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ЕЖЕМЕСЯЧНЫЙ НАУЧНЫЙ ЖУРНАЛ

Медицинские новости Грузии
საქართველოს სამედიცინო სიახლენი

GEORGIAN MEDICAL NEWS

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GMN: Georgian Medical News is peer-reviewed, published monthly journal committed to promoting the science and art of medicine and the betterment of public health, published by the GMN Editorial Board since 1994. GMN carries original scientific articles on medicine, biology and pharmacy, which are of experimental, theoretical and practical character; publishes original research, reviews, commentaries, editorials, essays, medical news, and correspondence in English and Russian.

GMN is indexed in MEDLINE, SCOPUS, PubMed and VINITI Russian Academy of Sciences. The full text content is available through EBSCO databases.

GMN: Медицинские новости Грузии - ежемесячный рецензируемый научный журнал, издаётся Редакционной коллегией с 1994 года на русском и английском языках в целях поддержки медицинской науки и улучшения здравоохранения. В журнале публикуются оригинальные научные статьи в области медицины, биологии и фармации, статьи обзорного характера, научные сообщения, новости медицины и здравоохранения. Журнал индексируется в MEDLINE, отражён в базе данных SCOPUS, PubMed и ВИНТИ РАН. Полнотекстовые статьи журнала доступны через БД EBSCO.

GMN: Georgian Medical News – საქართველოს სამედიცინო სიახლენი – არის ყოველთვიური სამეცნიერო სამედიცინო რეცენზირებადი ჟურნალი, გამოიცემა 1994 წლიდან, წარმოადგენს სარედაქციო კოლეგიისა და აშშ-ის მეცნიერების, განათლების, ინდუსტრიის, ხელოვნებისა და ბუნებისმეტყველების საერთაშორისო აკადემიის ერთობლივ გამოცემას. GMN-ში რუსულ და ინგლისურ ენებზე ქვეყნდება ექსპერიმენტული, თეორიული და პრაქტიკული ხასიათის ორიგინალური სამეცნიერო სტატიები მედიცინის, ბიოლოგიისა და ფარმაციის სფეროში, მიმოხილვითი ხასიათის სტატიები.

ჟურნალი ინდექსირებულია MEDLINE-ის საერთაშორისო სისტემაში, ასახულია SCOPUS-ის, PubMed-ის და ВИНТИ РАН-ის მონაცემთა ბაზებში. სტატიების სრული ტექსტი ხელმისაწვდომია EBSCO-ს მონაცემთა ბაზებიდან.

WEBSITE

www.geomednews.com

К СВЕДЕНИЮ АВТОРОВ!

При направлении статьи в редакцию необходимо соблюдать следующие правила:

1. Статья должна быть представлена в двух экземплярах, на русском или английском языках, напечатанная через **полтора интервала на одной стороне стандартного листа с шириной левого поля в три сантиметра**. Используемый компьютерный шрифт для текста на русском и английском языках - **Times New Roman (Кириллица)**, для текста на грузинском языке следует использовать **AcadNusx**. Размер шрифта - **12**. К рукописи, напечатанной на компьютере, должен быть приложен CD со статьей.

2. Размер статьи должен быть не менее десяти и не более двадцати страниц машинописи, включая указатель литературы и резюме на английском, русском и грузинском языках.

3. В статье должны быть освещены актуальность данного материала, методы и результаты исследования и их обсуждение.

При представлении в печать научных экспериментальных работ авторы должны указывать вид и количество экспериментальных животных, применявшиеся методы обезболивания и усыпления (в ходе острых опытов).

4. К статье должны быть приложены краткое (на полстраницы) резюме на английском, русском и грузинском языках (включающее следующие разделы: цель исследования, материал и методы, результаты и заключение) и список ключевых слов (key words).

5. Таблицы необходимо представлять в печатной форме. Фотокопии не принимаются. **Все цифровые, итоговые и процентные данные в таблицах должны соответствовать таковым в тексте статьи**. Таблицы и графики должны быть озаглавлены.

6. Фотографии должны быть контрастными, фотокопии с рентгенограмм - в позитивном изображении. Рисунки, чертежи и диаграммы следует озаглавить, пронумеровать и вставить в соответствующее место текста **в tiff формате**.

В подписях к микрофотографиям следует указывать степень увеличения через окуляр или объектив и метод окраски или импрегнации срезов.

7. Фамилии отечественных авторов приводятся в оригинальной транскрипции.

8. При оформлении и направлении статей в журнал МНГ просим авторов соблюдать правила, изложенные в «Единых требованиях к рукописям, представляемым в биомедицинские журналы», принятых Международным комитетом редакторов медицинских журналов - <http://www.spinesurgery.ru/files/publish.pdf> и http://www.nlm.nih.gov/bsd/uniform_requirements.html В конце каждой оригинальной статьи приводится библиографический список. В список литературы включаются все материалы, на которые имеются ссылки в тексте. Список составляется в алфавитном порядке и нумеруется. Литературный источник приводится на языке оригинала. В списке литературы сначала приводятся работы, написанные знаками грузинского алфавита, затем кириллицей и латиницей. Ссылки на цитируемые работы в тексте статьи даются в квадратных скобках в виде номера, соответствующего номеру данной работы в списке литературы. Большинство цитированных источников должны быть за последние 5-7 лет.

9. Для получения права на публикацию статья должна иметь от руководителя работы или учреждения визу и сопроводительное отношение, написанные или напечатанные на бланке и заверенные подписью и печатью.

10. В конце статьи должны быть подписи всех авторов, полностью приведены их фамилии, имена и отчества, указаны служебный и домашний номера телефонов и адреса или иные координаты. Количество авторов (соавторов) не должно превышать пяти человек.

11. Редакция оставляет за собой право сокращать и исправлять статьи. Корректур авторам не высылаются, вся работа и сверка проводится по авторскому оригиналу.

12. Недопустимо направление в редакцию работ, представленных к печати в иных издательствах или опубликованных в других изданиях.

При нарушении указанных правил статьи не рассматриваются.

REQUIREMENTS

Please note, materials submitted to the Editorial Office Staff are supposed to meet the following requirements:

1. Articles must be provided with a double copy, in English or Russian languages and typed or computer-printed on a single side of standard typing paper, with the left margin of 3 centimeters width, and 1.5 spacing between the lines, typeface - **Times New Roman (Cyrillic)**, print size - 12 (referring to Georgian and Russian materials). With computer-printed texts please enclose a CD carrying the same file titled with Latin symbols.

2. Size of the article, including index and resume in English, Russian and Georgian languages must be at least 10 pages and not exceed the limit of 20 pages of typed or computer-printed text.

3. Submitted material must include a coverage of a topical subject, research methods, results, and review.

Authors of the scientific-research works must indicate the number of experimental biological species drawn in, list the employed methods of anesthetization and soporific means used during acute tests.

4. Articles must have a short (half page) abstract in English, Russian and Georgian (including the following sections: aim of study, material and methods, results and conclusions) and a list of key words.

5. Tables must be presented in an original typed or computer-printed form, instead of a photocopied version. **Numbers, totals, percentile data on the tables must coincide with those in the texts of the articles.** Tables and graphs must be headed.

6. Photographs are required to be contrasted and must be submitted with doubles. Please number each photograph with a pencil on its back, indicate author's name, title of the article (short version), and mark out its top and bottom parts. Drawings must be accurate, drafts and diagrams drawn in Indian ink (or black ink). Photocopies of the X-ray photographs must be presented in a positive image in **tiff format**.

Accurately numbered subtitles for each illustration must be listed on a separate sheet of paper. In the subtitles for the microphotographs please indicate the ocular and objective lens magnification power, method of coloring or impregnation of the microscopic sections (preparations).

7. Please indicate last names, first and middle initials of the native authors, present names and initials of the foreign authors in the transcription of the original language, enclose in parenthesis corresponding number under which the author is listed in the reference materials.

8. Please follow guidance offered to authors by The International Committee of Medical Journal Editors guidance in its Uniform Requirements for Manuscripts Submitted to Biomedical Journals publication available online at: http://www.nlm.nih.gov/bsd/uniform_requirements.html
http://www.icmje.org/urm_full.pdf

In GMN style for each work cited in the text, a bibliographic reference is given, and this is located at the end of the article under the title "References". All references cited in the text must be listed. The list of references should be arranged alphabetically and then numbered. References are numbered in the text [numbers in square brackets] and in the reference list and numbers are repeated throughout the text as needed. The bibliographic description is given in the language of publication (citations in Georgian script are followed by Cyrillic and Latin).

9. To obtain the rights of publication articles must be accompanied by a visa from the project instructor or the establishment, where the work has been performed, and a reference letter, both written or typed on a special signed form, certified by a stamp or a seal.

10. Articles must be signed by all of the authors at the end, and they must be provided with a list of full names, office and home phone numbers and addresses or other non-office locations where the authors could be reached. The number of the authors (co-authors) must not exceed the limit of 5 people.

11. Editorial Staff reserves the rights to cut down in size and correct the articles. Proof-sheets are not sent out to the authors. The entire editorial and collation work is performed according to the author's original text.

12. Sending in the works that have already been assigned to the press by other Editorial Staffs or have been printed by other publishers is not permissible.

**Articles that Fail to Meet the Aforementioned
Requirements are not Assigned to be Reviewed.**

ავტორთა საქურაღებოლ!

რედაქციაში სტატიის წარმოდგენისას საჭიროა დაიცვათ შემდეგი წესები:

1. სტატია უნდა წარმოადგინოთ 2 ცალად, რუსულ ან ინგლისურ ენებზე დაბეჭდილი სტანდარტული ფურცლის 1 გვერდზე, 3 სმ სიგანის მარცხენა ველისა და სტრიქონებს შორის 1,5 ინტერვალის დაცვით. გამოყენებული კომპიუტერული შრიფტი რუსულ და ინგლისურენოვან ტექსტებში - **Times New Roman (Кириллица)**, ხოლო ქართულენოვან ტექსტში საჭიროა გამოვიყენოთ **AcadNusx**. შრიფტის ზომა – 12. სტატიას თან უნდა ახლდეს CD სტატიით.

2. სტატიის მოცულობა არ უნდა შეადგენდეს 10 გვერდზე ნაკლებს და 20 გვერდზე მეტს ლიტერატურის სიის და რეზიუმეების (ინგლისურ, რუსულ და ქართულ ენებზე) ჩათვლით.

3. სტატიაში საჭიროა გაშუქდეს: საკითხის აქტუალობა; კვლევის მიზანი; საკვლევი მასალა და გამოყენებული მეთოდები; მიღებული შედეგები და მათი განსჯა. ექსპერიმენტული ხასიათის სტატიების წარმოდგენისას ავტორებმა უნდა მიუთითონ საექსპერიმენტო ცხოველების სახეობა და რაოდენობა; გაუტკივარებისა და დაძინების მეთოდები (მწვავე ცდების პირობებში).

4. სტატიას თან უნდა ახლდეს რეზიუმე ინგლისურ, რუსულ და ქართულ ენებზე არანაკლებ ნახევარი გვერდის მოცულობისა (სათაურის, ავტორების, დაწესებულების მითითებით და უნდა შეიცავდეს შემდეგ განყოფილებებს: მიზანი, მასალა და მეთოდები, შედეგები და დასკვნები; ტექსტუალური ნაწილი არ უნდა იყოს 15 სტრიქონზე ნაკლები) და საკვანძო სიტყვების ჩამონათვალი (key words).

5. ცხრილები საჭიროა წარმოადგინოთ ნაბეჭდი სახით. ყველა ციფრული, შემაჯამებელი და პროცენტული მონაცემები უნდა შეესაბამებოდეს ტექსტში მოყვანილს.

6. ფოტოსურათები უნდა იყოს კონტრასტული; სურათები, ნახაზები, დიაგრამები - დასათაურებული, დანომრილი და სათანადო ადგილას ჩასმული. რენტგენოგრაფიების ფოტოასლები წარმოადგინეთ პოზიტიური გამოსახულებით **tiff** ფორმატში. მიკროფოტოსურათების წარწერებში საჭიროა მიუთითოთ ოკულარის ან ობიექტივის საშუალებით გადიდების ხარისხი, ანათალების შედეგების ან იმპრეგნაციის მეთოდი და აღნიშნოთ სურათის ზედა და ქვედა ნაწილები.

7. სამამულო ავტორების გვარები სტატიაში აღინიშნება ინიციალების თანდართვით, უცხოურისა – უცხოური ტრანსკრიპციით.

8. სტატიას თან უნდა ახლდეს ავტორის მიერ გამოყენებული სამამულო და უცხოური შრომების ბიბლიოგრაფიული სია (ბოლო 5-8 წლის სიღრმით). ანბანური წყობით წარმოდგენილ ბიბლიოგრაფიულ სიაში მიუთითეთ ჯერ სამამულო, შემდეგ უცხოელი ავტორები (გვარი, ინიციალები, სტატიის სათაური, ჟურნალის დასახელება, გამოცემის ადგილი, წელი, ჟურნალის №, პირველი და ბოლო გვერდები). მონოგრაფიის შემთხვევაში მიუთითეთ გამოცემის წელი, ადგილი და გვერდების საერთო რაოდენობა. ტექსტში კვადრატულ ფხიხლებში უნდა მიუთითოთ ავტორის შესაბამისი N ლიტერატურის სიის მიხედვით. მიზანშეწონილია, რომ ციტირებული წყაროების უმეტესი ნაწილი იყოს 5-6 წლის სიღრმის.

9. სტატიას თან უნდა ახლდეს: ა) დაწესებულების ან სამეცნიერო ხელმძღვანელის წარდგინება, დამოწმებული ხელმოწერითა და ბეჭდით; ბ) დარგის სპეციალისტის დამოწმებული რეცენზია, რომელშიც მითითებული იქნება საკითხის აქტუალობა, მასალის საკმაობა, მეთოდის სანდოობა, შედეგების სამეცნიერო-პრაქტიკული მნიშვნელობა.

10. სტატიის ბოლოს საჭიროა ყველა ავტორის ხელმოწერა, რომელთა რაოდენობა არ უნდა აღემატებოდეს 5-ს.

11. რედაქცია იტოვებს უფლებას შეასწოროს სტატია. ტექსტზე მუშაობა და შეჯერება ხდება საავტორო ორიგინალის მიხედვით.

12. დაუშვებელია რედაქციაში ისეთი სტატიის წარდგენა, რომელიც დასაბეჭდად წარდგენილი იყო სხვა რედაქციაში ან გამოქვეყნებული იყო სხვა გამოცემებში.

აღნიშნული წესების დარღვევის შემთხვევაში სტატიები არ განიხილება.

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IMPACT OF MOTHER'S HYPOTHYROIDISM ON FETAL DEVELOPMENT AND OUTCOMES: A SYSTEMATIC REVIEW

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Abstract.

The thyroid, a gland with a butterfly-like shape in the base of the human neck, plays an important role in metabolism. Body heat, energy levels, weight, hair, fingernail, and regular menstruation cycles are controlled by three hormones produced by the thyroid. A system of feedback regulates the release of those hormones. Overproduction as well as underproduction of thyroid hormones can result from shifts in the stimulation and regulation of those hormones. These factors can have physiological or pathological origins. Pregnancy is a physiological factor. There is a plethora of physiological and psychological shifts that occur during pregnancy. A thyroid alteration in the mother is one example. Thyroid irregularities result from a failure to adjust to new circumstances. Thyroid hormone levels can drop, or manufacturing could be slowed during pregnancy due to variations in hormone concentration. Hypothyroidism describes this disorder. Hypothyroidism in women who are pregnant is either gestational or could be a disorder that is present before pregnancy. Gestational hypothyroidism cures itself throughout postpartum times, though it can stay as subclinical hyperthyroidism for some time after delivery. They pose a serious risk to development, stunt the growth of the unborn child and lead to defects in subsequent generations. Enhanced thyroid binding globulin levels, enhanced iodine clearance by the kidneys, modified effects of the human reproductive hormone and reduced dietary consumption of iodine lead to these alterations in the gland. Cretinism and mental disorders are among the serious health problems related to an iodine imbalance in maternal hypothyroidism. The growth of the brain, nervous system and Intelligence of an unborn child depends on thyroid hormones. As a result, normal early stages of development suffer due to changes in maternal hormone levels.

Key words. Thyroid, metabolism, hormones, hypothyroidism, pregnancy, iodine imbalance, brain development.

Introduction.

The physiological process of pregnancy is a demanding time for the body. It is associated with changes in the body's hormone and metabolic systems, which can lead to a variety of physiological disorders and, if ignored, it has the potential to have serious consequences [1]. During pregnancy, the thyroid gland is one organ that experiences physiological changes. These particular modifications impact the beginning and the course of pregnancy [2].

The 12th week of pregnancy is marked with a T4 rise that progressively decreases, indicating the thyroid gland's activity. Throughout the second part of pregnancy, the levels of thyroid hormone in the serum decrease. Because the amounts of thyroid hormone in the bloodstream vary, it can be difficult to diagnose hypothyroidism in pregnancy. Certain hormone levels in the blood are lowered during pregnancy due to several causes. This leads to the observation of a moderate to severe thyroid hormone deficit. The disorder can be categorized as isolated hypothyroxinemia, subclinical hypothyroidism, or clinical hypothyroidism according to these hormones' concentrations. The term "subclinical hypothyroidism" (SCH) occurs when blood serum thyroxine (T4) hormone levels are normal, but TSH concentrations are elevated. TSH levels during pregnancy are once again in the normal range: "3.0 (mIU/L)" in the last six months and "2.5 (mIU/L)" in the first three [3,4]. Averaged development and growth require adequate amounts of this hormone [5]. The appropriate intake of iodine in the diet is crucial for brain development since it is the mother's iodine supply that carries T4 into the fetus. Thyroid hormone levels must therefore be at their ideal levels for cytotrophoblast differentiation and proliferation. Pregnant hypothyroidism is caused by iodine insufficiency. Numerous health repercussions result from it, particularly in mothers and young children [6]. One of the most prevalent causes of primary hypothyroidism is autoimmune disorders like Hashimoto's disease, in which the thyroid is targeted by the immune system of the body, interfering with the thyroid hormones' normal activity [4]. Fetal hypothyroidism can be in the cases of maternal hypothyroidism. It requires cautious handling because this anomaly might impair brain development and lead newborns to develop compressive goiter. Thyroid cancer is the cause of morphological issues with the thyroid since it grows frequently during pregnancy. Similar to the effects of the hormone known as human chorionic gonadotropin (hCG), thyroid-stimulating hormone (TSH) exacerbates and amplifies its ramifications.

Search methodology.

The research articles issued by journals that are indexed in reputable, trustworthy, and authentic platforms were taken into consideration when creating this review article. Articles were processed using various systems and the review was structured to resemble the discussion part of a paper in which details are provided in simple sentences. Google Scholar, Web of Science

and PubMed were the databases that were searched. Reviewable articles that were released in the last eight years were included. Among the requirements for inclusion were pregnant women who experienced hypothyroidism. Comorbid conditions like cardiovascular illness and other secondary diseases, along with hypothyroidism, are excluded factors. The key terms and quantity of papers are mentioned in (Figure 1A and Figure 1B). Figure 2 shows the representation of prisma.

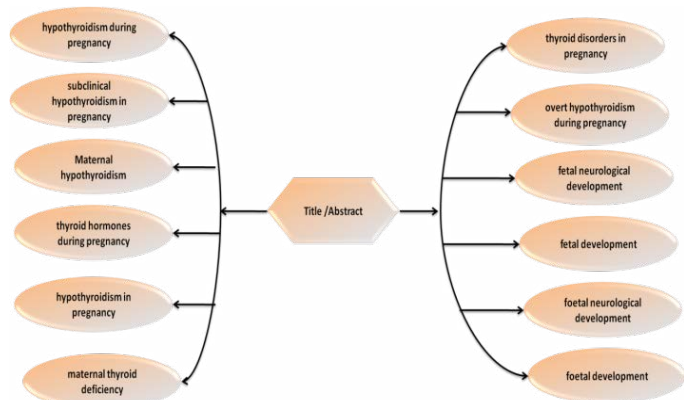


Figure 1A. Key terms [Title/Abstract].

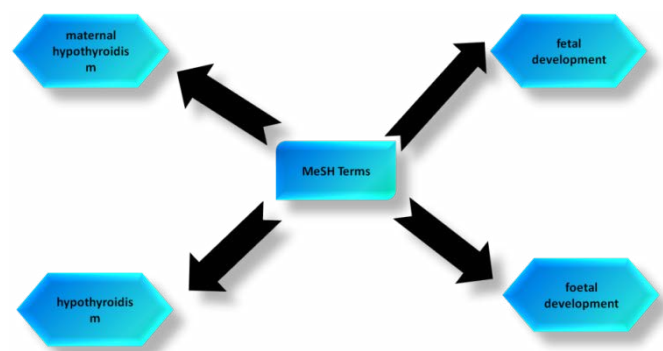


Figure 1B. Key terms [MeSH Terms]

Thyroid hormone during the developing fetus.

A significant number of endocrinologists raised public awareness of the consequences of maternal thyroid gland hormone insufficiency approximately 20 years ago [7]. The neurodevelopment of a child can be seriously impacted in 1999 if pregnant women with hypothyroidism choose not to address their condition [8]. Thyroid hormone levels must be sufficient for proper embryonic growth. The infant's thyroid area develops, and it starts to produce hormones related to the thyroid about 10 to 12 weeks of pregnancy. Thyroid hormone levels in the fetus's serum don't attain the adult range until 36 weeks of gestation [9]. The fetus is dependent upon the mother for hormone transportation because thyroid gland hormone can penetrate the placenta during the first trimester [10]. The thyroid gland is stimulated by the hCG hormone in the early stages of pregnancy [11]. Maternal serum thyrotropin values fall before rising again. Thus, there is a decrease in maternal serum thyrotropin values and an increase in free thyrotropin levels [12]. The birth of low weight babies are likely to be born if the mother had previous

experience with hypothyroidism during childbirth [13]. TSH receptor antibodies come in two varieties: (TSH) receptor-blocking antibodies and (TSH) receptor-stimulating antibodies. The fetal thyroid function is compromised because the placenta can be crossed by maternal receptor antibodies [14]. Figure 3 shows how the fetus's thyroid gland regulates thyroid hormones.

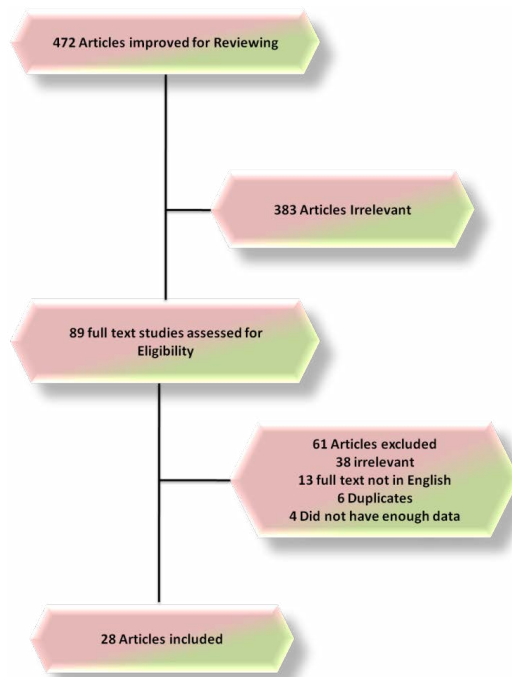


Figure 2. Representation of prisma.

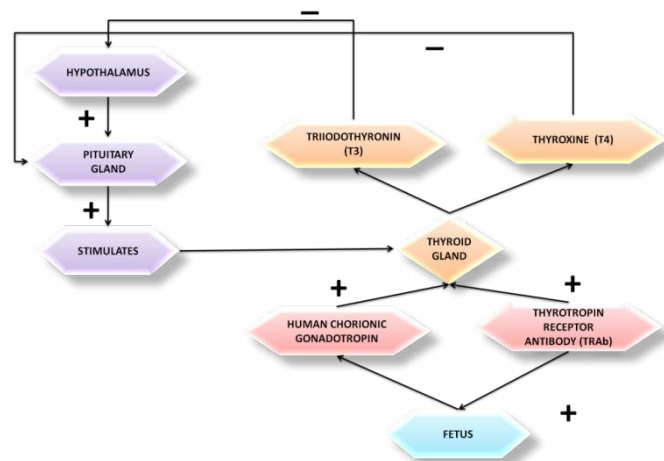


Figure 3. Thyroid hormone regulation in the growing fetus.

The growth, development, and intelligence of newborns are associated with maternal hypothyroidism.

By encouraging the creation of proteins, RNA, DNA and certain enzymes, the thyroid hormone advances embryonic development [19]. Tissue development, maturation and differentiation depend on it. Thyroid hormone is necessary for the proliferation of brain cells. The mother's Thyroid gland hormone is important for the growth of the brain until

the twentieth week of pregnancy. Throughout pregnancy's first and second trimesters, the brain grows. The fetus receives this hormone transplacentally since fetal thyroid follicle epithelium cells that are not developed cannot produce thyroid hormone after birth. While the consequences of a mother's thyroid gland hormone shortage third trimester of pregnancy might not be as bad as those of a mother's thyroid deficiency during the initial trimester, neuro-developmental problems can nonetheless result. Insufficient growth is observed in terms of cognitive and physical abilities, as well as reaction to outside stimuli when compared to offspring born to mothers who had healthy thyroid function during their whole pregnancy. Teeth and lengthy bones are formed by thyroid hormones [18].

Challenges and the physiological changes of the thyroid during pregnancy.

Thyroxine-binding globulin (TBG) increases throughout the first trimester and stays elevated during the second trimester. Higher levels of estrogen in mothers lead to sialylation and more importantly, decreased liver clearance, which increases TBG production. The mother's production of thyroid hormones is increased due to an increase in focus, which raises total T3 and T4 levels and increases the mother's natural production of thyroid hormones. An increase in the mother's glomerular filtration rate causes the kidneys to excrete more iodide. Plasma iodide levels decrease as a result of this clearance and improved thyroxine metabolism. In both the 2nd and 3rd trimesters, there is an increase in T4 metabolism because of elevated placental deiodinases. To respond, the placenta is essential and controlling the mother's thyroid gland hormones during pregnancy [16]. The thyroid gland gradually shrinks back to its original size following childbirth; however, these variations in hormone levels cause the gland to vary in size. Based on the trimester and the remaining portion of the pregnancy, several metrics are employed to evaluate hypothyroidism. The placenta stores iodine together with the thyroid gland. The production of thyroid hormones by the fetus requires iodine. Thus, iodine is absorbed through the mother's iodine absorption [17]. The sodium/iodine symporter (NIS) is thought to regulate iodine input, while pendrin is thought to regulate outflow.

Factors related to the development of hypothyroidism in mothers and the metabolism of that condition during pregnancy.

Maternal hypothyroidism is caused by the following risk factors: goiter, a history of thyroid dysfunction, the presence of thyroid antibodies, being older than thirty, having a diagnosis of type 1 diabetes, a history of surgical removal of the thyroid, autoimmune thyroid disorder running in the family, obesity, medications like lithium or amiodarone and geographic iodine deficiency [15]. When placental deiodinases are present, maternal fT4 is converted to reverse tri-iodothyronine (rT3) and tri-iodothyronine (T3). Maternal T3 penetrates the fetal tissues earlier to the growth of the embryonic thyroid. Thus, thyroid hormones have a major authority on how the central nervous system develops.

Management and Therapy.

Every six to eight weeks throughout pregnancy, a thyroid function test is required [1]. In this case, treatment of

hypothyroidism is necessary to avoid obstetric problems and infant neurodevelopmental difficulties. Since T3 cannot penetrate the placenta, levothyroxine (LT4) is administered as part of the treatment. There's a chance that T3 or T4 medication in combination will leave the fetus with insufficient thyroid hormone availability [23]. To keep the thyroid gland functioning normally throughout pregnancy, women who already have hypothyroidism before becoming pregnant should take more T4 than they did before becoming pregnant. Injections of levothyroxine thyroid gland hormone (LT4) are rarely used and should be given after dosage adjustment in cases of extreme unconsciousness or impaired oral feeding [24]. In several nations, screening for hypothyroidism is a common practice for asymptomatic expectant moms. Anti-thyroid drugs such as propylthiouracil or methimazole are used to treat autoimmune hyperthyroidism [28]. During pregnancy, anti-thyroid drugs can cross the placenta. Most fetuses will have sufficient thyroid hormone levels while pregnant provided that LT4 is dosed appropriately. While they can cross the placenta, maternal thyroid auto-antibodies do not affect the thyroid function of fetuses or newborns. Because high prenatal concentrations of thyroid hormones inhibit the hypothalamus-pituitary-thyroid system, newborns born to moms having autoimmune hyperthyroidism can develop central hypothyroidism [11, 26]. For the mother and the unborn child to have enough iodine throughout pregnancy, the mother must consume more iodine. The daily recommended dietary requirement increases to 250–300 mcg during pregnancy from 150 mcg. The pituitary gland secretes thyrotropin, or TSH as it is known. It causes the gland to produce more thyroid hormone and synthesize more of it. Serum TSH levels increase in low thyroid hormone concentrations and decrease in high thyroid hormone concentrations. Due to its great sensitivity as a thyroid function indicator, it is the recognized thyroid dysfunction screening test. [25].

Assessments.

Hypothyroidism is defined as an elevated TSH concentration above 10mIU/L or a standard blood thyroxin (T4) level with an increased stimulation of the thyroid concentration (either total or free). [3] Conclusions and implications from several studies on how maternal hypothyroidism affects fetal development are shown in Table 1.

Resulting from hypothyroidism in mothers.

Pregnancy can mimic several hypothyroidism symptoms, including weight gain, constipation, anxiety, fatigue and cramping in the muscles. As a result, it is harder to diagnose hypothyroidism throughout pregnancy. Neurological diseases and mental disability can arise from thyroid malfunction [20]. Some unfortunate expected outcomes that can occur include miscarriage, intrauterine death, preterm labor, preeclampsia, preterm delivery, gestational hypertension, eclampsia, gestational diabetes, fetal loss, placenta previa and placental ligation performed by abruption. There is evidence that babies born to hypothyroid moms have difficulties regarding verbal comprehension, focus, reading books, motor abilities and at last visual-spatial learning [21]. Within a cohort study, newborn jaundice was one of the most common results. There have been reports of urogenital anomalies, as well as Down syndrome,

Table 1. Conclusions and implications from several studies on how maternal hypothyroidism affects fetal development.

Serial number	Reference	Goal of the research	Implication	Conclusion
1)	[19]	To examine and record the relationship between pregnancy-related hypothyroidism and the fetus's growth and development.	Premature birth is a major risk factor for hypothyroid mothers, and it might have an impact on their babies' cognitive and psychomotor growth.	Hypothyroidism during pregnancy alters the growth of the fetus, raises the risk of delivery, and affects metabolism.
2)	[21]	To evaluate their outcomes observed in children of mothers with thyroid disorders.	Unbalanced metabolism in the fetus may result from the pregnant lady's thyroid disease.	The unborn child's health, metabolism, and chances of long-term illness are all impacted by maternal thyroid problems during pregnancy.
3)	[6]	To comprehend the process via which gestational hypothyroidism develops.	Pregnancy-related iodine shortage and fluctuations in circulating estrogen are two prominent causes of gestational hypothyroidism.	Due diligence and research are necessary due to the complexity, impact, and management of gestational hypothyroidism.
4)	[13]	To evaluate their relationship between birthweight and mother thyroid function.	Babies born with small gestational ages and low birth weights are the result of hypothyroidism in pregnant mothers.	Birth weight is influenced by the mother's thyroid function; subclinical hypothyroidism increases the chance of SGA.
5)	[22]	To examine as well as comprehend the anomalies that babies born to mothers with hypothyroidism face.	Cardiovascular problems were among the most prevalent congenital abnormalities. neonatal jaundice and Low birth weight were among the other anomalies.	Pregnancies with hypothyroidism in Pakistan can result in congenital abnormalities and poor neonatal outcomes, which highlights the importance of prompt identification and treatment.
6)	[27]	To examine that effects of your thyroid gland conditions on fetal growth, neurocognitive potential, and obstetrical outcomes in women who are pregnant.	Fetal neurodevelopment depends on the health of the mother's thyroid, yet there are possible obstetrical dangers.	The health of the fetus is affected by thyroid diseases; extensive research shows the significance of treatment
7)	[10]	To examine how thyroid hormones affect the fetus's neurodevelopment.	Infants with low developmental quotients and results are low thyroid function in the mother. It is associated with these infants' delayed cognitive development as well.	Thyroid hormones in the development of the central nervous system: a review with special attention to congenital hypothyroidism and mother therapy for better results.
8)	[23]	To investigate thyroid gland disorders during pregnancy.	LT4 treatment is required for pregnant women with hypothyroidism to prevent problems with embryonic neurodevelopment.	Pregnancy-related thyroid diseases need to be carefully managed for the sake of the mother and fetus, taking treatment options and any hazards into account.
9)	[7]	To examine their relationship between preterm birth and subclinical hypothyroidism throughout pregnancy.	Compared to euthyroid women, mothers who had subclinical hypothyroidism were more likely to give birth prematurely.	The risk of preterm birth is increased by maternal hypothyroidism and hypothyroxinemia, which calls for careful management to ensure healthier pregnancies.
10)	[28]	To discuss the difficulties and available treatments for hyperthyroidism during pregnancy, highlighting the importance of screening women who are expecting or who are planning a child.	The well-being of both the mother and the fetus depends on early screening and comprehensive therapy for thyroid problems during pregnancy.	For best results, screening for thyroid disorders during pregnancy is advised.

hypocalcemia, respiratory distress, and cardiovascular abnormalities [22]. There has been evidence of the offspring's diminished motor and cognitive abilities.

Conclusion.

During pregnancy, hypothyroidism poses a serious risk to the unborn child as well as the mother. Infants are susceptible to a significant risk of developmental abnormalities and growth-related obstacles to their physical and mental development.

Given that a pregnant woman can be diagnosed with gestational hypothyroidism, a kind of hypothyroidism that develops throughout pregnancy and can exist before conception, it's critical to recognize the symptoms as soon as possible and receive the necessary therapy. Women who have experienced hypothyroidism should get treatment before attempting to become pregnant. They have to wait till the normalization of thyroid hormone level occurs. Women must wait a certain amount of time once their blood levels reach the intended limit

before becoming pregnant to avoid any negative side effects that could impair the developing baby's growth as a result of the drugs they are taking for treatment. When diagnosed with gestational hypothyroidism, mothers need to start treatment right once. Due to the incapacity and impossibility of iodizing salts in certain places, iodine is advised for residents living in regions with significant iodine deficiencies. For the healthy growth and development of their child, mothers need to be informed about the significance of thyroid gland hormones and how they work. Understanding the ways to spot the early warning symptoms in one is crucial. It is advisable to periodically check for appropriate blood hormone levels, particularly in the early stages of pregnancy. It is necessary to enable the monitoring and regulation of recommended medication dosages as well as the preservation of normal functioning.

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