

WOMEN'S HEALTH: MAINTENANCE OF PREGNANCY IN PREGNANT WOMEN

SAÚDE DA MULHER: MANUTENÇÃO DA GRAVIDEZ EM GESTANTES

SALUD DE LA MUJER: MANTENIMIENTO DEL EMBARAZO EM MUJERES EMBARAZADAS

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ABSTRACT

Objective: to review and analyze, through the literature, the main physiological and pathological changes in pregnancy, as well as the recommendations to prevent them. **Method:** this is a descriptive, literature review-type study of bibliographic analysis, with searches carried out during the period from April 1st to 17th, 2020 in the Scientific Electronic Library Online (SciELO) and Virtual Health Library (VHL) virtual libraries. Nineteen articles were selected, the data were processed in the IRAMUTEQ® software and descriptively analyzed using the Reinert method. **Results:** seven classes were organized, from which four categories emerged: Class 1, 4 and 7 - Physiological changes in weight and nutritional assessment during pregnancy; Classes 2 and 3 - Educational Process on the nutritional pyramid for a healthy pregnancy outcome; Class 6 - The importance of hematological changes during pregnancy; Class 5 - Benefits of vitamin D on the health of pregnant women throughout the pregnancy and puerperal cycle. **Conclusion:** It was identified that it is essential to know the physiological and pathological changes so that the necessary care conditions can be offered, in order to prevent complications.

Descriptors: Women; Pregnant Women; Pregnancy; Pregnancy Maintenance; Edema; Women's Health.

RESUMO

Objetivo: revisar e analisar, através da literatura, as principais alterações fisiológicas e patológicas da gestação, bem como as recomendações para preveni-las. **Método:** trata-se de um estudo de análise bibliográfica, descritivo, tipo revisão de literatura, com buscas realizadas durante o período de 01 a 17 de abril de 2020 nas bibliotecas virtuais Scientific Electronic Library Online (SciELO) e Biblioteca Virtual em Saúde (BVS). Selecionaram-se 19 artigos, os dados foram processados no software IRAMUTEQ® e analisados descritivamente pelo método de Reinert. **Resultados:**

organizaram-se sete classes, destas emergiram quatro categorias: Classe 1, 4 e 7 - Alterações fisiológicas no peso e a avaliação nutricional na gestação; Classes 2 e 3 - Processo Educativo sobre a pirâmide nutricional para um desfecho saudável da gestação; Classe 6 - A importância das alterações hematológicas durante a gestação; Classe 5 - Benefícios da vitamina D na saúde da gestante ao longo do ciclo gravídico e puerperal. **Conclusão:** Identificou-se, que é fundamental o conhecimento das mudanças fisiológicas e patológicas para que seja ofertado as condições assistenciais necessárias, com intuito de prevenir complicações.

Descritores: Mulheres; Gestantes; Gravidez; Manutenção da gravidez; Edema; Saúde da Mulher.

RESUMEN

Objetivo: revisar y analizar, a través de la literatura, los principales cambios fisiológicos y patológicos del embarazo, así como las recomendaciones para prevenirlos. **Método:** se trata de un análisis bibliográfico, estudio descriptivo, tipo revisión de la literatura, con búsquedas realizadas durante el período del 1 al 17 de abril de 2020 en las bibliotecas virtuales de la Biblioteca Científica Electrónica en Línea (SciELO) y la Biblioteca Virtual en Salud (BVS). Se seleccionaron 19 artículos, los datos se procesaron en el software IRAMUTEQ® y se analizaron descriptivamente mediante el método Reinert. **Resultados:** se organizaron siete clases, de las cuales surgieron cuatro categorías: Clase 1, 4 y 7 - Cambios fisiológicos en el peso y valoración nutricional durante el embarazo; Clases 2 y 3 - Proceso educativo sobre la pirámide nutricional para un resultado de embarazo saludable; Clase 6: la importancia de los cambios hematológicos durante el embarazo; Clase 5 - Beneficios de la vitamina D sobre la salud de la gestante durante todo el embarazo y ciclo puerperal. **Conclusión:** Se identificó que es fundamental conocer los cambios fisiológicos y patológicos para que se puedan brindar las condiciones de atención necesarias, a fin de prevenir complicaciones.

Descriptores: Mujeres; Mujeres Embarazadas; Embarazo; Mantenimiento del Embarazo; Edema; Salud de la Mujer.

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INTRODUCTION

The gestational period is a time in a woman's life that will go through several physiological changes. Thus, during pregnancy, a series of small and continuous physiological changes are identified that affect the woman's entire body in order to accommodate the fetus. In this sense, there are many changes that occur in the body of a pregnant woman, including: physiological, morphological, hormonal, metabolic, circulatory and cervical. Thus, consequences of the body's response to the new reality, often causing unwanted signs and symptoms.¹

In this sense, the organism of the pregnant woman undergoes changes in practically all systems, the changes are both emotional and physical. These changes are the product of the interaction between hormones, whose objective is to enable readjustments in the woman's body that prepare her for pregnancy. However, these adjustments can sometimes cause some discomfort, such as dyspnea, fatigue, dizziness, nausea, among others.²

Throughout pregnancy, weight gain is due to the maternal volumes of nutrients and fats, addition of maternal tissues, among them, in the uterus, placenta, adipose tissue and breasts, amniotic fluid composition, expansion of extracellular fluid and blood volume, in addition to the development of the fetus. Thus, it is important to consider the variability of weight gain during pregnancy because this factor is synergistically influenced by nutritional complications that can increase the occurrence of gestational diabetes mellitus, hypertensive pregnancy syndromes, fetal macrosomia and postpartum weight retention.³

Inadequate pre-pregnancy or gestational nutritional status and inadequate weight gain are associated with intrauterine growth retardation, prematurity and low birth weight. Thus, almost always in the third trimester, the pregnant woman is susceptible to pregnancy complications because of the physiological increase in blood volume and fetal growth, causing an increase in blood pressure, causing metabolic and vascular changes associated with increased maternal cardiovascular risk.⁴

Gestational hyperlipidemia is a physiological change and is related to comorbidities, especially if you have preexisting diseases. Therefore, an increase in triglycerides (TG) is expected in the third

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trimester, there is an increase in high-density lipoproteins (HDL) in the second half of pregnancy, while low-density lipoprotein (LDL) increases in the last trimester, so it is normal for the accumulation of lipids in the pregnant woman's tissues to reserve energy for the puerperium, especially for breastfeeding. These changes are due to hormonal, genetic and energy factors.⁵

During pregnancy, the adoption of healthier eating habits and lifestyle is expected due to the increase in nutritional needs, however, this behavior may be related to cultural and socioeconomic aspects. Pregnant women should be aware of their dietary behavioral changes, such as: increased consumption of fruits and vegetables and reduced intake of sugary drinks and ultra-processed foods, which should be promoted by health professionals in prenatal care.⁶ In this way, it is proven that a diet consisting of vegetables, legumes and fruits, associated with the micronutrients iron, calcium and folate, and the intake of omega 3 and fiber, bring benefits to mother and baby.⁷

In the gestational period, adequate nutrition is extremely important for the child's growth and development and the mother's health, with the ingestion of micronutrients being essential.⁸ In this sense, vitamin D is essential for the absorption of calcium and phosphorus, because it prevents miscarriage, premature birth, gestational diabetes, reduces the risk of pre-eclampsia and helps in the healthy growth of the placenta. Thus, it is appropriate to investigate during the quarterly prenatal consultations' exams, on the possible factors that can lead to maternal-fetal and infant vitamin D deficiency.⁹

In addition, according to the World Health Organization (WHO) it is recommended the supplementation of multivitamins, calcium, phosphorus and folic acid and those belonging to the B complex, which are indispensable in pregnancy, as they act in the development of nerve cells, in preventing bad formation of the neural tube and in the normal growth and development of the fetus, also preventing megaloblastic anemia in the mother.¹⁰

In relation to anemia, which is characterized by a reduction in the concentration of hemoglobin in the blood, due to intense changes and maternal-fetal physiological adaptation to high iron demand, as hematopoiesis is increased, leading to the emergence of iron deficiency anemia, a risk factor in pregnancy .¹¹ Therefore, one of the causes is iron deficiency, called iron deficiency anemia, which is much awaited during pregnancy, due to physiological adaptations such as the increase in the plasma level, supplying the vascular hypertrophy of the uterus, gestational amenorrhea and its increase in intestinal absorption.¹²

It is emphasized that, according to estimates by the World Health Organization (WHO), the global prevalence of anemia in pregnant women is very important, being classified as a serious public health problem. In Brazil, data are not consistent to assess the prevalence of anemia in

pregnancy in the national context.¹³ It is known that moderate or severe anemia during pregnancy poses health risks, is related to increased maternal and infant mortality, premature birth and susceptibility to contracting infectious diseases. Nutrition rich in iron and folic acid is recommended, as well as its supplementation, to prevent this pathology.¹²

Regarding the respiratory system, due to gestational adaptations, the respiratory function is affected due to the growth of the uterus, which generates anatomical changes. The frequency of respiratory disorders increases with the progress of pregnancy due to several mechanisms, involving airway congestion and diaphragm elevation.¹⁴ Thus, monitoring with a multidisciplinary team is important because pulmonary changes in addition to risk to the health of the pregnant woman, there may also be damage to the fetus.²

In the context of otoneurological changes in pregnant women, resulting from hormonal changes, the homeostasis of labyrinth fluids can be compromised, resulting in symptoms such as: tinnitus, vertigo, dizziness, changes in the balance of the body in general, in addition to the possibility of disturbances in the pace and fall. Thus, these changes in estrogen and progesterone rates can cause a change in the cochlear blood flow from the mechanism of vasoconstriction and decreased flow, increasing the chances of pathologies of the hearing system arising and/or worsening during pregnancy.¹⁵

Gestational low back pain is the main complaint of musculoskeletal discomfort during pregnancy, due to the growth of the uterus that compresses the great vessels, causing a decrease in medullary blood flow, which affects the quality of life of pregnant women, generating pain, especially in the third trimester of pregnancy. The main causes of this pain are the physiological changes during the gestational period, caused by changes in the hormone levels of relaxing, estrogen, and progesterone, with the growth of joint flexibility, increased joint flexibility, increased pubic flexibility and increased supply pelvic muscles occur in biomechanical changes that cause compensatory postures, typical of the anserino walk, which overload the lumbar spine, stimulating the onset of pain.¹⁶

Sleep disorders are common in pregnancy as a result of physiological and anatomical changes characteristic of pregnancy. Thus, sleep changes during pregnancy have been related to several health complications for the maternal-fetal binomial. Therefore, it is important to consider sleep changes during pregnancy to prevent complications such as insomnia, low daytime productivity and safety risks, prolonged labor, and preterm birth.¹⁷

In this sense, it is fundamental and essential to know the physiological and pathological changes that occur during pregnancy to master the topic and prevent possible complications. Thus, the

following guiding question was elaborated: What are the main physiological and pathological changes that occur in a woman's body during pregnancy?

OBJETIVE

Review and analyze, through the literature, the main physiological and pathological changes in pregnancy, as well as the recommendations to prevent them.

METHOD

It is a bibliographic, descriptive analysis, integrative literature review type, which allowed exploring and understanding a different theme from other independent studies. It is revealed that the execution of the study was carried out in five main stages: identification of the guiding question of the study; literature search; definition of inclusion and exclusion criteria; data evaluation; interpretation and discussion of results and presentation of the review/synthesis of knowledge. In this sense, the following guiding question was used to guide the integrative review: What are the main physiological changes that occur in a woman's body during pregnancy?

To carry out the study, the Scientific Electronic Library Online (SciELO) and Virtual Health Library (VHL) virtual libraries were consulted. For the search, the descriptors in Health Sciences (DeCS) were used, namely, "women", "pregnant women", "pregnancy", "pregnancy maintenance" and "edema", using the Boolean operators "AND" and "OR" to carry out the associations of all descriptors with each other.

The search was carried out during the period from April 1st to 17th, 2020. The following inclusion criteria were considered for the selection of material: complete articles; available in open access in Portuguese and published in the years 2015 to 2019.

Initially, 3,912 publications were found, however, after applying the inclusion criteria, this number was reduced to 1,174 articles. 88 articles were found in the VHL and 1,086 SciELO, with only thirteen duplicate articles in the VHL and 243 in SciELO. Thus, after reading the titles, 168 articles were selected and 63 articles were selected for the abstract, leaving 19 studies selected for full reading, 16 in Scielo and 3 in the VHL. 1,156 articles were excluded for not being complete or not answering the research question. **Figure 1** shows the flowchart of the article selection process.

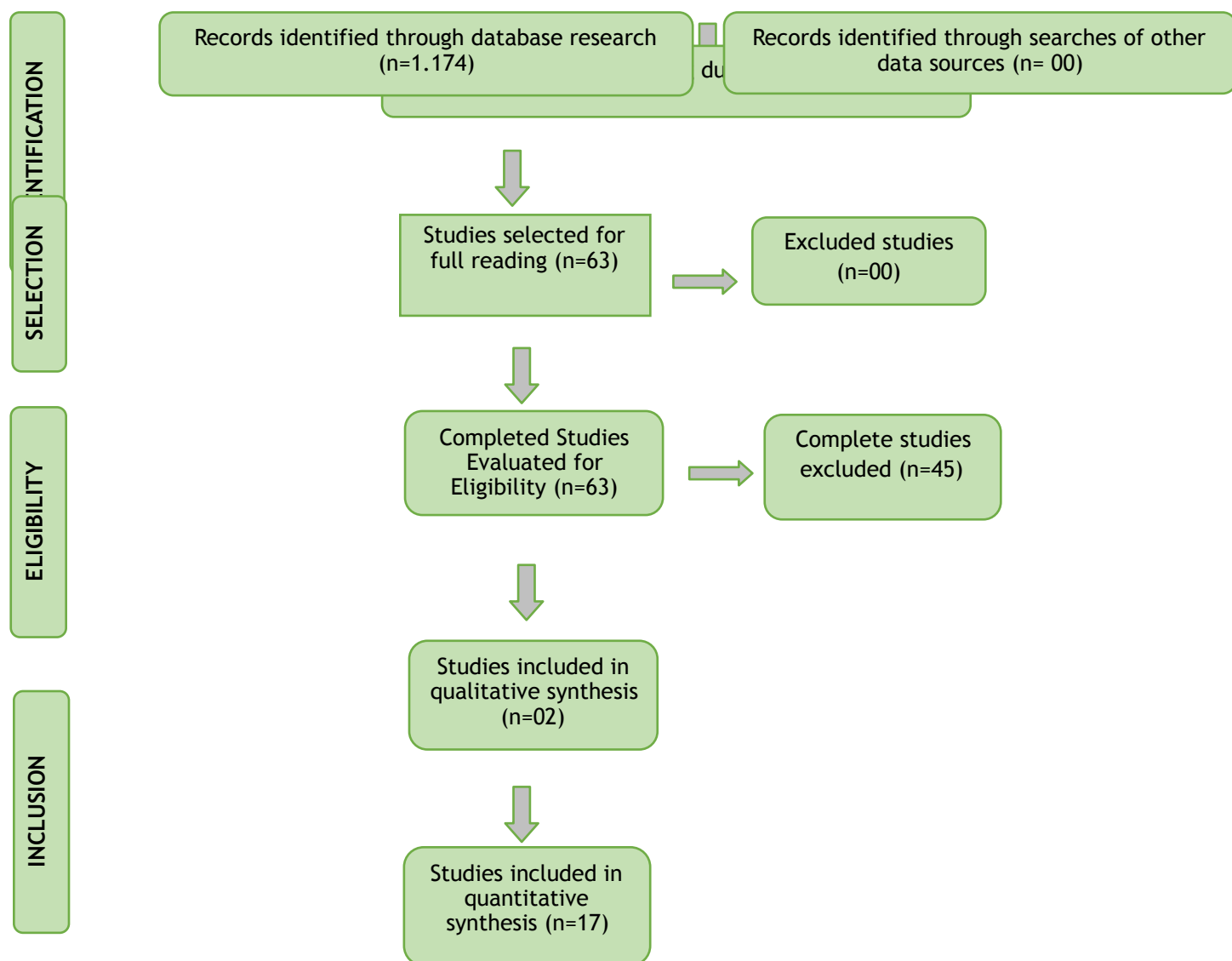


Figure 1. Study selection flowchart adapted of *Preferred Reporting Items for Systematic Reviews and Meta-Analyses* (PRISMA 2009). Belém (PA), Brasil, 2020.

From the pre-reading of each article selected in the search, it was possible to evaluate and characterize them as to authorship, year of publication, title, virtual libraries, objective, method, main conclusions and levels of evidence.

Studies were considered as strong evidence (meta-analysis of multiple controlled studies-Level 1; individual study with experimental design-Level 2), moderate evidence (study with quasi-experimental design as a study without randomization with a single pre- and post-test group, series temporal or case-control-Level 3; study with non-experimental design as descriptive correlational and qualitative research or case studies-Level 4; case report or data obtained in a systematic way, of verifiable quality or evaluation data of programs-Level 5), weak evidence (opinion of reputable authorities based on clinical competence or opinion of expert committees, including interpretations of information not based on research-Level 6).¹⁸

The textual corpus was elaborated with the conclusions of the articles, organizing it in a single text file for processing and analysis in the IRAMUTEQ® software (R interface pour les Analyses Multidimensionnelles de Textes et de Questionnaires). It is noteworthy that the IRAMUTEQ®,

developed by Pierre Ratinaud, was applied for the first time in Brazil in 2013.¹⁹ It is a program that contributes to the R software and enables different ways of statistical analysis regarding textual bodies and subject tables by words. For the analysis of the study, the Descending Hierarchical Classification (DHC) tool was defined, presented by Reinert (1990), in which publications are classified according to their respective vocabularies, and their grouping is distributed by the frequency of the forms. reduced.¹⁹

The objective is, through the DHC analysis, to obtain classes of text segments that, in addition to presenting similar vocabularies, have different cocallary from the text segments of other classes. It was found that, during data processing, the IRAMUTEQ® recognized the separation of the corpus into 19 text units, 69 text segments, 863 different forms and 2443 occurrences of words in the text. It is pointed out that the average frequency of the forms was 35.405797, generating distinct semantic classes, analyzed by DHC. 62 text segments were used, out of a total of 69, that is, 89.86% of the corpus was used for analysis. Words with a frequency equal to or greater than the registered mean frequency (three), a frequency twice greater than or equal to 20 and p value with significance ≥ 0.05 are considered relevant. Each class was represented by the most significant words and their respective associations with the class (chi-square).

In this sense, after the described phase, the publications were analyzed through a critical reading of the selected studies, in order to extract information related to physiological changes in pregnancy, according to their contents and reflection in the light of literature recommendations. Thus, after grouping by similarity of contents, four categories emerged: Class 1 and 4 - Physiological changes in weight and nutritional assessment during pregnancy; Classes 2 and 3 - Educational Process on the nutritional pyramid for a healthy pregnancy outcome; Class 6 - The importance of hematological changes during pregnancy; Class 5 - Benefits of vitamin D on the health of pregnant women throughout the pregnancy and puerperal cycle.

RESULTS

After selection, only 19 articles met the criteria established in this review, one in 2019 (5.3%), six in 2018 (31.7%), three in 2017 (15.8%), one in 2016 (5.3%), seven in 2015 (36.6%) and one in 2010 (5.3%). It was noted that sixteen are in the SciELO virtual library (89.4%) and three are in the VHL (10.6%). As for the languages, all studies in Portuguese (100%) were registered. Regarding the methodology used, seventeen studies were classified as quantitative (50%) and two as qualitative

(25%). Therefore, the articles included in this review are presented, thus exposing the specifications related to the code of each article, title, author, year, country of study, database, objective, method and the important points of the conclusions (**Figure 2**).

It is also evident, through the analyzes in IRAMUTEQ®, the dendrogram of the acquired classes, which illustrate the partitions made in the corpus up to the final classes, identifying which themes were more representative and which words were more frequent in each class, as illustrated in (Figure 3). The corpus was constituted by 19 texts, with 69 analyzed segments, that is, 89.86% of the corpus. The Reinert method was used, crossing text and word segments, where four classes emerged, according to the dendrogram below.

Based on the analysis of the classes, four categories emerged whose order corresponds respectively to classes 1, 4, 6, 5, 3 and 2 described below: Physiological changes in weight and nutritional assessment during pregnancy; Educational Process on the nutritional pyramid for a healthy pregnancy outcome; The importance of hematological changes during pregnancy; Benefits of vitamin D on the health of pregnant women throughout the pregnancy and puerperal cycle.

	Author/ Year/ Country	Title	Virtual library	Method	Evidence levels
A1	GOMES, Caroline de Barros et al. 2016. Brasil	High prevalence of inadequate dietary intake of calcium and vitamin D in two cohorts of pregnant women.	SCIELO	Quantitative, cross-sectional analytical study	Level 4
A2	LINHARES, Angélica Ozório; CESAR, Juraci Almeida. 2017. Brasil.	Folic acid supplementation among pregnant women in the extreme south of Brazil: prevalence and associated factors.	SCIELO	Quantitative, cross-sectional analytical study	Level 4
A3	FERREIRA, Larissa Bueno et al. 2018. Brasil	Care and pregnancy factors associated with anemia in nursing mothers attended at a human milk bank.	SCIELO	Quantitative, cross-sectional analytical study	Level 4
A4	CARVALHO, Maria Emília Coelho Costa et al. 2017. Brasil	Low back pain during pregnancy	SCIELO	Quantitative, cross-sectional analytical study	Level 4
A5	FEITOSA, Alina Coutinho Rodrigues et al. 2017. Brasil	Impact of the Use of Different Diagnostic Criteria on the Prevalence of Dyslipidemia in Pregnant Women.	SCIELO	Qualitative, cross-sectional analytical study.	Level 3
A6	CRIVELLENTI, Livia Castro; ZUCCOLOTTO, Daniela Cristina Candelas; SARTORELLI, Daniela Saes. 2018. Brasil	Development of an Adapted Diet Quality Index for Pregnant Women.	SCIELO	Quantitative, cross-sectional analytical study	Level 4
A7	OLIVEIRA, Alane Cabral Menezes De; BARROS, Amanda Maria Rocha De; FERREIRA, Raphaela Costa. 2015. Brasil	Factors associated with anemia in pregnant women in the public health network of a capital in northeastern Brazil	SCIELO	Quantitative, cross-sectional analytical study	Level 4
A8	PESSOA, Lidiane da Silva et al. 2015. Brasil.	Temporal evolution of anemia prevalence in pregnant adolescents in a public maternity hospital in Rio de Janeiro.	SCIELO	Quantitative, cross-sectional analytical study	Level 4
A9	PINTO, Anaelisa Venâncio Antunes et al. 2015. Brasil.	Assessment of respiratory mechanics in pregnant women	SCIELO	Quantitative, prospective, descriptive and analytical research.	Level 3

A10	DUARTE, Vlanice Madruga; MEUCCI, Rodrigo Dalke; CESAR, Juraci Almeida. 2018. Brasil.	Intense low back pain in pregnant women in the extreme south of Brazil	SCIELO	Quantitative, cross-sectional analytical study	Level 4
A11	URRUTIA-PEREIRA, Marilyn; SOLE, Dirceu. 2015. Brasil,	Vitamin D deficiency in pregnancy and its impact on the fetus, newborn, and childhood.	SCIELO	Quantitative study, integrative literature review type.	Level 5
A12	CAMPOS, Chiara Alzineth Silva et al. 2019. Brasil.	Gestational weight gain, nutritional status and blood pressure of pregnant women	SCIELO	Quantitative, cross-sectional analytical study	Level 4
A13	Gomes, Caroline De Barros et al. 2015. Brasil	Feeding practices of pregnant and non-pregnant women: are there differences?	SCIELO	Descriptive, cross-sectional study with a qualitative approach	Level 4
A14	MAGALHAES, Elma Izze da Silva et al. 2018	Anemia prevalence and determinants of hemoglobin concentration in pregnant women.	SCIELO	Quantitative, cross-sectional analytical study	Level 3
A15	RIBEIRO, Meireluci Costa et al. 2015. Brasil.	Sleep quality in overweight pregnant women.	SCIELO	Quantitative, cross-sectional analytical study	Level 4
A16	MAGALHAES, Elma Izze da Silva et al. 2015. Brasil.	Prevalence and factors associated with excessive gestational weight gain in healthcare facilities in southwestern Bahia.	SCIELO	Quantitative, cross-sectional analytical study	Level 4
A17	Araújo ES, Santana JM, Brito SM, Santos DB. 2015. Brasil.	Food consumption of pregnant women assisted in Health Units	BVS	Quantitative, cross-sectional analytical study	Level 4
A18	GASPARIN, Vanessa Aparecida et al. 2018. Brasil.	Physical activity in pregnant women as prevention of gestational hypertensive syndrome.	BVS	Quantitative study, integrative literature review type	Level 5
A19	GARCIA, Cláudia de Lima Teixeira Fuentes; SCHARLACH, Renata Coelho; MORAIS JÚNIOR, Sérgio Luis Alves de. 2018. Brasil	Otoneurological complaints and their relationship with hormones in pregnant women in the city of Osasco, São Paulo	BVS	Quantitative, cross-sectional descriptive and analytical study.	Level 4

Figure 2. Most representative themes in each class. Belém (PA), Brazil, 2020.

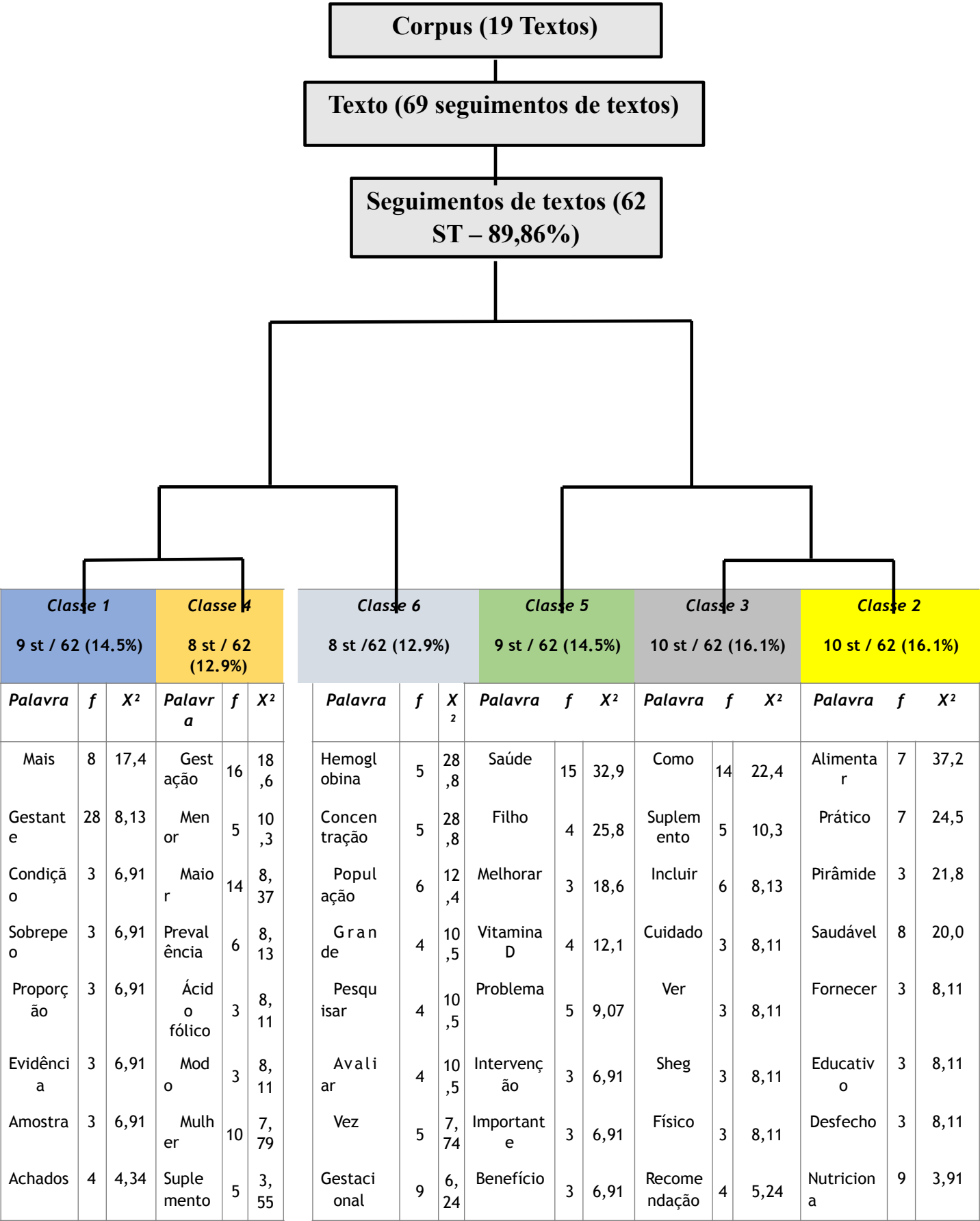


Figure 3. Dendrogram. Belém (PA), Brazil, 2020.

The emerging thematic categories are described below:

Class 1 and 4 - Physiological changes in weight and nutritional assessment during pregnancy.

It is evident, in this category, that the assessment of the eating behavior of pregnant women shows that most pregnant women habitually consume red meat five or more days a week; milk, mainly whole; soda, biscuits and biscuits once a week; excess fat. As well as, do not consume fruits, vegetables and vegetables habitually; little intake of sausages and fried in oil and fish. (A13)

It is observed that most pregnant women have a good consumption of vegetables and legumes, while they are deficient in fruits, fiber, omega 3, calcium, phosphorus and iron, with 15.3% consuming ultra-processed food. It was also observed that older pregnant women eat better using supplementation associated with physical activities. (A06)

There is a high prevalence of excessive weekly weight gain among pregnant women in the second and third trimesters. In this sense, the factors associated with excessive weekly weight gain were: family income and pre-pregnancy nutritional status. There was a higher prevalence of excessive weekly weight gain among pregnant women with a family income below the minimum wage, when compared to pregnant women with an income equal to or greater than the minimum wage, as well as a higher prevalence among women who started pregnancy with overweight/obesity in relation to those with pre-pregnancy nutritional status underweight/eutrophy. (A16)

It is noticed that of the 458 pregnant women identified in terms of weekly gestational weight gain, 85 (19%) had insufficient weight gain, while 271 (59%) had excessive weight gain. As for biochemical indicators, 18% had a high frequency of anemia and 13% had vitamin A deficiency. (A12)

Classes 2 and 3 - Educational Process on nutritional assessment for a healthy pregnancy outcome.

The energy value in kcal and percentage distribution (%) of macronutrients in the dietary plans are prepared according to the estimated energy needs for the 1st, 2nd and 3rd gestational trimesters. The assessment of food consumption in pregnant women with normal weight is divided into four levels, where the food is structured into eight food groups and divided into portions according to the energy requirements established for the 1st trimester and the 2nd and 3rd gestational trimesters. (A17)

It was observed that the caloric distribution by meals, in the 1st quarter, 20% of the daily Total Energy Value (TEV) was concentrated in breakfast, 30% in lunch, 26% in dinner and 14% was distributed in intermediate snacks. In the 2nd and 3rd trimesters of pregnancy, it was noted in the dietary plan that 19% of the TEV was concentrated in breakfast, 32% in lunch and 28% in dinner. The remaining 21% were divided between the intermediate snacks. (A17)

The study of the frequency of consumption of food groups showed that some pregnant women have adequate nutrition, but others consumption is insufficient or excessive. Regarding the food pyramid, food was divided into groups to see which pregnant women had a healthy diet. (A17)

Thus, in the group of breads, cereals, roots and tubers, it was observed that the consumption of daily portions was adequate, with emphasis on the consumption of rice (70%), followed by bread (57.2%) and cassava flour (41.4%); the consumption of pasta had a higher percentage of weekly consumption (65.7%), however, corn and cassava were hardly ingested, with 47.1% and 47.1%, respectively. The group of vegetables, the most consumed food, was tomato (54.3%) and then pepper (44.3%). Other vegetables such as squash (50.1%), lettuce (42.7%) and carrots (44.3%) had higher consumption in the weekly period. (A17)

It was observed that in the group of fruits the daily consumption of banana was (38.5%), orange and pear (35.7%), and natural juice (68%). As for the legume group, beans showed daily consumption with a percentage of 55.7%. Foods with protein sources of high biological value, consumed daily, were beef (37.5%) and chicken (15.9%). For the group of sugars/sweets, pregnant women were shown to have excessive consumption, with emphasis on simple sugar (57.9%), followed by artificial juice (35.4%), chocolates and caramels (31.8%) and soda (20.1%). (A17)

Regarding the group of oils and fats, margarine was most consumed (37.6%), followed by butter (30.4%). In addition to the referenced groups, it is noteworthy that pregnant women consumed a lot of coffee, representing 40.5% of the sample. It was also observed that 11.3% used alcoholic beverages daily, specifically beer. (A17)

Thus, it was recommended to choose a diversified diet, with foods from all groups in the pyramid, and to avoid food invariability; opt for vegetables: fruits, vegetables and greens; giving preference to baked, steamed or steamed foods, or grilled; include foods from the base of the pyramid in greater amounts in the daily diet; eat sugars, sweets, salt, and foods high in sodium in moderation; drink 6 to 8 glasses of water daily; do not consume alcohol; seek medical and nutritional care from the beginning of pregnancy to ensure an uneventful pregnancy. (A17)

Class 6 - The importance of hematological changes during pregnancy

In class six, 8 text segments are included, accounting for 12.9% of the corpus and directly associated with class four and one. The most frequent and significant words of these text segments are listed: Hemoglobin; concentration; population; great; search; to assess; time and gestational, extracted predominantly from articles 03, 07, 12 and 14 in order of significance.

It is believed that the prevalence of gestational anemia is associated with care and gestational factors, the predominance of this condition is between 30% and 40%, and most pregnant women underwent prenatal care in public health services, completing the six or more prenatal consultations. The prevalence of gestational anemia is related to the woman's sociodemographic characteristics such as profession, marital status, number of prenatal consultations and multiple pregnancy. (A03)

It was observed that the incidence of adolescent pregnant women was largely anemic, which with the evolution of pregnancy became quite accentuated, and that in general almost all pregnant women were already anemic in the 1st and 2nd trimesters, in the 3rd gestational trimester a part of this total would develop mild to moderate anemia, and only a small part had severe anemia in the last trimester of pregnancy. Most started prenatal care with a gestational age greater than 16 weeks, carrying out all prenatal consultations, along with the prenatal nutritional consultation, in addition to the sociodemographic, anthropometric, and prenatal care characteristics are associated with anemia. (A07)

It is pointed out that the association between gestational weight gain and risk of anemia and vitamin A insufficiency, is very evident when insufficient and excessive gestational weight gain, as well as in adolescent and adult pregnant women, presented vitamin A insufficiency. Only the risk for anemia among adolescent pregnant women with insufficient weight gain lost statistical significance. (A12)

It was found that pregnant women did not consume foods rich in iron sources, such as dark green leafy vegetables and meat, and that many of them had not undergone supplementation. The mean prevalence of hemoglobin in pregnant women evaluated was equal to 11.9 g/dL, and that there was a significant difference between the variables of initial gestational age, the number of pregnancies, weekly gestational weight gain and iron supplementation. (A14)

Class 5 - Benefits of vitamin D on the health of pregnant women throughout the pregnancy and puerperal cycle.

In this category, it was observed that the studies carried out show that biopsychosocial determinants can also influence the pre-gestational, gestational, and eutrophic nutritional status. There was a high proportion of pregnant women with excess weight, that is, who gained more

weight than recommended for their height and needs during the gestational period. Pointing out that the average energy intake in the three gestational trimesters of most pregnant women were, respectively: 1,757kcal, 1,962kcal and 1,934kcal, it is clear that there is an increase in caloric consumption throughout the pregnancy of the cuts in this study. However, the mean consumption of vitamin D and calcium were always below the recommended values in the three gestational trimesters. (A11)

It is identified that the reduced intake of vitamin D can also occur as a result of the limited variety of foods with significant amounts of this vitamin. One possible strategy is to guide the consumption of dairy products. However, the amount of vitamin D contained may be insufficient to establish adequate levels, requiring supplementation. (A11)

Concomitantly, obesity is also associated with vitamin D deficiency, because it is fat-soluble, that is, it has an affinity and can be absorbed by body fat, thus preventing it from reaching its site of action. (A11)

However, monitoring of pregnant women with vitamin D deficiency is not carried out in most countries, this measure is recommended for women with one or more risk factors aiming to reduce the risk of vitamin D deficiency during pregnancy and the negative maternal-fetal effects. (A11)

DISCUSSION

The pregnant woman's diet is directly linked to fetal growth and development, and with this, monitoring of the pregnant woman's diet should be carried out in order to have a better adherence to each nutrient for her pregnancy. Pregnant women who consume legumes, vegetables, especially beans, point to a better nutrient absorption rate. On the other hand, pregnant women who consume a diet based on ultra-processed foods such as biscuits, sandwiches, foods rich in sodium and carbohydrates, do not reach the expected level of nutrients. The non-consumption of fruits, and foods with fiber, rich in iron, calcium and some important minerals, can also be pointed out as an indication of a bad diet, in which the organism is not able to supply the nutrients for the mother-child's health.⁷

It was noted that pregnant women who had an unhealthy diet were also concerned about having gestational diabetes, hypertension, and cesarean delivery. However, these pregnant women sometimes exchanged their dinner or lunch for snacks without a source of fiber, minerals, and vitamins. Thus, it was realized that healthy eating during pregnancy brings many benefits, such as: a pregnancy without overweight/obesity, less probability of cesarean delivery and uneventful

premature birth, more chance of a healthy newborn, without macrosomia and without low Apgar score.⁶

Most pregnant women in the research showed nutrition poor in vitamin C and D, especially vitamin D. Thus, the pregnant woman must carry out and maintain a healthy diet rich in these micronutrients from the beginning of pregnancy, however, it was noted that this ingestion occurred disproportionately with lower food consumption in the first three months. Thus, low calcium intake is not directly related to supplementation, but rather insufficient intake of foods containing this vitamin, which can reduce the risk of pre-eclampsia, premature birth and maternal death. Vitamin D, on the other hand, is obtained through sun exposure through ultraviolet rays and dietary intake.⁸

In this sense, the health of the pregnant woman and her nutritional status can cause permanent effects on the newborn's health. Therefore, it is essential that the pregnant woman at risk of vitamin D deficiency is followed up at the beginning and midway through the pregnancy, in order to reduce the risk of vitamin D deficiency and consequently reduce the risk of complications for the fetus. Thus, a diet deficient in calcium and vitamin D can lead to maternal-fetal complications. Thus, during pregnancy, the vitamin D level is strongly linked to the umbilical cord, the deficiency of this vitamin can have effects in fetal life on the child's physiology and metabolism.²¹

Although vitamin D is produced endogenously or absorbed through food, studies carried out in different countries have revealed a prevalence of 20 to 40% of hypovitaminosis D among pregnant women, making it a health problem because it is essential for the musculoskeletal system, preventing growth retardation, osteopenia, osteoporosis, and increased risk of fractures, also associated with the development of infectious diseases, autoimmune diseases, and neoplasms. This vitamin maintains normal blood glucose levels and serves as the basis for calcitriol, which in turn is responsible for bone integrity and calcium homeostasis and is important to supply the fetus.²²

Lack of this vitamin in pregnancy is being associated with pregnancy-specific hypertensive disease, bacterial vaginosis, premature birth, gestational diabetes mellitus, osteomalacia, and weakness. It also leads to reduced fetal growth, as well as weight, causing insufficient skeletal mineralization.²² In addition, it was noticed that there is a deficiency or insufficiency of vitamin D throughout the gestational period among brown, black, and indigenous pregnant women, especially, among teenagers and primiparous.²³

Supplementation with folic acid is recommended before the desire to become pregnant, to avoid neural tube defects, until the end of pregnancy to prevent megaloblastic anemia. Thus, the study showed a higher consumption among primiparous mothers with planned pregnancy starting prenatal

care in the first trimester, white-skinned, who had partners, education, and income, with six or more appointments.¹⁰

In this sense, the use of this supplementation is related to the increase in the pregnant woman's age and her knowledge about its importance. Pregnant women who were followed up in the public network had a higher consumption of folic acid compared to those in the private network, this is due to the fact that this drug is provided free of charge by the Unified Health System, while in the private one they will have to pay for the drugs. However, consumption of this supplement before or during pregnancy is still low, especially in the pre-pregnancy period.¹⁰

It is understood that the morbidity of Brazilian pregnant women is due to the relationship between the state of nutrition and health, where we have two antagonistic segments, namely the deficit of the anthropometric state during pregnancy, resulting in low birth weight, among other negative consequences for health of the newborn, and by excess weight, associated with obesity, cardiovascular diseases, diabetes mellitus, macrosomia, increasing the risk of maternal and child morbidity and mortality. Guidance on nutritional needs according to the gestational period is necessary, knowing that there are several physiological changes that demand less or more caloric intake, vitamins and other nutrients.²⁰

It was identified a high prevalence of excessive weight gain during pregnancy, which is worrying, as it increases the possibilities of causing several negative consequences for the health of the pregnant woman and the fetus. In this sense, weight gain is related to pregnant women with lower family income, compared to pregnant women with higher income. Thus, it is clear that pregnant women with higher incomes have greater access to foods of higher nutritional quality and less caloric value. On the other hand, the financial limitations experienced by most Brazilian pregnant women make it difficult or even impossible to acquire healthier foods, consequently imposing inadequate food consumption.³

Anemia is a public health problem when related to the health of the pregnant woman and the baby, being more prevalent in women with multiple pregnancies due to greater demand for iron.¹² Thus, the incidence of anemia in pregnant women is related to some factors such as socioeconomic conditions and food insecurity for having large families, thus not having quality in their food. Becoming a health problem by the World Health Organization (WHO), because of these factors, many pregnant women have a deficit in the consumption of iron in their diet, having to supplement with ferrous sulfate during their pregnancy, which is made available by health care units, becoming more accessible to these pregnant women.¹¹

Iron deficiency anemia, which is characterized by a deficiency of iron in the blood, can cause several other problems in pregnancy, which affects almost half of pregnant women worldwide. Other causes that can lead to this deficiency are nutritional insufficiency, hemoglobinopathies, chronic and infectious diseases. Other factors pointed out in scientific studies are teenage pregnancy, lack of iron previously, the short period from one pregnancy to another and parasitic diseases.²⁴

In this sense, with the implementation of the national iron supplementation program up to the third month postpartum, which can be associated with wheat and corn flour fortification. This reduces iron deficiency anemia by 67%, as well as a 19% drop in low birth weight. Before mandatory fortification, hemoglobin levels among pregnant women were low and anemia levels were high, after fortification the effect was the opposite. Therefore, it is extremely important to complete all prenatal consultations, as it allows the monitoring of the parameters of the mother and child, so that the outcome is a success.¹²

Iron is the molecule that is essential to carry oxygen through the bloodstream, and the fetus needs oxygen demand for its growth, which causes the deficiency of the pregnant woman during pregnancy, as it becomes a cause for concern in pregnancy, which can cause anemia in the newborn in the first year of life, in addition to being related to low birth weight, premature babies and fetal death.²⁵

It was noticed that the diagnosis of anemia among pregnant women with insufficient weight was lower than that of pregnant women with adequate or excessive weight gain. Anemia can be said to have occurred due to hemodilution.⁴ Thus, pregnancy causes a two- to three-fold increase in iron requirements, not only for hemoglobin synthesis, but also for the fetus and the production of certain enzymes. . There is a 10- to 20-fold increase in folate requirements and a two-fold increase in vitamin B12 requirements.²⁶

Therefore, the research had limitations regarding the pre-established period for the study, represented in five years, considering that numerous articles could add other information, in addition to the proposed time. In addition, another limitation in the search for journals was a smaller number of articles with a high degree of evidence, noting that there is a low adoption of the method based on levels of evidence on this topic.

CONCLUSION

It is considered that every pregnant woman in her pregnancy process goes through several multisystemic changes in her body. Thus, understanding all these changes is very important to

differentiate physiological changes from pathological changes that are produced by the development of the fetus during the pregnancy.

It was identified, through this literature review, that the most frequent physiological changes during pregnancy are configured as a series of small and continuous changes that affect the entire body of the woman, among them the study highlights the hematological and nutritional changes such as more prevalent and can cause pathologies such as anemia, obesity and diabetes. Thus, it is essential to know these changes so that the necessary care conditions are offered, such as prenatal care.

Therefore, it is recommended that the health of this pregnant woman is investigated in detail in order to early diagnose diseases in pregnancy, the Ministry of Health (MS) makes available the Program for Humanization in Prenatal and Birth, with the purpose of enhancing care these pregnant women, to reduce the mortality of newborns and preterm infants, it being imperative to carry out effective campaigns, conducted for women with lower socioeconomic status. It is very important for this pregnant woman to start prenatal care by performing the 6 consultations, as it is from there that the pregnant woman will receive all the guidance on body care, with nutrition, exercise, among other advice.

It is concluded that, in Brazil, there are many questions about the health conditions of pregnant women, which is characterized as a broad aspect that still needs to be studied, focusing on physiology and not focusing on pathologies, thus passing to have a preventive character. It was found that the deficiency of these practices can cause serious problems arising from the low incentive for new and robust research.

CONTRIBUTIONS

All authors contributed equally in the design of the research project, data collection, analysis and discussion, as well as in the writing and critical review of the content with intellectual contribution, and in the approval of the final version of the study.

CONFLICT OF INTERESTS

Nothing to declare.

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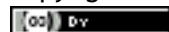
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