas pelas gestantes, observou-se associação estatisticamente significativa com o diagnóstico de diabetes mellitus gestacional ($p = 0,002$), de obesidade ($p = 0,051$) e de histórico de câncer de tireoide ($p < 0,001$), além de a própria gestação ter se destacado como fator de risco para o desenvolvimento de distúrbios da tireoide ($p < 0,001$). Foi possível concluir a importância do rastreio universal dos distúrbios da tireoide, diante de uma desordem com elevados riscos materno-fetais durante o período gestacional.

Palavras-chave: Hipertireoidismo. Gravidez de alto risco. Trabalho de parto prematuro. Hipotireoidismo. Distúrbios da tireoide.

ABSTRACT

Thyroid function is regulated by the hypothalamic-pituitary-thyroid axis. During pregnancy, there are various mechanisms that stimulate this axis, which can trigger or worsen maternal thyroid disorders and generate maternal-fetal repercussions. Hyperthyroidism is relatively uncommon during pregnancy, occurring in 0.1 to 0.4% of all pregnancies. Hypothyroidism, on the other hand, has a very wide geographical variation in its prevalence during pregnancy, from 2.5% to 11%, and is higher in Asian countries compared to Western countries. In view of this, this study aimed to assess the prevalence of thyroid disorders during pregnancy in a high-risk prenatal clinic at a public hospital in the Federal District during the period 2023 and 2024 and the association of this disorder with other maternal comorbidities. The results found a prevalence of thyroid disorders during pregnancy of 19.8%, of which 15.5% were hypothyroidism and 4.3% hyperthyroidism. When assessing the association between hypothyroidism and the comorbidities presented by the pregnant women, a statistically significant association was found with a diagnosis of gestational diabetes mellitus ($p = 0.002$), obesity ($p = 0.051$) and a history of thyroid cancer ($p < 0.001$), in addition to pregnancy itself being a risk factor for the development of thyroid disorders ($p < 0.001$). It was possible to conclude the importance of universal screening for thyroid disorders, given that this is a disorder with high maternal-fetal risks during pregnancy.

Keywords: Hyperthyroidism. High-risk pregnancy. Preterm labor. Hypothyroidism. Thyroid disorders.

RESUMEN

La función tiroidea está regulada por el eje hipotálamo-hipófisis-tiroides. Durante el embarazo, existen diversos mecanismos que estimulan este eje, lo que puede desencadenar o agravar los trastornos tiroideos maternos y generar repercusiones materno-fetales. El hipertiroidismo es relativamente infrecuente durante el embarazo, ya que se produce entre el 0,1% y el 0,4% de todos los embarazos. El hipotiroidismo, en cambio, presenta una variación geográfica muy amplia en su prevalencia durante el embarazo, del 2,5% al 11%, y es mayor en los países asiáticos que en los occidentales. En vista de esto, este estudio tuvo como objetivo evaluar la prevalencia de trastornos tiroideos durante el embarazo en una clínica prenatal de alto riesgo en un hospital público del Distrito Federal durante el período 2023 y 2024 y la asociación de este trastorno con otras comorbilidades maternas. Los resultados encontraron una prevalencia de trastornos

tiroideos durante el embarazo de 19,8%, de los cuales 15,5% fueron hipotiroidismo y 4,3% hipertiroidismo. Al evaluar la asociación entre el hipotiroidismo y las comorbilidades que presentaban las gestantes, se encontró una asociación estadísticamente significativa con el diagnóstico de diabetes mellitus gestacional ($p = 0,002$), la obesidad ($p = 0,051$) y los antecedentes de cáncer de tiroides ($p < 0,001$), además de ser el propio embarazo un factor de riesgo para el desarrollo de trastornos tiroideos ($p < 0,001$). Se pudo concluir la importancia del cribado universal de los trastornos tiroideos, dado que se trata de un trastorno con elevados riesgos materno-fetales durante el periodo gestacional.

Palabras clave: Hipertiroidismo. Embarazo de alto riesgo. Parto prematuro. Hipotiroidismo. Trastornos tiroideos.

INTRODUCTION

Thyroid diseases are the second most common endocrine diseases in the reproductive period and affect approximately 3% of women (Avramovska et al, 2021). According to ACOG (2020), hyperthyroidism occurs in 0.2 to 0.7% of pregnancies, and Graves' disease is responsible for 95% of these cases. Signs and symptoms of hyperthyroidism include nervousness, tremors, tachycardia, frequent stools, excessive sweating, heat intolerance, weight loss, goiter, insomnia, palpitations, and hypertension. Although some of these symptoms are common in pregnancy and other non-thyroid-associated diseases, the results of serum thyroid function tests differentiate it from these other possibilities. Inadequately treated or untreated maternal thyrotoxicosis is associated with a higher risk of preeclampsia with severe features, maternal heart failure, and thyroid storm than treated and controlled maternal thyrotoxicosis.

Subclinical hypothyroidism in pregnancy has a prevalence ranging from 2.0 to 2.5% in the United States (USA) and from 0.8 to 1.7% worldwide, while clinical hypothyroidism affects 0.2 to 1% of pregnant women worldwide. Pregnancy influences thyroid function, and untreated thyroid dysfunction (hyperthyroidism or hypothyroidism) is associated with increased rate of adverse maternal-fetal outcomes. This increases the need for awareness about thyroid disease in pregnancy with the aim of reducing the rate of complications. (Negro and Mestman, 2011; ACOG, 2020)

Thyroid function is regulated by the hypothalamic-pituitary axis, through hypothalamic thyrotropin-stimulating hormone (TRH) and thyroid-stimulating hormone (TSH). The basic element for thyroid hormone synthesis is iodide, which comes from the diet. Due to this, iodine-deficient regions can endemically determine thyroid insufficiency (Evident Hypothyroidism) (Nobel and Medeiros-Neto, 2004; Vaisman, Rosenthal and Carvalho, 2004).

Overt hypothyroidism (HE) is defined as a low free thyroxine (FT4) with elevated TSH levels. Iodine deficiency is the leading cause of HE worldwide, however, in areas where iodine intake is sufficient (such as in the United States), the most frequent cause is autoimmune thyroiditis (or Hashimoto's thyroiditis). Other causes are previous thyroidectomy, radioiodine therapy, use of medications such as amiodarone, antithyroid medications, and lithium, congenital hypothyroidism, pituitary or hypothalamic disease, and immunoglobulin binding to the TSH receptor (blocking its activity) (Dugalic et al, 2023)

With this in mind, the World Health Organization (WHO), the National Academy of Medicine (ANM), and the American Thyroid Association (ATA) recommend, respectively, the intake of at least 250 mcg, 220 mcg, and 150 mcg of iodine daily during pregnancy. In

Brazil, most prenatal vitamin supplements have a dose of 200mcg of iodine per tablet. According to the WHO, the maximum tolerable dose of iodine for pregnant women is 500mg per day.

Iodine requirements are higher in pregnant women than in non-pregnant women, due to the increase in maternal production of thyroxine (T4), required to maintain maternal euthyroidism, and due to an increase in renal iodine clearance. Severe maternal iodine deficiency during pregnancy results in a reduction in maternal T4 production, inadequate placental transfer of this hormone, and impaired fetal neurological development. However, excessive iodine intake can also be harmful, as it can lead to fetal hypothyroidism and goiter (Ross, 2024)

T4 and T3 (triodothyronine) are thyroid hormones synthesized from tyrosine, which originates from the thyroglobulin glycoprotein (TG), through reactions with the enzyme thyroperoxidase (TPO), which will be important markers in the diagnosis and prognosis of thyroid disorders (Nobel and Medeiros-Neto, 2004).

During pregnancy, several mechanisms occur that stimulate the hypothalamic-pituitary-thyroid axis. But, the main changes in thyroid function during pregnancy are: increased TBG and TSH stimulation by human chorionic gonadotropin (hCG) (Ross, 2024).

There is an increase in the serum concentration of estrogens, which results in an increase of about 50% in the production of thyroxine-binding globulin (TBG). To maintain adequate concentrations of free thyroid hormone (THs) during this time, the thyroid gland's production of T4 and T3 must increase. Excess TBG leads to an increase in total but non-free serum concentrations of T4 and T3, which increase by approximately 50% during the 1st half of pregnancy, reaching a plateau at approximately 20 weeks of gestation, at which time a new stable state is reached and the overall rate of thyroid hormone production returns to pregestational rates (Ross, 2024; Nobel and Medeiros-Neto, 2004; Bártholo, Monteiro and Trajano, 2014; FEBRASGO, 2022).

Simultaneously, there is an increase in the glomerular filtration rate, resulting in greater renal clearance of iodine and an increase in the serum concentration of hCG, which has subunits identical to TSH, stimulating thyroid tissue by cross-reacting with the TSH receptor. This stimulus generates the release of TH by the thyroid in the first 8 to 14 weeks of pregnancy and generates negative feedback in the hypothalamic-pituitary axis, which implies a reduction in TSH in this gestational phase, concomitant with the peak of hCG and can generate goiter and transient hyperthyroidism during pregnancy (Nobel and Medeiros-Neto, 2004; Bártholo, Monteiro and Trajano, 2014; FEBRASGO, 2022).

For every 10,000 mIU/L of HCG produced, there is an approximate drop of 0.1 mIU/L of TSH. Due to this, gestational thyrotoxicosis or transient hyperthyroidism is the most common cause of hyperthyroidism in pregnancy, and can remain until around the 20th week, when the development of the fetal thyroid gland is complete and maternal thyroid function begins to return to normal (Bártholo, Monteiro and Trajano, 2014; FEBRASGO, 2022).

Up to the 18th week of gestation, the fetus is totally dependent on placental transfer from maternal THs. With this in mind, and considering that the metabolic demands of pregnant women are greater in the first trimester of pregnancy, the presence of maternal thyroid dysfunctions and/or insufficient or borderline iodine intake during pregnancy can cause fetal hypothyroidism (Nobel and Medeiros-Neto, 2004; FEBRASGO 2022).

The two main differential diagnoses in pregnant patients with thyrotoxicosis are Graves' disease (GD), which is the main pathology etiologically associated with hyperthyroidism in pregnancy, and gestational hyperthyroidism. In both situations, the clinical manifestations of the disease are similar, however the absence of a previous history of thyroid disease and clinical signs of GD (goiter, ophthalmopathy) favors the diagnosis of gestational hyperthyroidism. In doubtful cases, the measurement of the anti-TSH receptor antibody (TRAb) is indicated, since 95% of GD cases are positive for TRAb (SBEM, 2013).

The diagnosis of hyperthyroidism is suspected by the presence of some signs and symptoms, including tremor of the extremities and/or eyelid, weight loss or failure to gain weight despite adequate diet, tachycardia, palpitations, anxiety, dysthermias, increased appetite, change in bowel habit and irritability, and is confirmed through laboratory detection of suppression of serum TSH levels and elevation of FT4. Tests that use radioactive iodine are contraindicated in pregnancy. In addition, the measurement of TRAb, as already mentioned, allows the diagnosis of GD, which represents an important cause of hyperthyroidism (Bártholo, Monteiro and Trajano, 2014; FEBRASGO 2022).

Hypothyroidism, in turn, is more common in pregnant women than hyperthyroidism. This thyroid disorder can have adverse effects on pregnancy outcomes depending on the severity, whether clinical, subclinical, or hypothyroxinemia (low maternal FT4 level alone), such as: increased risk of severe preeclampsia, preterm birth, placental abruption, neonatal respiratory distress syndrome, and/or miscarriage, with a worse prognosis for patients with clinical hypothyroidism (Hallengren et al, 2009).

Universal screening for hypothyroidism in pregnancy is controversial, due to insufficient data showing a benefit of thyroid hormone replacement during pregnancy, but TSH measurement in the 1st trimester of pregnancy is recommended for all women living in

areas with moderate to severe iodine deficiency, with symptoms of hypothyroidism, with a personal or family history of thyroid disease and with a personal history of: positive TPO antibodies, goiter, age >30 years, type 1 diabetes, irradiation in the head and neck region, recurrent miscarriage or preterm birth, multiple previous pregnancies (two or more), grade 3 obesity, infertility, previous thyroid surgery, use of amiodarone, lithium or recent administration of iodinated radiological contrast agents (ACOG, 2020)

According to the ATA, the diagnosis of hypothyroidism in pregnancy is made by measuring TSH using population- and trimester-specific reference intervals for pregnant women. TSH should be measured in any woman with symptoms of hypothyroidism and in conjunction with FT4 in asymptomatic women with TSH above the population-specific and trimester upper limit of normal (or above 4.0 mU/L when local reference ranges are not available).

TPO antibody should be evaluated in pregnant women with TSH >2.5 mU/L. This antibody is elevated in approximately 30% to 60% of pregnant women with elevated TSH. The literature describes that pregnant women with subclinical hypothyroidism with positive TPO antibodies have a higher risk of complications than those whose antibodies are negative (Liu, et al, 2014).

The ATA Guidelines for the Diagnosis and Treatment of Thyroid Disease during Pregnancy and Postpartum recommend the use of population-based trimester-specific reference intervals for TSH and assay method and trimester-specific reference intervals for FT4, due to changes in thyroid physiology during pregnancy (Alexander *et al*, 2017)

In the absence of population- and trimester-specific normal ranges, ATA guidelines suggest that between 7 and 12 weeks gestational age, the lower limit of the TSH reference interval should be reduced by approximately 0.4 mU/L and the upper limit by 0.5 mU/L (corresponding to a TSH reference interval of approximately 0.1 to 4 mU/L) and between the 2nd and 3rd trimesters of gestational age, there should be a gradual return of TSH to the normal non-pregnant range. (Alexander *et al*, 2017).

Therefore, the diagnosis of thyroid disease during pregnancy requires evaluation of changes in thyroid physiology and thyroid function tests that accompany the physiological changes of pregnancy and not only the observation of absolute values of thyroid hormones (Ross, 2024)

Pregnant women with overt hyperthyroidism should be treated with antithyroid medications, and those with overt hypothyroidism should be treated with adequate thyroid hormone replacement to minimize the risk of adverse outcomes. Pregnant women who lack

thyroid function after thyroidectomy or radioiodine therapy may require higher dosages of medication (ACOG, 2020).

Drug treatment of hyperthyroidism during pregnancy may carry fetal, neonatal and/or maternal risks that the obstetrician should be aware of. Propylthiouracil (PTU) and methimazole (MMZ) inhibit the production of FT4. In addition, PTU also blocks the peripheral conversion of T4 to T3, which has greater cellular activity in peripheral tissues.

The drug of choice for the treatment of hyperthyroidism in pregnancy in the first trimester is propylthiouracil (PTU), because methimazole (MMZ) presents a high teratogenic risk. However, in the second and third trimesters and also in the puerperium, MMZ is the drug of choice, due to the hepatotoxicity of the PTU, which can cause hepatic necrosis in the pregnant woman and in the fetus (Bártholo, Monteiro and Trajano, 2014; FEBRASGO, 2022).

Untreated hyperthyroidism or inadequate thyrotoxicosis control can lead to fetal, neonatal, and maternal repercussions such as hypertensive disease, miscarriage, preterm birth, low fetal weight, fetal intrauterine growth restriction, stillbirths, thyrotoxic crisis and maternal heart failure, placental abruption, and fetal thyroid dysfunction. (Maia et al, 2013; Bártholo, Monteiro and Trajano, 2014; FEBRASGO, 2022)

Evaluation of therapy in pregnant women with hyperthyroidism is done by monitoring FT4 and the dose of antithyroid drug should be adjusted appropriately to achieve a free T4 at the upper limit of the normal range of pregnancy. In women who also have T3 thyrotoxicosis, this hormone should also be monitored with an optimal level at the upper limit of the normal range of pregnancy (ACOG, 2020).

Treatment of hypothyroidism is indicated for all pregnant women with newly diagnosed clinical or subclinical hypothyroidism and should be done with thyroid hormone (levothyroxine). For pregnant women with TSH between 2.6 and 4 mU/L, the choice between treatment and treatment should be individualized, based on risk-benefit and comorbidities and personal history of each patient. However, in cases where it is decided not to carry out drug treatment and the patient is at particularly high risk of developing hypothyroidism during pregnancy, monthly follow-up of TSH should be performed, and treatment should be instituted immediately if TSH > 4 mU/L is observed (Ross, 2024).

Women with preexisting hypothyroidism in reproductive planning require optimized doses of levothyroxine, aiming at a preconception serum TSH level between the lower reference limit and 2.5 mU/L, in order to avoid decompensation of the disease during the 1st trimester of pregnancy (Ross, 2024).

The evaluation of hypothyroidism is guided by the measurement of TSH levels, which should be monitored every 4 to 6 weeks and the levothyroxine dose should be adjusted aiming for a value less than or equal to 2.5 milliunits/L (ACOG, 2020).

Prematurity and diseases such as hypertension and diabetes are the main concerns of obstetricians when referring to high-risk pregnancies. Thyroid pathologies, in turn, are often not screened during prenatal care, even in patients at high risk for these disorders. Thus, this work aims to rescue the importance of such, by evaluating the prevalence of thyroid disorders in pregnancy in a high-risk prenatal outpatient clinic of a public hospital in the Federal District during a period of one year (2024).

THEORETICAL FRAMEWORK

According to Gupta, et al (2021), the most frequent thyroid disorder in pregnancy is hypothyroidism. The geographic variation in the prevalence of hypothyroidism during pregnancy is very wide and ranges from 2.5% to 11% and is higher in Asian countries compared to Western countries.

Gupta, et al (2021) conducted a prospective study between 2018 and 2020, with 865 pregnant women, in order to assess the prevalence and pattern of thyroid disorders in pregnant women. The study was conducted at the Department of Physiology in collaboration with the Department of Obstetrics and Gynecology, Index Medical College, Hospital and Research Center, in Indore, MP, India. The results found were: a prevalence of thyroid dysfunction of 10.4% (90 patients). Of these, subclinical and manifest hypothyroidism were found in 5.50% and 0.92%, respectively, while subclinical and manifest hyperthyroidism were observed in 3.12% and 0.81% of the pregnant women, respectively. A significant association was found between thyroid dysfunction and maternal age, BMI, parity, and education.

The prevalence of hyperthyroidism in pregnancy varies between 0.1% and 0.4% and can manifest clinically as subclinical hyperthyroidism (without symptoms), thyrotoxicosis and thyrotoxic crisis (Bártholo, Monteiro and Trajano, 2014)

The prevalence of thyroid disorders during pregnancy has been studied for several years, in order to improve measures for screening, diagnosis, and follow-up of patients during prenatal care. Andrade et al. (2005) studied 75 pregnant volunteers, living in the city of Itabuna, Bahia State, Brazil, with the following inclusion criteria: pregnant women with no previous history of thyroid disease and diabetes mellitus, under 40 years of age, at any gestational age. In the study, a prevalence of 4.0% of subclinical hypothyroidism was

observed in the sample and, based on this result, the authors consider the inclusion of thyroid evaluation in the routine of prenatal examination to be of great importance.

Unnikrishnan and Menon (2011) reviewed the literature on the epidemiology of five thyroid disorders in India. Among the results observed in this study, it was evidenced that the prevalence of hypothyroidism in women was higher than in men, being 11.4% in women and 6.2% in men, and it was also observed that the prevalence of subclinical hypothyroidism increased with age. Regarding hyperthyroidism, it was present in 0.6% and 1.2% of the women interviewed in a hospital study of women in Pondicherry.

Saraladevi et al (2016) conducted a prospective and comparative study with 1000 patients, aiming to evaluate the prevalence of thyroid disorders in the first trimester of pregnancy in patients attending prenatal care at a maternity hospital in Hanamkonda, India, and found a prevalence of thyroid disorders in pregnancy of 11.6%, with 6.4% subclinical hypothyroidism, 2.8% preexisting hypothyroidism, 1.8% subclinical hyperthyroidism and 0.6% preexisting hyperthyroidism.

Saraladevi et al (2016) also concluded that subclinical hypothyroidism, in addition to being the most prevalent thyroid disorder among the patients studied, was the most associated with poor obstetric outcomes and fetal complications, such as preeclampsia (9.37%), premature birth (7.81%), miscarriages (4.68%) and placental abruption (1.56%), fetal intrauterine growth restriction (6.25%), low birth weight (4.68%) and stillbirths (1.56%).

Reiterating the results found by Saraladevi et al, Roushali Kumar et al, (2023) conducted a prospective observational study in a tertiary care institute in Punjab, also in India, with 300 patients, in order to estimate the prevalence of thyroid disorders in pregnant women and their association with maternal-fetal outcomes. The result obtained was an overall prevalence of thyroid disorders in pregnancy of 33.9%, with hypothyroidism (31.6%) being more common than hyperthyroidism (2.3%). In addition, a significant association was found between thyroid disorders and maternal-fetal complications (p value < 0.001).

Avramovska et al (2021), also studied the prevalence of thyroid disorders in pregnant women, and found results similar to those described by Roushali Kumar et al, (2023), of the 358 women tested, 132 women (36.76%) had subclinical hypothyroidism, 1.94% had subclinical hyperthyroidism, and there was only one case of overt hypothyroidism (0.28%). In their study, adverse perinatal outcomes were also observed in pregnant women with thyroid disorders, with statistical significance IUGR ($p = 0.028$) and 1-minute Apgar score ($p = 0.015$).

METHODOLOGY

This is an observational, cross-sectional, and retrospective study with a quantitative approach, in which the prevalence of thyroid disorders during pregnancy in a high-risk prenatal outpatient clinic of a public hospital in the Federal District during the period 2023 and 2024 and the association of this disorder with other maternal comorbidities was investigated.

The research was carried out in a public environment, at the High-Risk Prenatal Outpatient Clinic (HRCP) for endocrinopathies of pregnancy at the Regional Hospital of Taguatinga (HRT), which is located in Brasília - DF.

The recruitment process was carried out through the collection of data from electronic medical records, in the TRAKCARE system (patient care system in the Hospitals of the Health Department of the Federal District), of all patients attended in prenatal care at high risk of endocrinopathies of pregnancy at the Regional Hospital of Taguatinga.

The consent of the research participants was obtained through the signing of the free and informed consent form, which was sent to the patients electronically (whatssapp), after contact was made via telephone call with them, to inform them about the research and the submission of the informed consent.

To define the sample, the following parameters were used: the population served in the HRCP for endocrinopathies of pregnancy during the 2-year period (2023 and 2024): 303 patients; 95% confidence level; margin of error of 4% and expected prevalence of 15%. The sampling for the selection is probabilistic of the simple casual type. The sample size was calculated using the following formula:

$$n = \frac{Z^2 . P . (1 - P) . N}{E^2 (N - 1) + Z^2 . P (1 - P)}$$

Where:

n = sample size

N = size of the population treated in the HRCP for endocrinopathies of pregnancy in the last year.

E = margin of error (0.04).

Z = critical value for the 95% confidence level and margin of error of 0.05% (1.96).

Prevalence was defined based on international studies (Unnikrishnan, A. G; Menon, U. V., 2011) that indicate prevalences of 2% to 11.5% for endocrinopathies in pregnancy. We used 15% as a conservative estimate, ensuring an adequate sample size, and added 10% for possible losses. A total sample of 169 patients was present. But, at the end of the research, a total of 303 medical records were analyzed.

The research participants were all pregnant women followed up in high-risk prenatal care and in HRT endocrinology from 01/01/2023 to 12/31/2024. The exclusion criteria were: follow-up at another high-risk prenatal outpatient clinic of the HRT, other than that of endocrinopathies of pregnancy, pregnant women attended at the same service, but with another gestational risk, pregnant women attended in other years, other than those delimited in the study time.

The present research was developed following the following steps: the project was submitted for analysis on the Brazil Platform under CAAE number 85683324.1.0000.5553, and accepted, on February 25, 2025, under a consolidated opinion of CEP number 7.409.958. After the approval of the CEP, the patients were submitted to the completion of the free and informed consent form (ICF), followed by data collection through a search in electronic medical records. The collected data were compiled and coded in a Microsoft Excel spreadsheet (version 2013) and then data analysis was performed using the JASP program, using the chi-square test, considering a statistical significance of $p<0.05$. In this study, the anonymity of the patients was respected, in accordance with the ethical precepts of resolution 466/12 of the National Health Council/Ministry of Health.

RESULTS AND DISCUSSIONS

This study evaluated a total of 303 pregnant women, and it was possible to highlight a prevalence of thyroid disorders of 19.8% (60 patients), of which 15.5% had a diagnosis of hypothyroidism, a statistic close to that used to characterize the sample of this study, described by Unnikrishnan, A. G; Menon, U. V. (2011), but much higher than that reported in the literature, such as in the studies by Gupta et al (2021) and Saraladevi et al (2016).

Regarding hyperthyroidism, the prevalence found in this study was 4.3%, a value close to that observed in the study by Gupta, et al (2021), but higher than that observed in most studies described in the literature, such as Saraladevi et al (2016), which found a prevalence of hyperthyroidism of 0.1 to 0.4%, and Bártholo, Monteiro and Trajano (2014), who found 2.4% and the ACOG literature review (2020), which showed a prevalence of hyperthyroidism around the world ranging from 0.2 to 0.7%.

This study also revealed that, among the patients with hypothyroidism, 34% (16 patients) had a diagnosis of diabetes mellitus prior to pregnancy and 29.8% had a diagnosis of gestational diabetes (14 patients). When evaluating the association between hypothyroidism and specific comorbidities, a statistically significant association was observed with the diagnosis of gestational diabetes mellitus ($p = 0.002$).

Obesity was another frequent comorbidity among the patients with hypothyroidism studied, being found in 38.3% (18 patients) of the patients. For obesity, a borderline p-value was identified ($p = 0.051$), which may indicate a trend towards an association between the variables. Although this value does not reach the conventional level of significance ($p<0.05$), it is suggested that future studies, with greater sample power, can explore this relationship in a more in-depth way.

Hyperthyroidism was less frequent than hypothyroidism in pregnant women, and most patients did not have other associated comorbidities, and no statistically significant association was found. The presence of arterial hypertension was observed in 23% of the patients and it was the endocrine disorder that had the highest incidence in this population, but there was no statistically significant association.

Regarding the origin of thyroid disease, among the 303 patients studied, 4.3% developed thyroid disorders during pregnancy, when evaluating the association between pregnancy and the development of thyroid disorders, a statistically significant association was observed ($p < 0.001$), which may bring a positive contribution in favor of the need to implement screening in the general population in prenatal care in relation to thyroid disorders and not only in specific at-risk populations, as established by ACOG (2020) to date.

Another significant finding observed in this study was the association between pregnant women with hypothyroidism and a history of thyroid cancer. Approximately 15.5% of the patients studied had thyroid disorders prior to pregnancy, among these cases, 6 patients had a history of thyroid cancer and thyroidectomy prior to pregnancy, which resulted in post-thyroidectomy hypothyroidism, and 3 cases of iodine therapy due to hyperthyroidism refractory to clinical treatment, which also resulted in hypothyroidism as a post-treatment sequelae. When evaluating the association between hypothyroidism and history of thyroid carcinoma, a statistically significant association was also observed ($p < 0.001$).

According to ACOG (2020), thyroid function testing (TSH) is indicated in women with a personal or family history of thyroid disease, type 1 diabetes mellitus, clinical suspicion of thyroid disease, with significant goiter, or with distinct thyroid nodules. These indications are in agreement with the results of this study, since a significantly statistical relationship was observed between hypothyroidism and gestational DM, as well as between hypothyroidism and personal history of thyroid cancer, a fact that ratifies the importance of screening for hypothyroidism in diabetic patients and with a personal history of thyroid disease, however obesity was not included as a risk factor in this algorithm.

The associations obtained in this study in relation to pregnancy as a risk factor for thyroid disorders and obesity as a comorbidity in patients with hypothyroidism may indicate a trend towards changes in the screening pattern of thyroid disorders in pregnant women, which is currently not done universally, but more studies are needed to explore this relationship in a more in-depth way.

CONCLUSIONS

This study demonstrated a high prevalence of thyroid disorders (19.8%) in the population studied, especially hypothyroidism, but also a prevalence of hyperthyroidism higher than that evidenced in other clinical studies evaluated for the theoretical basis of this study. When evaluating the association between hypothyroidism and specific comorbidities, this study observed a statistically significant association with the diagnosis of gestational diabetes mellitus ($p = 0.002$), obesity, borderline value ($p = 0.051$) and thyroid cancer ($p < 0.001$), as well as evidence of pregnancy as a risk factor for the development of thyroid disorders ($p < 0.001$).

These data draw attention to the need for improvement in the training and qualification of health professionals who perform prenatal care, so that they are able to diagnose and manage this disease during pregnancy and, in this way, contribute to the improvement of maternal fetal outcomes. They also serve as a warning for a possible delay in the diagnosis of these disorders due to the contraindication to universal screening of thyroid disease, by the screening algorithm and clinical management of thyroid disease available so far in Brazil, based on the recommendations of ACOG (2020).

Thus, it is expected that the results of this study can contribute to changes in the current algorithm for screening and clinical management of thyroid disease in pregnancy, enabling the reduction of maternal-fetal morbidity and mortality due to thyroid disorders.

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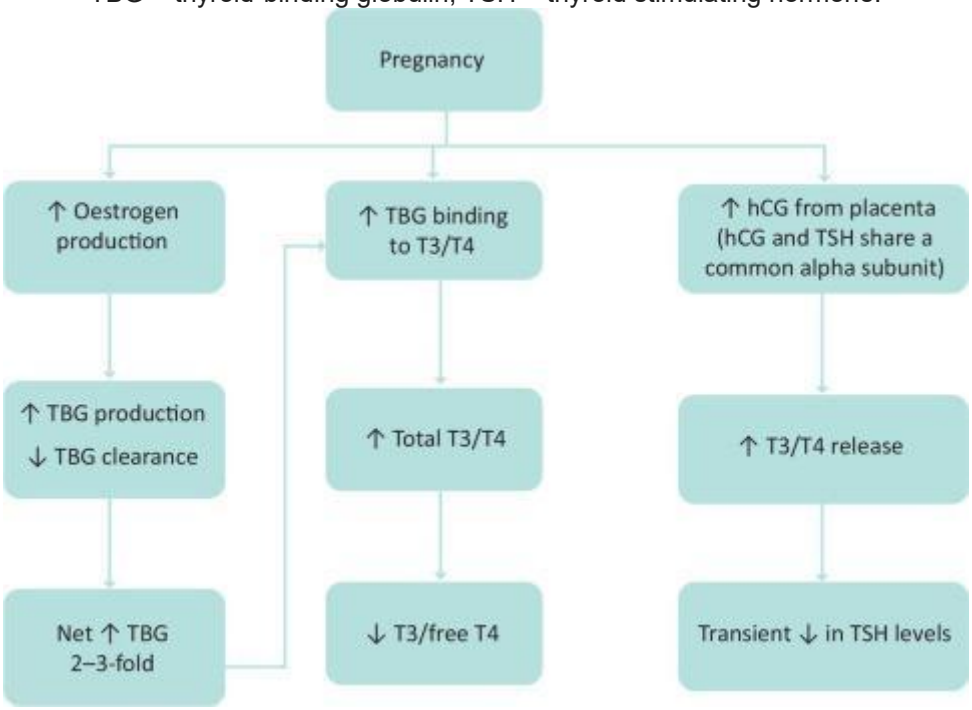
FIGURES AND TABLES

Figure 1. Physiological changes in thyroid hormones in pregnancy. hCG = human chorionic gonadotropin; TBG = thyroid-binding globulin; TSH = thyroid stimulating hormone.



Source: Yap YW, Onyekwelu E, Alam U. Thyroid disease in pregnancy. Clin Med (Lond). 2023

Figure 2 Relative frequency of prior and gestational diabetes among women with and without hypothyroidism

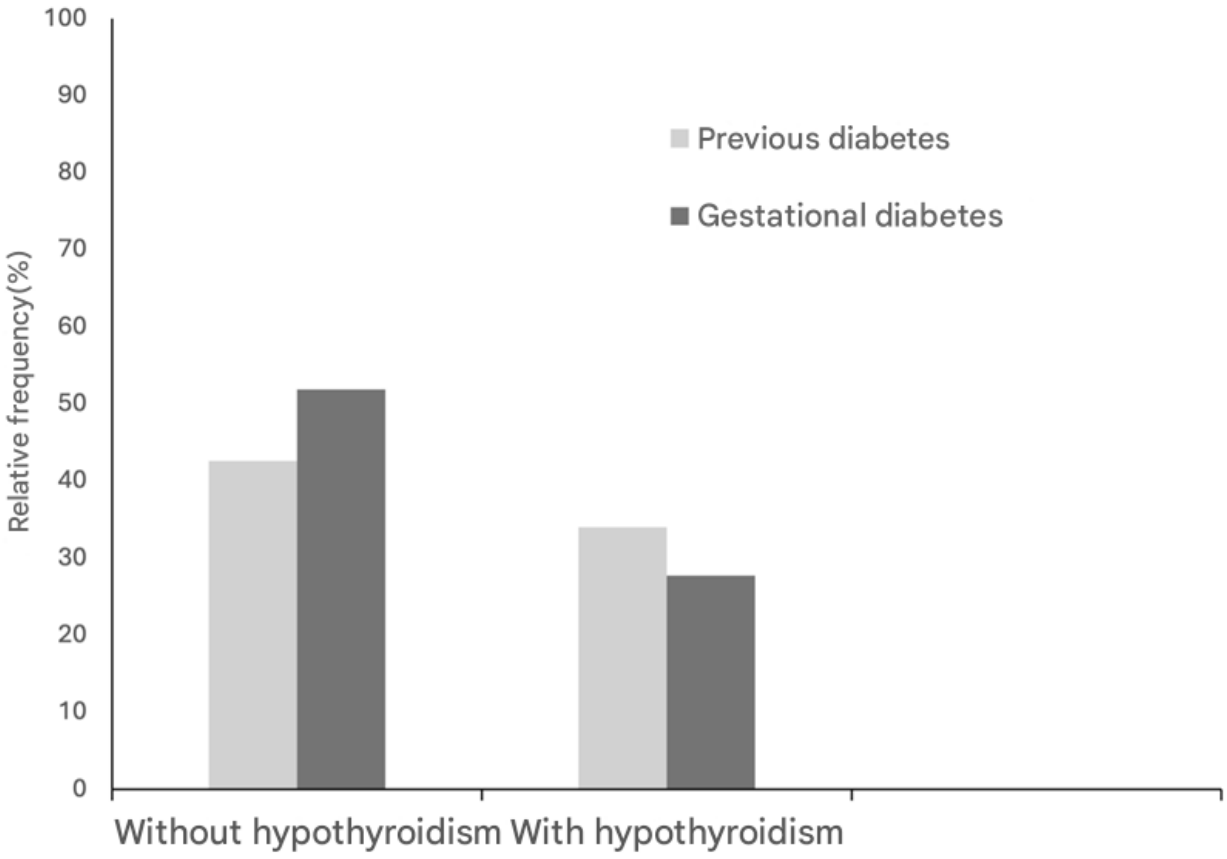


Table 1 Prevalence of endocrine disorders in high-risk prenatal prenatal pregnancy at a public maternity hospital in the Federal District

Variables	Total Sample (n=303)	
	n	**%**
Hypothyroidism		
Yes	47	15,5
No	256	84,5
Hyperthyroidism		
Yes	13	4,3
No	290	95,3
Hypertension		
Yes	65	21,6
No	236	78,4
Previous diabetes mellitus		
Yes	125	41,3
No	178	58,7
Gestational Diabetes Mellitus		
Yes	146	48,2
No	157	51,8
Obesity		
Yes	81	26,7
No	222	73,3
Thyroid carcinoma		
Yes	4	1,3
No	299	98,7
Thyroid disorder triggered by pregnancy		
Yes	13	4,3
No	290	95,7

Table 2 Association between hypothyroidism and other endocrine disorders in pregnant women attending high-risk prenatal care at a public maternity hospital in the Federal District

Comorbidities	Hypothyroidism		P-value*
	No n(%)	Yes n (%)	
Previous diabetes mellitus			0,275
No	82,6%	17,4%	
Yes	87,2%	12,8	
Gestational Diabetes Mellitus			0,002
No	21,7%	78,3%	
Yes	91,1%	8,9 %	
Hypertension			0,407
No	83,5 %	16,5 %	
Yes	87,7%	12,3%	
Obesity			0,051
No	86,9%	13,1 %	
Yes	77,8 %	22,2%	
Thyroid carcinoma			<0.001
No	85,6%	14,4%	
Yes	0.000 %	100,0%	

*Chi-square test: significance, p<0.05

Table 3 Association between pregnancy and thyroid disorders in pregnant women attending high-risk prenatal care at a public maternity hospital in the Federal District

RISK FACTOR	THYROID DISEASE	THYROID DISEASE	P-VALUE
Gestation	NO	YES	
No	86,9%	13,1%	<0.001
Yes	30,8%	69,2%	

*Chi-square test: significance, p<0.05