

Empowering Pregnant Women's Health from Thyroid Disorders: A Nursing Educational Program for Pregnant Women.

Rasha Mohamed Hassan Eltelt.

Assistant Professor of Women's Health and Maternity Nursing. Faculty of Nursing, Kafr El-sheik University.

Abstract

Background: Thyroid disorders are among the most prevalent endocrine issues in pregnant women and can have a major negative impact on the health of both the mother and the fetus. **Aim:** This study aims to evaluate the effect of nursing educational programs on pregnant women's health from thyroid disorders. **Design:** A quasi-experimental research design was used to conduct this study. **Setting:** The research was conducted in an outpatient clinic in obstetrics and gynecology at Kafr El-Sheikh University Hospital. **Sample:** A purposive sample of 120 pregnant women with thyroid disorders was sorted into a control group and a study group based on specific criteria. **Tools:** One tool was utilized in this research. The interview questionnaire is divided into four parts: demographic characteristics, medical history of pregnant women with thyroid disorders, pregnant women's knowledge, and pregnant women's self-reported practices. **Results:** Shows that, 88.2 % in the study group had poor knowledge, 91.6% in the control group had poor knowledge before implementation of the program improved to 91.6 % good knowledge post-program, and 75.0% slight decline in the follow-up program in the study group, compared to no improved the total knowledge in the control group. 86.6% poor knowledge in the post-program and 93.4 % in the follow-up. Regarding total self-reported practice scores level pre-program $r=0.6$ in the study group and $r=0.5$ in the control group for the program improved to $r=0.7$ in the study group after implementing the program and $r=0.6$ in the control group post-program. Also, $r=0.8$ was found in follow-up in the study group, and $r=0.6$ was found in the control group after program implementation. There was a highly statistically significant difference between the two groups in post-test and follow-up, where $p<0.001$. **Conclusion:** A highly statistically significant relation between the total knowledge scores, total self-reported practice scores, and demographic characteristics pre-, post, and following the implementation of the educational program in the study group, with a significance level of $P < 0.001$ compared to the control group with no improvement in knowledge and self-reported practice. **Recommendations:** Pregnant women with thyroid disorders should have regular follow-up appointments, especially if they have a history of thyroid problems. Routine screening for thyroid function tests in the antenatal clinic is important to enhance pregnant women's health.

Key Word: Nursing educational program, Pregnant women's health, thyroid disorders.

Introduction:

Pregnant women frequently experience thyroid problems, including hyperthyroidism and hypothyroidism, which require prompt management. Located in the anterior part of the neck, the thyroid gland plays a crucial role in the secretion of hormones that govern several physiological processes, including metabolism, heart activity, nervous system activity, body weight, body temperature, and other related functions. *Okosieme, Marx, and Lazarus (2016).*

Pregnant women who already have Enhanced medical supervision may be necessary to effectively manage hyperthyroidism or hypothyroidism while pregnant, particularly in

the initial trimester. Pregnancy can occasionally result in symptoms that have a resemblance to hyperthyroidism within the first three months. Pregnant women who have symptoms such as palpitations, weight loss, and frequent vomiting are advised to seek medical attention. *Vissenberg, et al, (2018).*

Thyroid hormones are crucial during pregnancy to develop a healthy baby and sustain the mother's well-being. Untreated thyroid conditions during pregnancy can result in early birth, hypertension, miscarriage, and low birth weight, among other complications. Before and during pregnancy, it is crucial to undergo monitoring and alter treatment as needed. *Smyth, et al, (2017).*

Pregnant women with thyroid issues can ensure a successful pregnancy and safeguard their fetuses' well-being by educating themselves on how pregnancy impacts the thyroid, staying up-to-date on thyroid function tests, and adhering to necessary prescription regimens. The thyroid gland produces thyroid hormones T3 and T4, controlled by TSH produced through the pituitary duct. **Mandel (2017).**

The synthesis of thyroid hormone is regulated by thyroid-stimulating hormone (TSH), which is synthesized by the pituitary gland located in the brain. A reduction in the concentration of thyroid hormone within the bloodstream triggers an elevation in the synthesis of thyroid-stimulating hormone (TSH) by the pituitary gland. Elevated thyroid hormone levels reduce the pituitary gland's thyroid-stimulating hormone (TSH) production. **Stagnaro-Green, et al, (2017).**

Human chorionic gonadotropin (HCG) and estrogen, two hormones connected to pregnancy, lead to elevated levels of thyroid hormones in the bloodstream. HCG, produced by the placenta, has a similar effect to TSH by slightly stimulating the thyroid to increase thyroid hormone production. Elevated concentrations of estrogen stimulate the production of thyroid-binding globulin, which is more commonly referred to as thyroxin-binding globulin. This protein facilitates the transportation of thyroid hormones within the circulatory system. Regular hormonal changes can complicate the interpretation of thyroid function tests in pregnancy. **Negro, et al, (2016).**

The presence of thyroid hormone is crucial for the optimal growth and maturation of the infant's brain and nervous system. During the initial trimester, the developing embryo depends on the maternal provision of thyroid hormone delivered via the placenta. The baby's thyroid attains autonomy and commences operation at approximately 12 weeks. **Pop, Brouwers, et al, (2017).**

During pregnancy, the thyroid gland in healthy women modestly increases in size, which is not detectable by a physical examination. An enlarged thyroid can indicate thyroid illness and should be assessed. Diagnosing thyroid issues during pregnancy can be challenging because of elevated levels of thyroid hormone in the bloodstream, enlarged thyroid gland, exhaustion, and overlapping symptoms typical of both

pregnancy and thyroid conditions. **Korevaar, et al. (2017).**

Pregnant women should not have radioactive iodine treatment due to its potential to harm the unborn thyroid gland. In some cases, women who are unable to tolerate antithyroid drugs may undergo Surgery to remove all or part of the thyroid gland. Antithyroid medicines can pass Through the placenta in minimal quantities, potentially reducing fetal thyroid hormone synthesis. Therefore, it is advisable to administer the smallest effective dose to prevent hypothyroidism in the newborn. **Abalovich, et al . (2018).**

A community health nurse can be crucial in collaborating with pregnant women to enhance outcomes by providing detailed information on all medications. This includes factors like dose, potential harmful effects, and drug interactions. Women should be advised to conduct pulse checks regularly, no less than twice per week, and to discontinue using the thyroid supplement. If the pulse surpasses 100, the physician should be notified. Emphasize the necessity of continuous medical evaluation to monitor thyroid function and the possibility that the drugs could cause hyperthyroidism in women with preexisting hypothyroidism. Provide education to women on the thyroid gland, hypothyroidism, and associated consequences such as heart disease and edema. Inform women that any new symptoms of heart issues or hyperthyroidism should be reported promptly. Clarify that caloric and fiber requirements differ. Women should promptly report any unusual weight fluctuations or alterations in bowel habits. **(Marx et al .2016).** Finally, If women comprehend their illness and adhere to the prescribed treatment plans, they can achieve a safe delivery and give birth to a healthy baby. **Tim and Vincent. (2017)**

Significance of the study

Thyroid disorders can often be effectively controlled with appropriate drugs and hormone treatment in daily life. The hazards associated with low or high thyroid hormone levels are especially evident during pregnancy. **(Mestman. 2018).** At least 80,000 pregnant women in the United States annually experience thyroid disorders. **Alexander et al. (2018)** According to their statement, it was shown that

these ladies had a higher likelihood of encountering severe adverse pregnancy outcomes, including hypertension and preterm birth. Moreover, there is an increased incidence of labor inductions and other medical interventions among these individuals during the process of birthing.

As reported by the **American Thyroid Association in 2015**, Approximately one out of every eight pregnant women will experience a thyroid issue at some point. An estimated 20 million Americans suffer from a thyroid disease or dysfunction,

In Egypt, the prevalence of hypothyroidism among pregnant women during the first trimester was 56% when utilizing the trimester and average population threshold values for thyroid functions. There were no statistically significant disparities observed in the prevalence of clinical or subclinical hypothyroidism between the high-risk and low-risk categories. The implementation of the most recent standards established by the Endocrine Society led to an inability to identify clinical or subclinical hypothyroidism in 34.5% of pregnant Women. The use of thyroid dysfunction screening for pregnant women in Egypt should be extensively adopted—**Center for Maternal and Child Enquiries, (2017)**.

Aim of the study:

This study aims to evaluate the effect of nursing educational programs on pregnant women's health from thyroid disorders through:

1-Assessing the pregnant women's knowledge and self-reported practice with thyroid disorders to detect their needs.

2-Designing educational programs according to pregnant women's needs.

3-Implementing educational programs according to pregnant women's needs

3-Evaluating the effectiveness of educational programs will improve pregnant women's knowledge and self-care practices for thyroid disorders, leading to better overall health outcomes

Research Hypothesis:

Implementing an educational program on thyroid disorders will significantly enhance pregnant women's knowledge and self-care

practices, ultimately improving their overall health.

Subjects and Method:

Methodology

Design: A quasi-experimental research design was used to conduct this study.

Setting: The research was conducted in the outpatient obstetrics and gynecology clinic at Kafr El-Sheikh University Hospital. This hospital treats most pregnant women with thyroid disorders. Between January 2020 and December 2020, we attended to about 1,200 women.

Sample:

A purposive sampling was utilized in this investigation. It consisted of 120 pregnant women with thyroid issues, accounting for approximately 10% of all pregnant women visiting the antenatal clinic between January 2020 and December 2020. The pregnant women chosen must meet the following criteria: be between 18 and 32 years old, diagnosed with thyroid disorders, in the first trimester of pregnancy, capable of communication, and willing to engage in the study. Reside near the hospital to facilitate your participation in our research. There were two groups: a study group and a control group comprising 60 pregnant women.

Tools of data collection

An interviewing questionnaire: One tool was utilized in the study, and the researcher Constructed it using a literature review and pregnant women's medical records to collect data on the specified topics. The tool contains four parts:

Part I: The demographic characteristics of pregnant women with thyroid disorders consist of 7 closed-ended questions covering age, education level, occupation, residence, monthly income, family size, and number of rooms.

Part II: Previous past and current obstetric history: data regarding **Past obstetric history** such as normal single baby, baby low birth weight, abortion, stillbirth, and any congenital anomalies. Also, did you receive instruction about thyroid disorders during pregnancy? Were you suffering from complications in the previous pregnancy, such as preeclampsia, severe anemia, diabetes thyroid problems, and types of thyroid disorders, such as hyperthyroidism, hypothyroidism, and goiters?

The current pregnancy history: gestational age (in weeks), body weight (Kg), laboratory investigation such as complete blood count (CBC), thyroid Harmons, blood group and RH factors, urine analysis (sugar& albumin), blood sugar, noninvasive test (Echo, ECG) and ultrasonography, fetal heart rate. Types of treatment and side effects of antithyroid medications during current pregnancy.

Part III: Knowledge of pregnant women regarding thyroid disorders was assessed using this section as a pre/post and follow-up test. The data include the concept of thyroid diseases, types, causes and risk factors, signs and symptoms, pregnant women and fetal complications, and treatment. The evaluation was carried out on two occasions: immediately following the program (post-test) and one month later (follow-up)

Scoring system:

A scoring system was developed to assess pregnant women's knowledge. Each question was assigned a certain number of points based on the accuracy and completeness of the response provided. A correct and complete answer was awarded two points, an incomplete answer received one, and a "don't know" answer received zero points. The cumulative score for all knowledge-related questions was 14 marks, equivalent to 100%.

Total knowledge scores :

- **Good:** >70% of the overall score (>13.3 marks)
- **Average:** 50- < 70% (9.5-13.3 marks).
- **Poor:** < 50% of the total score (below 9.5 marks).

Part V: Pregnant women with thyroid disease self-reported practices questionnaire sheet: The measure assessed daily living habits pre-post and follow-up program implementation. This study includes the following aspects: food, rest, sleep, exercise, dental, and foot care, Participants were asked to indicate their responses as either Yes or No.

Scoring system: Each self-reported practice questionnaire form was assigned a score of one point. "Yes" answer and zero points for each "No" answer. The cumulative score obtained on this sheet amounted to 6 marks, comparable to 100%. In the context of self-reported practices, a score of 12 points or doing the right action (< 60%) is considered not doing

the right action, whereas a score below Points (> 60%).

Ethical considerations: Official permission to conduct the proposed study was obtained from the Scientific Research Ethics Committee in the Faculty of Nursing at Kafr El Sheikh University. Before signing the informed consent form, subjects were given complete information about the research and their role. They were assured that participation was voluntary and that they could withdraw anytime. The participants were assured of the information's confidentiality, ensuring that any other entity would not access it without their permission. Respect was given to ethics, values, culture, and beliefs.

Pilot study: A pilot study assessed the instrument's clarity, applicability, and understandability. It was conducted on 10% (12) pregnant women. The pilot participants were included in the primary study sample since no significant changes were required.

Tools Reliability: Cronbach's Alpha determined the study instrument's reliability coefficient. The findings were 0.76 for knowledge and 0.89 for self-care practice evaluation tools.

Fieldwork: Following the acquisition of formal approvals to conduct the research, the chosen participants were provided with a clear explanation of the study's objective. The research was conducted over six months, commencing in January 2020 and concluding in June 2020. average, it took participants approximately 30 minutes to complete the tools. Researchers visited the setting on Saturdays and Thursdays from 10:00 a.m. to 2:00 p.m.

Educational program: it included 4 phases:

Assessment: This phase included interviews with pregnant women at the outpatient obstetrics and gynecology clinic at Kafr El-Sheikh University Hospital. This stage served as the first step in gathering baseline data. At the start of the interview, the researchers cordially addressed the pregnant women and introduced themselves to each participant.

Development of the program

A four-phase structure was employed for the educational program, encompassing assessment, planning, implementation, and evaluation.

1) Assessment phase

The researcher built the educational program based on the evaluation results, which

included a pre-test and an interview questionnaire.

II) Planning of the educational program

During this step, the researcher analyzed the pre-test results and tailored the educational session's content to meet the specific needs of pregnant women with thyroid disorders. A pamphlet was created to document the goals and objectives of the academic program sessions, which were derived from the identified needs, requirements, and weaknesses. The pamphlet provides comprehensive information regarding thyroid disorders in pregnancy, encompassing various aspects such as the concept of thyroid disease, types, causes, risk factors, signs and symptoms, pregnant women's and fetal complications, treatment, prevention, therapy, and the ask about self-care practice such as: 'rest, sleep, exercise, diet, dental and foot care, drugs.

Program objectives:

Implementing an educational program on thyroid disorders will significantly enhance pregnant women's knowledge and self-care practices, ultimately improving their overall health.

Content of the program: Gain a comprehensive understanding of thyroid disorders: Theoretical Framework of Thyroid Disorder, such as the concept of thyroid disease, types, causes, risk factors, signs and symptoms, complications of pregnant women and fetal, and treatment. The objective is to ascertain thyroid illness's etiology and predisposing factors, ensuring thorough and complete knowledge.

Acquire essential self-care practices that are crucial and practical in your daily life. the significant study group and 51.7% of the control group were of regular follow-up and prenatal visits should be recognized. Illustrate various forms of daily living habits, types of food, rest, sleep, exercise, dental and foot care, drugs, and follow-up.

The methods and teaching strategies include lecture/discussion, role play, demonstration, and brainstorming. The researcher employed a range of audiovisual aids, such as a data projector, booklet, audio recordings, photographs, and physical objects.

III) Implementation phase

The educational program was executed over six months, consisting of 8 sessions. (3 theory & 5 practical) Each session lasted between 20 and 30 minutes. The academic program was administered either on an

individual basis or in small groups composed of 2 to 4 pregnant women; at the commencement of each session, the researchers started with a recapitulation of the content covered in the preceding session while ensuring the use of uncomplicated and lucid language to cater to the educational proficiency of the pregnant women. Following the completion of each session, the examined sample was provided with information on the content and schedule of the subsequent session.

VI) Evaluation of the program

The educational program was evaluated immediately post-program and one month after its implementation as part of the follow-up process. The evaluation used the same pre-program framework.

Statistical design

This study utilized SPSS software version 23.0 (Statistical Package for the Social Sciences) to input and analyze the data. Data were analyzed using descriptive statistics, including frequencies and percentages for qualitative variables and means and standard deviations for quantitative variables. When comparing qualitative category variables, the chi-square test was employed. A t-test for personnel correlation was employed. There was a determination of statistical significance at: Differences were considered very significant when the p-value was less than 0.001. Statistically significant differences were indicated by a P-value that was less than 0.05. Statistically insignificant differences were marked by a P-value greater than 0.05.

Results:

According to **Table (1)**, 61.7% of the study group and 51.7% of the control group were aged between 24 < and 30, with the average age of the study group being 28.68 ± 4.68 years and the control group 27.77 ± 4.52 ; in addition, 76.7% and 55.0% of the pregnant women in both categories were housewives, and 61.7% and 58.3% of the study sample had completed secondary school education. On the other hand, 61.6% of the study group and 58.4% of the control group lived in urban areas. The average family size in the study group was 4.22 ± 0.68 , while in the control group, it was 4.35 ± 0.79 . Regarding family monthly income. In the study group, 58.3% and 65.1% of the control group did not have enough family income to meet their basic family demands. 53.3% of the study group and 55.0% of the control group had room

numbers 2-3 rooms. There was no statistically significant difference between the two groups at $p > 0.05$.

Figure (1) shows that 32.7% of the study group had a single live baby compared to 27.5% of the control group. Nearly equal percentages of 20.4%, 25.5%, 24.5%, 15.7% & 18.4%, and 21.5% of the study and control groups had low birth weight babies, abortion, or preterm infants, respectively. Meanwhile, 4%, 5.9% & 3.9% had a stillbirth and congenital anomalies with lower percentages in their previous pregnancy outcomes.

Figure (2) shows that 91.7% and 88.3% of the study and control groups did not receive instructions during the previous pregnancies,

Figure (3) reveals that 47.0% of the study and control groups had severe anemia. Meanwhile, 34.7% and 37.3% of them had thyroid problems, respectively. 2.0%, 3.9%, and 10.2%, respectively, of the participants in the study and control groups had prior experience with complications associated with diabetes and pre-eclampsia.

Table (2) demonstrates that 83.3 % and 88.4% of the study and control groups had hypothyroidism, respectively. Meanwhile, 10.0% and 8.3% of them had hyperthyroidism. Regarding goiter, the same table revealed that 6.7 % of the study and 3.3% of control groups had a goiter. There was no statistically significant difference between both groups at $p > 0.05$.

Table (3) Regarding the current pregnancy history, the study elaborates that the mean gestational age (in weeks) was 9.57 ± 1.64 weeks for the study group and for the control group, 10.18 ± 1.68 weeks. Also, the mean body weight of women in kg was 71.88 ± 9.07 for women in the study group compared to 70.29 ± 6.43 for the control group. Meanwhile, 100.0% of the study group and the control group had done complete blood count (CBC), 83.3% in the study group and 91.6% of the control group had done T3, T4, & FSH, 100.0% of the study group and control group done blood group and RH factor. Meanwhile, 83.3% and 75.0% of the study group and the control group had done urine analysis (sugar & albumin), and 66.6% and 51.7% of the study group and the control group had not done blood sugar tests. Also, 100.0% of the study group and control group do

noninvasive tests (Echo, ECG), and 100.0% of the study group and control group do ultrasonography and fetal heart rate. There was no statistically significant difference between both groups at $p > 0.05$.

Table (4) indicates that 76.6% of the study group and 66.6% of the control group give thyroid hormone during the current pregnancy, 58.3% in the study group, 71.6% in the control group give Iron supplement /multivitamins during pregnancy, 43.3% in the study group, 46.6% in the control group give anti-arrhythmic drugs during pregnancy, 41.6% in the study group, and control group give anti-hypertensive drugs during pregnancy, and 11.3% in the study group, 10.0% in control group give anticoagulant during current pregnancy. Regarding the side effects of antithyroid medication, the current study revealed that 50.0 % and 48.3% of the studied women suffer from allergies and skin rash. Meanwhile, 46.6 % and 45.0% of the study and control groups reported fatigue and weakness. On the other hand, 28.3 % and 43.3 % of them suffer from vague abdominal pain. Also, 76.6% of the study group give thyroid hormones. Meanwhile, 71.6% of the control group gave iron supplements such as multivitamins. There was no statistically significant difference between the two groups at $p > 0.05$.

Table (5) regarding pregnant women's knowledge of thyroid diseases, the current study showed that 75.0%, 88.3%, 90.0%, 63.3%, 83.3%, 60.0%, and 76.7%, in the study group, and 70.0%, 91.7, 85.0 %, 66.7%, 90.0%, 63.3 %, and, 68.3% of the control groups don't know regarding the concept, types, causes, and risk factors, signs and symptoms, pregnant and fetal complication, and treatment of thyroid disorder in the pre-program, respectively improved to complete correct answers knowledge 88.3%, 78.3%, 86.7%, 90.0%, 85.0%. 90.0% and 81.3% of the study group regarding the concept, types, causes, and risk factors, signs and symptoms, pregnant and fetal complications, and treatment of thyroid disorder immediately (**post-test**), and 81.7% 66.7 %, 78.3%, 86.7%, 66.7%, 80.0% and 68.3% during the last trimester (**follow-up**) after implementation of the educational program. Meanwhile, 40.0%, 10.0 %, 16.7 %, and 45.0% of the control group had entirely incomplete correct answers regarding types of thyroid disease immediately and after

implementing the educational program. And not improve the knowledge of the control group. There was a statistically significant difference between the two groups in the post-test and follow-up, where $p < 0.001$.

Table (6) shows that pregnant women's total knowledge score, 88.2% in the study group poor knowledge, 91.6% in the control group poor knowledge before implementation of the program improved to 91.6 % post-program and 75.0% in follow-up post-program in the study group compared to no improvement in total knowledge pre, post and follow up in control group, There was a statistically significant difference between the two groups in post-test and follow-up, where $p < 0.001$.

Table (7) shows that 16.8%, 20.4%, 1.7%, 18.6%, and 19.2% in the study group, and 10.2%, 14.4% 13.3%, and 18.0% in the control group were not done practice regarding daily living habits(food, rest, sleep, exercise, dental and foot care, and follow-up before program implementation improved to done practice 85.0%, 91.6% 90.0, 90.0%,83.3% and 85.6% after the program, 80.0%, 83.3%, 85.0%. 80.0%, 75.0%, and 81.6% after follow-up of the program, and no improvement in the post-program and follow-up in the control group There was a statistically significant difference between the two groups in post-test and follow-up, where $p < 0.001$.

Table (8) shows that a highly statistically significant positive correlation coefficient between total self-reported practice scores level pre-program $r = 0.6$ in the study group and $r = 0.5$ in the control group for the program improved to $r = 0.7$ in the study group after implementing the program and $r = 0.6$ in the control group post-

program. Also, $r = 0.8$ was found in follow-up in the study group, and $r = 0.6$ was found in the control group after program implementation. And no improvement in the post-program and follow-up in the control group. There was a statistically significant difference between the two groups in post-test and follow-up, where $p < 0.001$.

Figure (4) shows that 10.0% doing write action before the program improved to 95.0% post-program and 80.0% after follow-up. There was a statistically significant difference between the two groups in post-test and follow-up, where $p < 0.001$.

Table (9) Explored the relationship between pregnant women's total knowledge and their demographic data. The results indicated a statistically significant relation between the total knowledge of pregnant women and their demographic data such as age, educational levels, occupation, place of residence, family size, monthly income, and number of rooms. This relation was seen pre-, post, and following the implementation of the educational program ($P < 0.001$). There was no statistically significant relation in the control group.

Table (10) Explored the relationship between pregnant women's total self-care practice and their demographic data. The results indicated a statistically significant relation between the total knowledge of pregnant women and their demographic data such as age, educational levels, occupation, place of residence, family size, monthly income, and number of rooms. This relation was seen pre-, post, and following the implementation of the educational program ($P < 0.001$). There was no statistically significant relation in the control group.

Results:

Table (1): Frequency distribution of the study and control groups based on their demographic characteristics. (n = 120)

| Demographic Characteristics | Study group (n= 60) | | Control group (n=60) | | X ² | P-value |
|-------------------------------|---------------------|-------------|----------------------|-------------|----------------|---------|
| | No. | % | No. | % | | |
| Age groups (in years): | | | | | 1.229 | >0.05 |
| 18 <24 | 9 | 15.0 | 11 | 18.3 | | |
| 24 <30 | 37 | 61.7 | 31 | 51.7 | | |
| ≥ 30 | 14 | 23.3 | 18 | 30.0 | | |
| Mean ± SD | 28.68± 4.68 | | 27.77 ± 4.52 | | | |
| Educational level: | | | | | 0.518 | > 0.05 |
| Not read and write | 3 | 5.0 | 2 | 3.3 | | |
| Basic education | 8 | 13.3 | 10 | 16.7 | | |
| Secondary education | 37 | 61.7 | 35 | 58.3 | | |
| University education or more | 12 | 20.0 | 13 | 21.7 | | |
| Occupation: | | | | | 0.758 | > 0.05 |
| Housewife. | 46 | 76.7 | 33 | 55.0 | | |
| Worker. | 14 | 23.3 | 27 | 45.0 | | |
| Place of residence: | | | | | 0.688 | > 0.05 |
| Rural. | 23 | 38.4 | 25 | 41.6 | | |
| Urban. | 37 | 61.6 | 35 | 58.4 | | |
| Family size: | | | | | 0.563 | >0.05 |
| ≤ 3 | 26 | 43.4 | 35 | 58.4 | | |
| ≥ 3 | 34 | 56.6 | 25 | 41.6 | | |
| Mean ± SD | 4.22± 0.68 | | 4.35± 0.79 | | | |
| • ≥ 3 | | | | | | |
| Monthly income : | | | | | 0.871 | >0.05 |
| Enough .and saved | 6 | 10.0 | 4 | 6.6 | | |
| Enough | 19 | 31.7 | 17 | 28.3 | | |
| Not enough | 35 | 58.3 | 39 | 65.1 | | |
| Numbers of rooms: | | | | | 0.945 | >0.05 |
| 1 | 19 | 31.7 | 22 | 36.7 | | |
| 2-3 | 32 | 53.3 | 33 | 55.0 | | |
| ≥ 3 | 9 | 15.0 | 5 | 8.3 | | |

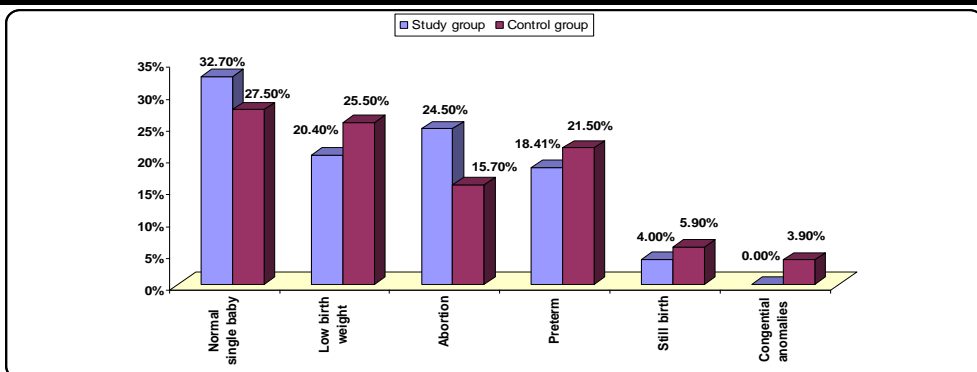


Figure (1): Frequency distribution of the control and study groups according to their pregnancy history. (n=120)

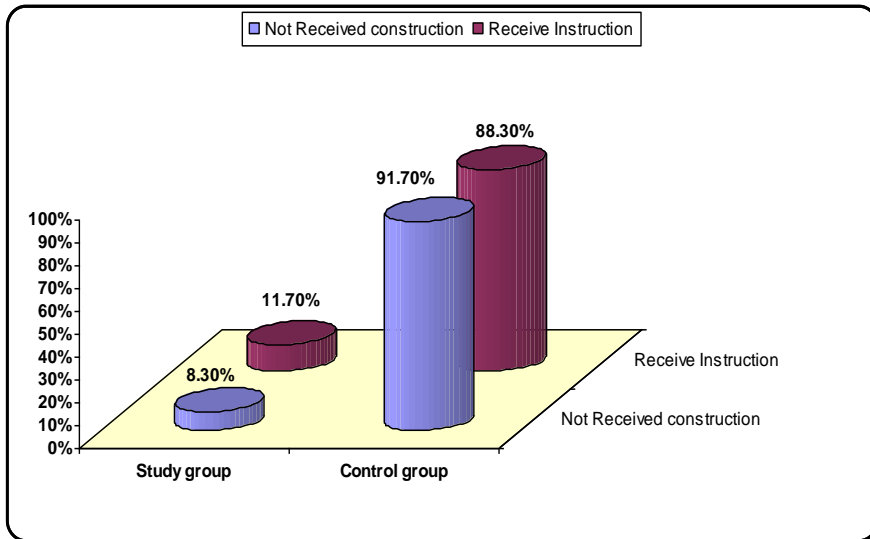


Figure 2: Frequency distribution of the study and control groups received instructions about thyroid disorders throughout their pregnancies (n=120)

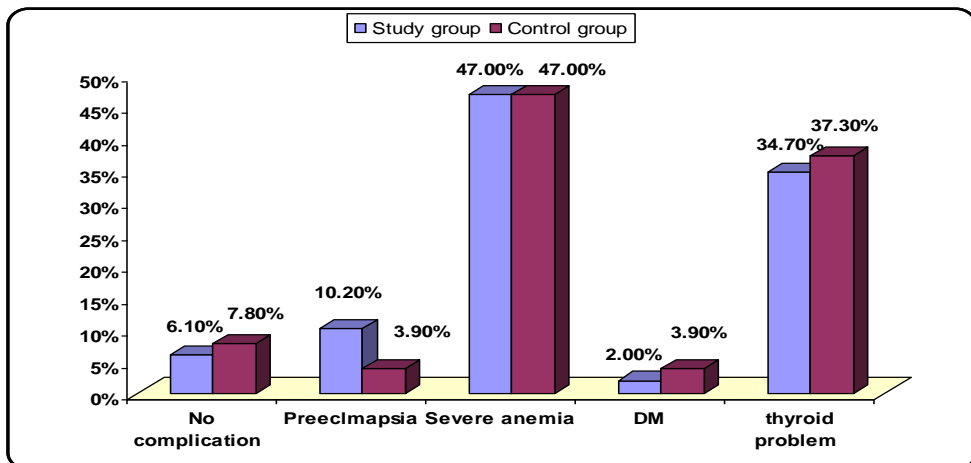


Figure (3): Illustrates the frequency distribution of complications in the previous pregnancy among the study and control groups (n=120)

Table (2): Frequency distribution of types of thyroid disorders among the study and control groups (n=120).

| Groups Items | Study group (n=60) | | Control group (n=60) | | X ² | p-value |
|------------------|-----------------------|------|-------------------------|------|----------------|---------|
| | No. | % | No. | % | | |
| Hypothyroidism | 50 | 83.3 | 53 | 88.4 | 4.088 | < 0.05 |
| Hyperthyroidisms | 6 | 10.0 | 5 | 8.3 | | |
| Goiter | 4 | 6.7 | 2 | 3.3 | | |

Table (3): Frequency distribution of the study and control groups regarding previous and current obstetric history (n=120).

| Present pregnancy | Study group (n=60) | | Control group (n= 60) | | X ² | P-value |
|---|--------------------|---------------------|-----------------------|---------------------|----------------|---------|
| | No. | % | No. | % | | |
| Gestational age (in weeks): Mean± SD | 9.57 ± 1.64 | | 10.18 ± 1.68 | | 1.657 | >0.05 |
| Body weight (kg): 60-70 71-80 >80 | 41 19 0 | 68.3 31.7 0.0 | 50 10 0 | 83.3 16.7 0.0 | 1.872 | >0.05 |
| Mean ±SD | 71.88± 9.07 | | 70.29 ±6.43 | | | |
| Laboratory investigations: Complete blood count (CBC): Done | 60 | 100.0 | 60 | 100.0 | NA | NA |
| Thyroid hormones: T 3, T 4 & FSH. Not done | 50 10 | 83.3 16.7 | 55 5 | 91.6 8.4 | 0.453 | 0.607 |
| Blood group and RH factor: Done | 60 | 100.0 | 60 | 100.0 | NA | NA |
| Urine analysis (sugar & albumin) Done Not done | 50 10 | 83.3 16.7 | 45 15 | 75.0 25.0 | 1.543 | 0.129 |
| Blood sugar: Done Not done | 20 40 | 33.4 66.6 | 29 31 | 48.3 51.7 | 0.834 | 0.268 |
| Noninvasive test (Echo, ECG): Done | 60 | 100.0 | 60 | 100.0 | NA | NA |
| Ultrasonography and fetal heart rate: Done | 60 | 100.0 | 60 | 100.0 | NA | NA |

NA: Not applicable

Table (4): Frequency distribution in the study and control group according to the administered treatments and side effects of antithyroid medication during the current pregnancy (n=120).

| Groups Treatment | Study group (n=60) | | Control group (n= 60) | | X ² | P-value |
|---|--------------------|------|-----------------------|------|----------------|---------|
| | No. | % | No. | % | | |
| Thyroid hormones | 46 | 76.6 | 40 | 66.6 | 1.822 | >0.05 |
| Iron supplements/multivitamins. | 35 | 58.3 | 43 | 71.6 | | |
| Anti-arrhythmic drugs. | 26 | 43.3 | 28 | 46.6 | | |
| Anti-hypertensive drugs. | 25 | 41.6 | 25 | 41.6 | | |
| Anticoagulant drugs. | 8 | 11.3 | 6 | 10.0 | | |
| Side effects of antithyroid medications: | | | | | 8.654 | > 0.05 |
| Allergy and skin rash. | 30 | 50.0 | 29 | 48.3 | | |
| Fatigue and weakness. | 28 | 46.6 | 27 | 45.0 | | |
| Yellowing of the skin. | 12 | 20.0 | 17 | 28.3 | | |
| Persistent sore throat. | 15 | 25.0 | 12 | 20.0 | | |
| Vague abdominal pain. | 17 | 28.3 | 26 | 43.3 | | |
| Fever. | 14 | 23.3 | 19 | 31.6 | | |
| Easy bruising. | 10 | 16.6 | 8 | 11.3 | | |
| Liver failure. | 1 | 1.6 | 2 | 3.3 | | |

The responses exhibited a lack of mutual exclusivity as certain pregnant women were administered many forms of medicine.

According to research hypothesis :Implementing an educational program on thyroid disorders will significantly enhance pregnant women's **knowledge** and self-care practices, ultimately improving their overall health.(tables 5, & 6,).

Table (5): Frequency distribution of the study and control groups regarding ' knowledge about thyroid disease pre-, post, and follow-up the implementation of the educational program (n=120)

| Knowledge items | Pre-test | | | | X ² P-value | Immediately(Post-test) | | | | X ² P-value | After one month (follow-up) | | | | X ² P-value |
|---|------------------|------|--------------------|------|------------------------|------------------------|------|--------------------|------|------------------------|-----------------------------|------|--------------------|------|------------------------|
| | Study group n=60 | | Control group n=60 | | | Study group n=60 | | Control group n=60 | | | Study group n=60 | | Control group n=60 | | |
| | No. | % | No. | % | | No. | % | No. | % | | No. | % | No. | % | |
| Concept of thyroid disease: Complete correct answer | - | - | - | - | 0.3 > 0.05 | 53 | 88.3 | - | - | 98.3 <0.001** | 49 | 81.7 | - | - | 91.60 <0.001** |
| | 15 | 25.0 | 18 | 30.0 | | 7 | 11.7 | 24 | 40.0 | | 11 | 18.3 | 20 | 33.3 | |
| | 45 | 75.0 | 42 | 70.0 | | - | 0.0 | 36 | 60.0 | | - | - | 40 | 66.7 | |
| Types of thyroid disease: Complete correct answer | - | - | - | - | 0.3 >0.05 | 47 | 78.3 | 1 | 1.7 | 99.6 <0.001** | 40 | 66.7 | 2 | 3.3 | 99.00 <0.001** |
| | 7 | 11.7 | 5 | 8.3 | | 13 | 21.7 | 6 | 10.0 | | 20 | 33.3 | 4 | 6.7 | |
| | 53 | 88.3 | 55 | 91.7 | | - | - | 53 | 88.3 | | - | - | 54 | 90.0 | |
| Causes and risk factors: Complete correct answer | - | - | - | - | 0.6 > 0.05 | 52 | 86.7 | - | - | 102.2 <0.001** | 47 | 78.3 | - | - | 93.0 <0.001** |
| | 6 | 10.0 | 9 | 15.0 | | 8 | 13.3 | 10 | 16.7 | | 13 | 21.7 | 14 | 23.3 | |
| | 54 | 90.0 | 51 | 85.0 | | - | - | 50 | 83.3 | | - | - | 46 | 76.7 | |
| Signs and symptoms Complete correct answer | - | - | - | - | 0.1 > 0.05 | 54 | 90.0 | - | - | 100.3 <0.001** | 52 | 86.7 | 3 | 5.0 | 83.50 <0.001** |
| | 22 | 36.7 | 20 | 33.3 | | 6 | 10.0 | 27 | 45.0 | | 8 | 13.3 | 29 | 48.3 | |
| | 38 | 63.3 | 40 | 66.7 | | - | - | 33 | 55.0 | | - | - | 28 | 46.7 | |

Not significant $p > 0.05$

** Highly significant $p < 0.001$

Table (5) Cont.:

| Knowledge items | Pre-test | | | | X ² P-value | Immediately(Post-test) | | | | X ² P-value | After one month (follow up) | | | | X ² P-value |
|--------------------------------------|------------------|------|--------------------|------|------------------------|-------------------------|------|--------------------|------|------------------------|-----------------------------|------|--------------------|------|------------------------|
| | Study group n=60 | | Control group n=60 | | | Study group n=60 | | Control group n=60 | | | Study group n=60 | | Control group n=60 | | |
| | No. | % | No. | % | | No. | % | No. | % | | No. | % | No. | % | |
| Pregnant women complications: | | | | | | | | | | | | | | | |
| Complete correct answer | - | - | - | - | 1.1 | 51 | 85.0 | - | - | 99.1 <0.001** | 40 | 66.7 | - | - | 88.4 <0.001** |
| Incomplete correct answer | - | 16.7 | 6 | 10.0 | >0.05 | 8 | 13.3 | 9 | 15.0 | | 15 | 25.0 | 13 | 21.7 | |
| Don't know | 50 | 83.3 | 54 | 90.0 | | 1 | 1.7 | 51 | 85.0 | | 5 | 8.3 | 47 | 78.3 | |
| Fetal complication: | | | | | | | | | | | | | | | |
| Complete correct answer | 1 | 1.7 | - | - | 1.0 >0.05 | 54 | 90.0 | 2 | 3.3 | 92.3 <0.001** | 48 | 80.0 | - | - | 81.0 <0.001** |
| Incomplete correct answer | 23 | 38.3 | 22 | 36.7 | | 6 | 10.0 | 30 | 50.0 | | 12 | 20.0 | 52 | 86.7 | |
| Don't know | 36 | 60.0 | 38 | 63.3 | | - | - | 28 | 46.7 | | - | - | 8 | 13.3 | |
| Treatment : | | | | | | | | | | | | | | | |
| Complete correct answer | - | - | - | - | 2.4 >0.05 | 49 | 81.7 | 1 | 1.7 | 87.6 <0.001** | 41 | 68.3 | - | - | 76.5 <0.001** |
| Incomplete correct answer | 14 | 23.3 | 19 | 31.7 | | 11 | 18.3 | 20 | 33.3 | | 18 | 30.0 | 22 | 36.7 | |
| Don't know | 46 | 76.7 | 41 | 68.3 | | - | - | 39 | 65.0 | | 1 | 1.7 | 38 | 63.3 | |

Not significant $p > 0.05$ ** Highly significant $p \leq 0$.

Table (6): Distribution of the studied women (study and control groups) according to their total score knowledge about thyroid diseases pre-, post-, and follow-up implementation of the educational program (n=120)

| Total knowledge score | Study group (n=60) | | Control group (n=60) | | X ² | p-value |
|-----------------------|--------------------|------|----------------------|------|----------------|---------|
| | No. | % | No. | % | | |
| Pre-program | | | | | | |
| Good | 2 | 3.4 | 0 | 0.0 | 7.086 | < 0.05 |
| Average | 5 | 8.4 | 5 | 8.4 | | |
| Poor | 53 | 88.2 | 55 | 91.6 | | |
| Post-program | | | | | | |
| Good | 55 | 91.6 | 0 | 0.0 | 8.099 | < 0.05 |
| Average | 3 | 5.0 | 8 | 13.4 | | |
| Poor | 2 | 3.4 | 52 | 86.6 | | |
| Follow -up | | | | | | |
| Good | 45 | 75.0 | 0 | 0.0 | 7.045 | < 0.05 |
| Average | 5 | 8.4 | 4 | 6.6 | | |
| Poor | 10 | 16.6 | 56 | 93.4 | | |

According to research hypothesis number, Implementing an educational program on thyroid disorders will significantly enhance pregnant women's knowledge and self-care practices, ultimately improving their overall health (tables 7 and 8).

Table (7): Distribution of Frequencies among the (study and control groups) self-reported practice pre-, post, and follow-up the implementation of the educational program.(n=120)

| Self-reported practice items | Pre-test | | | | X ² P-value | Immediately(Post-test) | | | | X ² P-value | After one month (follow up) | | | | X ² P-value |
|------------------------------|------------------|------|--------------------|------|------------------------|-------------------------|------|--------------------|------|------------------------|-----------------------------|------|--------------------|------|------------------------|
| | Study group n=60 | | Control group n=60 | | | Study group n=60 | | Control group n=60 | | | Study group n=60 | | Control group n=60 | | |
| | No. | % | No. | % | | No. | % | No. | % | | No. | % | No. | % | |
| Daily living habits : | | | | | | | | | | | | | | | |
| Food | - | - | - | - | 1.1 > 0.05 | 51 | 85.0 | - | - | 99.1 <0.001** | 48 | 80.0 | - | - | 88.4 <0.001** |
| Rest | 28 | 16.8 | 17 | 10.2 | | 55 | 91.6 | 9 | 15.0 | | 50 | 83.3 | 13 | 21.7 | |
| Sleep | 34 | 20.4 | 24 | 14.4 | | 54 | 90.0 | 24 | 14.4 | | 51 | 85.0 | 20 | 33.3 | |
| Exercise | 1 | 1.7 | - | - | 1.0 >0.05 | 54 | 90.0 | 2 | 3.3 | 92.3 <0.001** | 48 | 80.0 | - | - | 81.0 <0.001** |
| Dental and foot care | 31 | 18.6 | 22 | 13.3 | | 50 | 83.3 | 30 | 50.0 | | 45 | 75.0 | 28 | 46.6 | |
| Follow - up | 32 | 19.2 | 30 | 18.0 | | 51 | 85.0 | 28 | 46.7 | | 49 | 81.6 | 15 | 25.5 | |

Table (8): Frequency distribution of pregnant women’s total self-reported practice score levels of the study and control groups concerning thyroid disorders, pre-, post, and follow-up education the program's implementation (n=120).

| Total reported practice score level | Study group n= 60 | | Control group n=60 | |
|-------------------------------------|-------------------|---------|--------------------|---------|
| | R | P | R | P |
| Pre-test | 0.6 | <0.01** | 0.5 | <0.01** |
| Post-test (immediately) | 0.7 | <0.01** | 0.6 | <0.01** |
| Follow-up (after one month) | 0.8 | <0.01** | 0.6 | <0.01** |

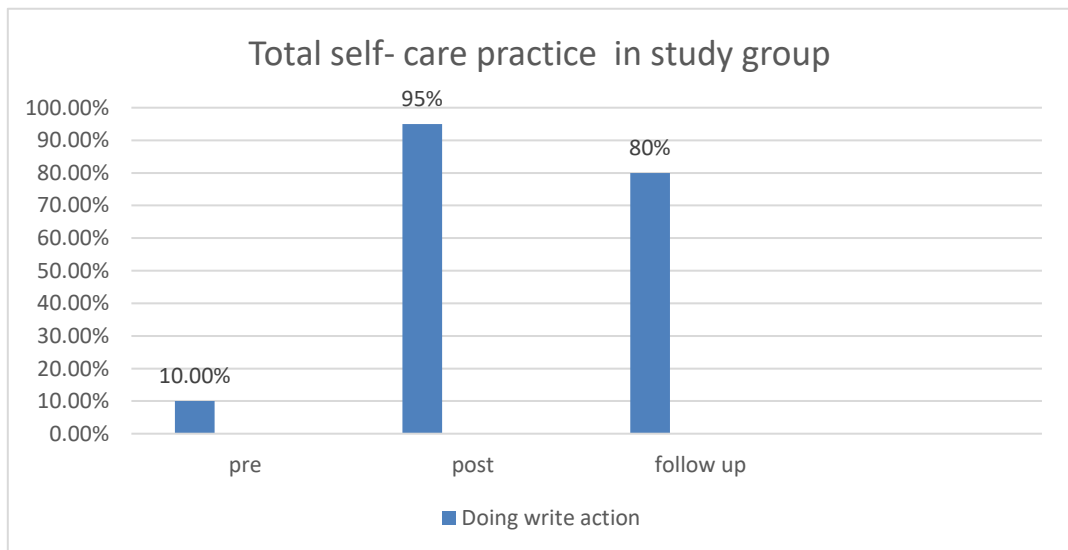


Table (9) shows the relation between total knowledge and socio-demographic characteristic study and control group pre-, post, and follow-up the implementation of the educational program (n=120).

| Demographic characteristic items | Pre-test | | | | X ² P-value | Immediately (Post-test) | | | | X ² P-value | After one month (follow up) | | | | X ² P-value |
|----------------------------------|--------------------|-------|---------------------|------|------------------------|-------------------------|------|--------------------|------|------------------------|-----------------------------|------|--------------------|------|------------------------|
| | Study group | | Control group | | | Study group | | Control group | | | Study group | | Control group | | |
| | Good knowledge n=2 | | Good knowledge n= 0 | | | Good knowledge n=55 | | Good knowledge n=0 | | | Good knowledge n=45 | | Good knowledge n=0 | | |
| | No. | % | No. | % | | No. | % | No. | % | | No. | % | No. | % | |
| Age group (in years) : | | | | | | | | | | | | | | | |
| 18<24 | 1 | 50.0 | 1 | 20.0 | 7.2 | 25 | 45.4 | 1 | 20.0 | 90.4 <0.001** | 18 | 37.5 | 1 | 20.0 | 79.3 <0.001** |
| 24<30 | 1 | 50.0 | 0 | 0.0 | | 15 | 27.3 | 0 | 0.0 | | 20 | 41.6 | 0 | 0.0 | |
| >30 | 0 | 0.0 | 0 | 0.0 | | > 0.05 | 15 | 27.3 | 0 | | 0.0 | 10 | 20.9 | 0 | |
| Educational level | | | | | | | | | | | | | | | |
| Not read and write | 0 | 0.0 | 0 | 0.0 | 12.0 >0.05 | 15 | 26.3 | 0 | 0.0 | 97.4 <0.001** | 9 | 20.0 | 0 | 0.0 | 80.4 <0.001** |
| Basic education | 1 | 50.0 | 0 | 0.0 | | 30 | 52.6 | 0 | 0.0 | | 26 | 57.7 | 0 | 0.0 | |
| Secondary education | 1 | 50.0 | 0 | 0.0 | | 12 | 21.1 | 0 | 0.0 | | 10 | 22.3 | 0 | 0.0 | |
| Occupation | | | | | | | | | | | | | | | |
| Housewife | 1 | 50.6 | 0 | 0.0 | 13.12 | 20 | 36.3 | 0 | 0.0 | 96.4 | 15 | 33.3 | 0 | 0.0 | 81.5 |
| Workers | 1 | 50.0 | 0 | 0.0 | >0.05 | 35 | 63.7 | 0 | 0.0 | <0.001** | 30 | 66.7 | 0 | 0.0 | <0.001** |
| Place of residence | | | | | | | | | | | | | | | |
| Rural | 0 | 0.0 | 0 | 0.0 | 12.36 | 18 | 32.7 | 0 | 0.0 | 97.1 | 11 | 24.4 | 0 | 0.0 | 85.1 |
| Urban | 2 | 100.0 | 0 | 0.0 | <0.005 | 37 | 67.3 | 0 | 0.0 | <0.001** | 34 | 75.6 | 0 | 0.0 | <0.001** |
| Family size | | | | | | | | | | | | | | | |
| <3 | 1 | 50.6 | 0 | 0.0 | 13.12 | 20 | 36.3 | 0 | 0.0 | 96.4 | 15 | 33.3 | 0 | 0.0 | 81.5 |
| >3 | 1 | 50.0 | 0 | 0.0 | >0.05 | 35 | 63.7 | 0 | 0.0 | <0.001** | 30 | 66.7 | 0 | 0.0 | <0.001** |
| Monthly income | | | | | | | | | | | | | | | |
| Enough and saved | 0 | 0.0 | 0 | 0.0 | 12.0 | 15 | 26.3 | 0 | 0.0 | 97.4 | 9 | 20.0 | 0 | 0.0 | 80.4 |
| Enough | 1 | 50.0 | 0 | 0.0 | > 0.05 | 30 | 52.6 | 0 | 0.0 | <0.001** | 26 | 57.7 | 0 | 0.0 | <0.001** |
| Not enough | 1 | 50.0 | 0 | 0.0 | | 12 | 21.1 | 0 | 0.0 | | 10 | 22.3 | 0 | 0.0 | |
| Number of room | | | | | | | | | | | | | | | |
| 1 | 1 | 50.0 | 1 | 20.0 | 7.2 | 25 | 45.4 | 1 | 20.0 | 90.4 | 18 | 37.5 | 1 | 20.0 | 79.3 |
| 2-3 | 1 | 50.0 | 0 | 0.0 | > 0.05 | 15 | 27.3 | 0 | 0.0 | <0.001** | 20 | 41.6 | 0 | 0.0 | <0.001** |
| >3 | 0 | 0.0 | 0 | 0.0 | | 15 | 27.3 | 0 | 0.0 | | 10 | 20.9 | 0 | 0.0 | |

Table (10) the relation between total self-reported practice and socio-demographic characteristic study and control group pre-, post, and follow-up the implementation of the educational program (n=120).

| Demographic characteristics items | Pre-test | | | | X ² P-value | Immediately (Post-test) | | | | X ² P-value | After one month (follow up) | | | | X ² P-value |
|-----------------------------------|------------------------|------|------------------------|------|------------------------|-------------------------|------|------------------------|------|------------------------|-----------------------------|------|------------------------|------|------------------------|
| | Study group | | Control group | | | Study group | | Control group | | | Study group | | Control group | | |
| | Doing write action n=6 | | Doing write action n=5 | | | Doing write action n=57 | | Doing Write action n=5 | | | Doing write action n=48 | | Doing write action n=5 | | |
| | No. | % | No. | % | | No. | % | No. | % | | No. | % | No. | % | |
| Age group (in years) : | | | | | | | | | | | | | | | |
| 18<24 | 1 | 16.6 | 1 | 20.0 | 11.2 | 32 | 56.1 | 1 | 20.0 | 88.1 <0.001** | 18 | 37.5 | 1 | 20.0 | 77.4 <0.001** |
| 24<30 | 3 | 50.0 | 2 | 40.0 | | 15 | 26.3 | 1 | 20.0 | | 20 | 41.6 | 13 | 20.0 | |
| >30 | 2 | 33.4 | 2 | 40.0 | | > 0.05 | 10 | 17.6 | 3 | | 60.0 | 10 | 20.9 | 47 | |
| Educational level | | | | | | | | | | | | | | | |
| Not read and write | 0 | 0.0 | 0 | 0.0 | 10.0 >0.05 | 15 | 26.3 | 0 | 0.0 | 95.6 <0.001** | 9 | 18.7 | 0 | 0.0 | 83.2 <0.001** |
| Basic education | 2 | 33.4 | 2 | 40.0 | | 30 | 52.6 | 2 | 33.4 | | 29 | 60.5 | 2 | 40.0 | |
| Secondary education | 4 | 66.6 | 3 | 60.0 | | 12 | 21.1 | 3 | 66.6 | | 10 | 20.8 | 3 | 60.0 | |
| Occupation | | | | | | | | | | | | | | | |
| Housewife | 1 | 16.6 | 2 | 40.0 | 11.1 | 20 | 35.1 | 1 | 20.0 | 93.2 | 15 | 31.3 | 1 | 20.0 | 80.1 |
| Workers | 5 | 83.4 | 3 | 60.0 | >0.05 | 37 | 64.9 | 4 | 80.0 | <0.001** | 33 | 68.7 | 4 | 80.0 | <0.001** |
| Place of residence | | | | | | | | | | | | | | | |
| Rural | 1 | 16.6 | 1 | 20.0 | 10.3 | 18 | 31.6 | 1 | 20.0 | 95.2 | 14 | 29.2 | 1 | 20.0 | 82.2 |
| Urban | 5 | 83.4 | 4 | 80.0 | <0.005 | 39 | 68.4 | 4 | 80.0 | <0.001** | 34 | 56.6 | 4 | 80.0 | <0.001** |
| Family size | | | | | | | | | | | | | | | |
| <3 | 1 | 16.6 | 2 | 40.0 | 11.1 | 20 | 35.1 | 1 | 20.0 | 93.2 | 15 | 31.3 | 1 | 20.0 | 80.1 |
| >3 | 5 | 83.4 | 3 | 60.0 | >0.05 | 37 | 64.9 | 4 | 80.0 | <0.001** | 33 | 68.7 | 4 | 80.0 | <0.001** |
| Monthly income | | | | | | | | | | | | | | | |
| Enough and saved | 1 | 16.6 | 1 | 20.0 | 11.2 | 32 | 56.1 | 1 | 20.0 | 88.1 | 18 | 37.5 | 1 | 20.0 | 77.4 |
| Enough | 3 | 50.0 | 2 | 40.0 | > 0.05 | 15 | 26.3 | 1 | 20.0 | <0.001** | 20 | 41.6 | 13 | 20.0 | <0.001** |
| Not enough | 2 | 33.4 | 2 | 40.0 | | 10 | 17.6 | 3 | 60.0 | | 10 | 20.9 | 47 | 60.0 | |
| Number of room | | | | | | | | | | | | | | | |
| 1 | 0 | 0.0 | 0 | 0.0 | 10.0 | 15 | 26.3 | 0 | 0.0 | 95.6 | 9 | 18.7 | 0 | 0.0 | 83.2 |
| 2-3 | 2 | 33.4 | 2 | 40.0 | >0.05 | 30 | 52.6 | 2 | 33.4 | <0.001** | 29 | 60.5 | 2 | 40.0 | <0.001** |
| >3 | 4 | 66.6 | 3 | 60.0 | | 12 | 21.1 | 3 | 66.6 | | 10 | 20.8 | 3 | 60.0 | |

Discussion:

The status of pregnancy in women with thyroid disorders remains a complex issue due to its correlation to elevated risks of pregnant women and fetal illness and mortality, particularly in underdeveloped nations. It is imperative for nurses to actively address the disparity between the available evidence and the

challenges faced by pregnant women in recognizing the signs and symptoms of thyroid dysfunction. Education plays a crucial role in surmounting these obstacles. Nurses are vital client advocates in assessment, education, and referral. There is a need to develop and implement formal and informal education programs that are culturally appropriate to convey knowledge about thyroid disorders

effectively. Nurses must leverage their leadership role to disseminate knowledge to the general public and identify women susceptible to thyroid disease. This necessitates fostering collaboration among many healthcare fields. **Leah, (2018).**

Regarding pregnant women's demographic characteristics, the present study shows that the mean age of the study group was 28.68 ± 4.68 compared to 27.77 ± 4.52 years for the control group. This finding agrees with a study by **Taha et al. (2018)** conducted in Egypt about "Structural thyroid diseases in pregnancy in El-Minia," who reported that the mean age of the study groups was 28.6 ± 5.63 years, and the control group was 27.7 ± 5.62 . From the investigator's perspective, the women experienced thyroid issues, married around their middle years, had late pregnancies, and were concerned about potential concerns that could arise as complications of thyroid disorders.

Regarding the pregnant women's level of education, the study group and control group revealed that less than two-thirds had secondary education, and less than two-thirds lived in urban areas. For most of the study group and control group, the monthly income was insufficient for their basic family demands; this finding agrees with a study by **Farag (2017)**, the survey conducted in Egypt about "stress and coping strategies among thyroid-pregnant women." reported that more than half of the studied women had secondary education, and more than half lived in urban areas and the majority of them had insufficient income. From the investigator's perspective, the living standards in Egypt are high, and the family's monthly income is inadequate to meet their daily demands.

The present study results showed that the majority of the study group were housewives, while more than half of the control group had to work. This finding agrees with a study by **Pop et al. (2017)**, which was conducted in Pakistan, titled "Maternal Hypothyroxinemia during Early Pregnancy and Subsequent Child Development: a 3-year Follow-up Study." The report showed that most participants were housewives. From the investigator's point of view, most pregnant women with hypothyroidism cannot work hard during pregnancy.

Regarding family size, the present study findings revealed that the mean family size

was 4.22 ± 0.68 for the study group and 4.35 ± 0.79 for the control group. Also, more than half of the study group and control group the number of rooms 2-3 rooms. This finding agrees with a study by **Badge et al. (2017)** the study conducted in India "about the quality of life of pregnant women with thyroid disease," who found that the mean family size was 4.99 ± 0.88 for the study group and 4.88 ± 0.92 for the control group, and the number of room 2-3 rooms.

Regarding the pregnant women study and control group receiving instruction during pregnancy, the present study findings revealed that the majority of the studied women did not receive any instruction about thyroid disease during pregnancy. This finding agrees with **Diao et al. (2016) and Bonow and Carabello (2017)**, the study conducted in Sub-Saharan Africa about "pregnant women with thyroid disease" who reported that only a few thyroid-pregnant women had received appropriate prior counseling. From the investigator's point of view, it may be due to the absence of physicians who give health education most of the time. Also, a shortage of nursing staff leads to no time to provide instruction, which leads to the risk of maternal and fetal complications during pregnancy and delivery.

Concerning the past-obstetric history, the findings noticed that nearly one-third of the studied and control groups had a normal single baby, almost a quarter and one-fifth of them had low birth weight, and one-quarter of the study group and control group abortion, preterm, and the minority of the stillbirth and congenital anomalies. This finding agrees with **Smyth et al. (2017)**, a study conducted in Iran, about "Maternal iodine status and thyroid volume during pregnancy: correlation with neonatal iodine intake who reported that most thyroid-pregnant women's outcomes were normal live babies. , and almost a quarter and one-fifth of them had low birth weight and one-quarter of the study group and the control group had an abortion, preterm, and the minority of the stillbirth and congenital anomalies

Concerning pregnant women's complications, the present study findings showed that in the study and control group, one-third of the studied women had thyroid problems, nearly half of them had severe anemia, and the minority of them Suffered from diabetes and

preeclampsia. This finding is in contrast with **Demer,& Spencer. (2017)** study conducted in China about “Laboratory Medicine Practice Guidelines: Laboratory Support for Diagnosing and Monitoring Thyroid Disease” showed that thyroid complications were observed among the study sample as follows: anemia (5.8%), diabetes (0.8%), preeclampsia (2.5%), and fever (1.7%). Also, the finding agrees with **Koregol et al. (2017)**, a study conducted in Turkish about the “Association of maternal thyroid during early pregnancy with offspring IQ and brain morphology in childhood: a population-based prospective cohort study” was observed in (10.9%) who had anemia (2.7%) who had a weakness, and 4.5% who diabetes and preeclampsia. From the investigator's point of view, this could be due to hemodynamic compromise, placental insufficiency, and antithyroid drugs leading to complications during pregnancy.

Regarding the medical history of the studied women about the types of thyroid disease in the current study, findings revealed that the majority of the study and control groups had hypothyroidism. On the other hand, one-tenth of them had hyperthyroidism. These findings are in agreement with **Badge et al. (2017)**, a study conducted in Iran about “Clinical Profile and Obstetric Outcome in Pregnancies Complicated by Thyroid Disease: A five Year Indian Rural Experience.” found that 85% of the study group suffering from hypothyroidism. Additionally, this finding was consistent with **Alexander et al. (2017)** a study conducted in China about “Guidelines of the American Thyroid Association for the Diagnosis. Showed that 80% of the study group suffered hypothyroidism. From the investigator's point of view, this may be due to the high prevalence of thyroid disorder in developing countries (Egypt), especially in females, as females remain confined to households and there is a lack of healthcare access due to non-compliance with prescribed treatment. Meanwhile, thyroid disorder is less apparent in developed countries due to their high level of education and socioeconomic conditions other than other diseases are more prevalent.

Regarding pregnant women's gestational age (in weeks) the mean age in the study group was 9.57 ± 1.64 and 10.18 ± 1.68 in the control group. The study by agree by **Elsabagh, and Zaiton, (2017)** the study conducted in Egypt

about the “Impact of Intervention Program on Nurse's Knowledge and Practice regarding Nursing Care of Pregnant Thyroid Patients during Labor, found that the mean gestational age of pregnant women was 10.88 ± 1.76 .

Regarding pregnant women's body weight (kg), more than two-thirds of the study group weighed 60-70 kg, while, the majority of pregnant in the control group were 60-70 kg. Meanwhile, this finding is agreed by **Mirsanjari et al. (2016)**, the study conducted in Singapore about “quality of life about nutritional attitude and practices during pregnancy” which reported that the mean body weight of the pregnant women in the initial antenatal visit was 60.4 ± 12.2 kg.

Regarding laboratory investigations, the present study findings indicated that all studied women in the study group and the control group completed blood count (CBC), blood group, and Rh factor, as well as noninvasive tests (cardiac radiology, ultrasonography, and fetal heart rate) and more than half of them done urine analysis (sager & albumen and blood sager and the majority of them done thyroid hormone T3, T4 & FSH. This finding agrees with **Mohy-Eldine's (2017)** study conducted in Egypt about “The impact of health educational intervention for rural health nurses on their quality of home visits for women about thyroid disorders, who clarified that 95% of pregnant women made laboratory investigations as blood group, hemoglobin, Rh factor, urine, and blood sugar. From the investigator's point of view, this may reflect the availability of antenatal care in the clinic at governmental hospitals and increased awareness of studying women about the importance of follow-up for antenatal care.

Regarding medications used, the present study findings showed that more than two-thirds of the studied women used thyroid hormones, and more than one-third of them used anti-arrhythmic, anti-hypertensive drugs. On the other hand, more than two-thirds of the control group, compared to one-half of the study group, used iron supplements. This result is in agreement with **Makino et al. (2016)** study conducted in Japan about “risk factors associated with preterm delivery in women with thyroid disease by, which constituted 80.2% of pregnant study used to thyroid hormones, 50.2% antihypertensive, 70.2% iron supplementation, and 10.0% for anticoagulant drugs. From the

investigator's point of view, it could be explained that thyroid pregnant women comply with drug regimens during pregnancy to improve maternal and fetal circulation under medical supervision.

Concerning the side effects of antithyroid medications in the study group and control group, our study findings showed that less than one-quarter of the studied women had health problems such as yellowing of the skin and persistent sore throat, and one-third of the studied women reported vague abdominal pain and more than one-quarter of them suffered from fever. On the other hand, less than a tenth of them suffered from liver failure. This finding agrees with **Rosediani et al. (2015)**, a study conducted in Malaysia about "Knowledge, Attitude, and Practice on Endocrine Disease among Women in North-East Coast," who reported that pregnant women take antithyroid medications during pregnancy suffer from many health problems such as yellowish skin (86.6%) and abdominal pain (85.9%), followed by fever (81.0%). In the same stream, **Farag (2017)** the study conducted in Egypt about "Stressors and Coping Strategies among Thyroid Pregnant Women" found that the most common health problems among pregnant women with thyroid disorder were fever 94%, fatigue 98%, skin rash 90.7%, and headache 94%.

According to research hypothesis number, Implementing an educational program on thyroid disorders will significantly enhance **pregnant women's knowledge** and self-care practices, ultimately improving their overall health.

Concerning the knowledge of the studied women about thyroid diseases, the present study findings revealed that the majority of the study and control groups don't know answers regarding the concept, types, causes, risk factors, and signs and symptoms, pre-program improved to the majority of them complete correct answer post educational program in the study group and a slight decline in follow-up after program implementation. And not improve the knowledge of the control group. There was a highly statistically significant difference between the two groups in post-test and follow-up. p value = 0.000**. This finding agrees with **Abd-Elmoatey (2016)**, the study conducted in Egypt about the "Impact of Educational Program for thyroid disorders Pregnant Women on their Pregnancy Outcomes" who found that 90.0% of

the study group and the control group didn't know about thyroid disorders pre-program, the study group will be improved after participating the program p value = 0.000**. Meanwhile, this finding disagrees with **De Groot et al. (2019)** study conducted in Iran about "Management of thyroid dysfunction during pregnancy and

postpartum: an Endocrine Society clinical practice guideline" which found that about half of women had correct knowledge about thyroid disorders. The investigator's point of view the large number of pregnant mothers visiting outpatient clinics for follow-up in the place where the research was conducted, and the lack of sufficient nurses to work in the clinics, means there is no time to give mothers sufficient information about the disease.

Regarding pregnant women's knowledge about complications, the current study revealed that the majority of pregnant women in the study group and control group don't know about pregnant complications, and more than two-thirds of the study group and control group don't know about fetal complications and the majority of them don't know about the treatment of thyroid disorders during pregnancy, pre-program improved to the majority of them complete correct answer post educational program in study post and a slight decline in follow-up after program implementation. And not improve the knowledge of the control group. There was a highly statistically significant difference between the two groups in post-test and follow-up. p value = 0.000**. This finding agrees with **Meneguim, and Xavier, (2018)**: the study conducted in Brazil about "Quality of Life of Pregnant Women with Thyroid Disease." found that 80% of pregnant women don't know about complications of the thyroid gland in pregnancy and fetal complications and Treatment regimen.

Regarding the study of women's **total knowledge** score levels about thyroid disorders, the findings showed that more than two-thirds of the study and control groups had poor total knowledge score levels before program implementation. And improved to good knowledge post-program. And a slight decline in follow-up after program implementation in a study group. And not improve the total knowledge of the control group. This finding is in agreement with **Rosediani et al. (2015)**, who clarified that pregnant women with thyroid disorders have poor knowledge about thyroid

problems pre-program and improved to good knowledge post-program. From the investigator's point of view, these may reflect the improvement of study women's knowledge after the program. The two groups had a statistically significant difference in the post-program and follow-up. This indicates that the pregnant women who were studied needed this knowledge because it may affect their knowledge and health. Also, This finding is in agreement *Greenberger, Simpson, and Mosca (2017)*, with the study about knowledge, preventive action, and barriers to thyroid disorder prevention by race and ethnicity in women with who found that two-thirds of women with thyroid disease indicated that they had poor awareness regarding thyroid disorder.

According to the research hypothesis, Implementing an educational program on thyroid disorders will significantly enhance pregnant women's knowledge and **self-care practices**, ultimately improving their overall health.

Meanwhile, the findings showed that most of the study group had not done self-reported practice about daily living habits (food, rest, sleep, exercise, dental and foot care, and follow-up) pre-program, improved practice in the post-test, and a slight decline in follow-up after program implementation. And not improve the knowledge of the control group. There was a highly statistically significant difference between the two groups in post-test and follow-up. p value = 0.000**. This finding agrees with *Abd-Elmoatey (2014)*, who found that most pregnant women who have not practiced increased pre-participation in the program to 95.0 % immediately and after post-program implementation. From the investigator's point of view, This could be explained by the fact that most of the studied women had secondary education and were more able to read the printed material (booklet) and remember the basic information about thyroid diseases, as well as their affection for the program and their positive participation. There was a statistically significant difference between the two groups in the posttest and follow-up after program implementation.

Regarding total self-reported practice, the current study revealed that, shows that a highly statistically significant positive correlation coefficient between total self-

reported practice scores level pre-program $r=0.6$ in the study group and $r=0.5$ in the control group for the program improved to $r=0.7$ in the study group after implementing the program and $r=0.6$ in the control group post-program. Also, $r=0.8$ was found in follow-up in the study group, and $r=0.6$ was found in the control group after program implementation. The study agreed by

Lazarus, et al. (2014) a study conducted in Tarika about “thyroid association guidelines for the management of subclinical hypothyroidism in pregnancy and in children” and found that most pregnant women who had not practiced daily living habits will improve their practice after participating in the program. From the investigator's point of view, It was noted that after the pregnant women participated in the program, there was a significant improvement in their information as well as a significant improvement in changing their healthy lifestyle, as the pregnant women began to take care of the type of healthy food they need during pregnancy, as well as organizing rest and sleep times, as well as taking care of their dental hygiene and taking care of their feet, as well as the great importance of continuous follow-up during pregnancy, taking into account the interest in practicing sports to improve the health of the pregnant women.

The relation difference between the total knowledge score and demographic characteristics regarding thyroid disorders The study revealed a statistically significant difference between the total knowledge score and demographic characteristics such as; age, educational levels, occupation, place of residence, family size, monthly income, and numbers of room, $P < 0.001$. The study agreed by *Thillainadesan, & Gargya, (2019)* conducted a survey in Pakistan about “ A. Thyroid disorders in pregnancy and postpartum. Endocrinology Today” “found a statistically significant difference between total knowledge scores and demographic characteristics for all items such as the age of pregnant, educational level, occupation, place of residence, family size, monthly income, and number of rooms. $P < 0.001$. From the investigator's point of view, age, education level, work and place of residence have a clear impact on mothers' knowledge of thyroid problems during pregnancy.

The relation difference between the total self-care practice score and

demographic characteristics regarding thyroid disorders. The study revealed a statistically significant difference between the total practice score and demographic characteristics such as; age, educational levels, occupation, place of residence, family size, monthly income, and numbers of room, $P = < 0.001$. The study agreed by **Ranimah et al, (2015)** the study conducted in Kelantan about the "Association between Knowledge, Attitude, and Practice on Thyroid Disease among Women in Kelantan" "found a statistically significant difference between total practice scores and demographic characteristics all items such as the age of pregnant, educational levels, occupation, place of residence, family size, monthly income, and numbers of room. $P = < 0.001$. From the investigator's point of view, when the level of education of pregnant women increases, knowledge and practices towards thyroid disorders.

To summarize, according to the research hypothesis, the results showed a highly statistically significant relation between the total knowledge score levels and total self-care practice of the study pregnant women before and after program implementation.

The study results supported the educational program to improve health for pregnant women with thyroid disorders through educational program implementation.

Conclusion:

Based on the findings of the present study, it can be concluded that:

The educational program that was demonstrated a statistically significant enhancement in the knowledge and self-reported practices of pregnant women with thyroid disorders, both in comparison to the control group in the study group in post and follow-up educational program, seen between the total knowledge scores and total self-reported practice scores pre-, post, and following the implementation of the educational program, with a significance level of $P < 0.001$., compared to the control group with no improvement in knowledge and self-reported practice.

Recommendations:

In light of the present study findings, the main recommendations can be stated as follows:

- Regular follow-up is necessary for pregnant women with thyroid disorders who have a positive history of thyroid illnesses.

Additionally, routine screening for thyroid function tests should be conducted in the antenatal clinic to enhance health and improve outcomes

- The designed educational program will be regularly implemented in the antenatal clinic at MCH centers, outpatient clinics, and hospitals for pregnant women with thyroid disorders. Its purpose is to provide them with the necessary knowledge and practice related to thyroid disorders. Is obligatory.
- The illustrated booklet designed for pregnant women with thyroid problems should be distributed and implemented in the prenatal clinic within hospital settings and family health centers.
- Further research is needed to examine the enduring impact of this educational intervention on the well-being of women.

Reference:

- Abalovich, M; Amino, N; Barbour, LA; Cobin, RH; De Groot, LJ; and Glinoe D ., (20018).** "Management of thyroid dysfunction during pregnancy and postpartum: an Endocrine Society Clinical Practice Guideline." *The Journal of Clinical Endocrinology and Metabolism* **92** (8 Supl): S1–47.
- Abl- Elmoaty, S.M, (2016):** Impact of Educational Program for thyroid disorders Pregnant Women on their Pregnancy Outcomes in Dakahlia Governorate. Unpublished Thesis, Ph.D. in Community Health Nursing Department, Faculty of Nursing, Zagazig University. Pp 70-74.
- Alexander EK, Marqusee E, Lawrence J, et al. (2018)** Thyroid disorders and magnitude of increases in levothyroxine requirements during pregnancy in women with hypothyroidism. *NEJM* 2018; 351:241-9.
- Alexander EK, Pearce EN, Brent GA, et al. (2017)** Guidelines of the American Thyroid Association for the Diagnosis
- American Thyroid Association (ATA): (2015):** Functional capacity assessment in clinical and research applications. 102,(13), Pp: 1591-1597.
- And Management of Thyroid Disease During Pregnancy and the Postpartum. *Thyroid* 2017;27:315–89.

- Badge, D., Shivkumar, P., and Tayade, S., (2017):** Clinical Profile and Obstetric Outcome in Pregnancies Complicated by thyroid Disease: A five Year Indian Rural Experience. Research Article International Journal of Reproduction, Contraception, Obstetrics and Gynecology Int J Report Contracept Obstet Gynecol. Mar; 2 (1) Pp: 52-57.
- Bonow, R., and Carabello B., (2017):** Guidelines for the Management of Patients with Thyroid Disease. JAM cll Cardiol, 52.P.P:142-6.
Bulletin 2019;57:22-26.
- Center for Maternal and Child Enquiries. (2017):** Saving Mothers' Lives. Reviewing Maternal Deaths to Make Motherhood Safer (CMACE).
- De Groot L, Abalovich M, Alexander EK, et al. (2019)** Management of thyroid dysfunction during pregnancy and postpartum: an Endocrine Society clinical practice guideline. J Clin Endocrinol Metab 2019;97:2543–65.
- Demer LM, Spencer CA.(2017)** Laboratory medicine practice guidelines: laboratory support for diagnosing and monitoring thyroid disease. Clin Endocrinol 2017; 58:138-40.
- Diao, M., Kane, A., Mbaye, A., Kane, A., and Abdou, S., (2016):** Pregnancy in Women with thyroid Disease in Sub-Saharan Africa, CLINICAL RESEARCH, Archives of thyroid Disease, © 2011 Elsevier Masson SAS.104, Pp:370-374.
- Elsabagh, E.M., and Zaiton, HI., (2017):** Impact of Intervention Program on Nurse's Knowledge and Practice regarding Nursing Care of Pregnant thyroid Patients during Labor, Faculty of Nursing, Zagazig University, Egypt, Med. J. Cairo Univ., Vol. 81, No. 2, (12) ,Pp: 141-153.
- Farag, A. F., (2017):** Stressors and Coping Strategies among thyroid Pregnant Women. Unpublished Master Thesis in Maternity and Newborn Nursing, Faculty of Nursing, Ain shams University, Egypt, Pp: 64 – 65.
- Greenberger, TM. Simpson, L., and Mosca, L., (2017):** Knowledge, Preventive Action and Barriers to Thyroid Disease Prevention by Race and Ethnicity in Women: Journal of Women's Health. ;19, Pp: 1243-1249.
- Koregol, M., Mahale, N., Nayak, R. and Bhandary, A., (2017):** Maternal and Perinatal Outcomes of Pregnancies Complicated by Thyroid Disease. J Turkish-German Gynecol Assoc; 10. Pp: 23-29.
- Korevaar, Tim I. M; and Vincent, W.V., (2017).** "Association of maternal thyroid function during early pregnancy with offspring IQ and brain morphology in childhood: a population-based prospective cohort study." *The Lancet Diabetes & Endocrinology*.doi:10.1016/s2213-8587(15)00327-7. 30-4.
- Lazarus J, Brown RS, Daumerie C, et al.(2014)** European thyroid association guidelines for the management of subclinical hypothyroidism in pregnancy and children. Eur Thyroid J 2014;3:76–943.
- Leah, H. D., (2018):** Nurses' Role in Educating Women about Thyroid Disease: A Literature Review, Kentucky Christian University, And 100 Academic Parkway.
- Makino, Y., Matsuda, Y., Mitani, M., and Matsui, H., (2016):** Risk Factors Associated with Preterm Delivery in Women with Thyroid Disease. Published by Elsevier Ltd. Journal of endocrine .59. 27 March, P.p: 291-298.
- Mandel, S.J., (2017).** "Hypothyroidism and chronic autoimmune thyroiditis in the pregnant state: maternal aspects." Best Pract Res Clin Endocrinol Metab. 2004; 18: 213-24.
- Marx, H; Amin, P; and Lazarus, J.H. (2016).** "Hyperthyroidism and pregnancy. ".*BMJ (Clinical research ed.)* 336 (7645): 663–7.
- Meneguín, S. and Xavier, C. (2018):** Quality of Life of Pregnant Women with Thyroid Disease. Text Context Nursing, Florianopolis, Jul-Set; 22(3) Pp: 811-8
- Mestman, J.; (2018):** "Hyperthyroidism in pregnancy." Best Pract Res Clin Endocrinol Metab. 2004; 18 267-88.
- Mirsanjari, M., Ahmad, A., Shukri, M. and Othman, M., (2016):** Quality of Life in Relationship with Nutritional Attitude and Practices during Pregnancy. International Conference on Management and Education Innovation, IPEDR vol.37, IACSIT Press, Singapore, Pp160-163.

- Mohy-Eldine, H.F., (2017):** The impact of health educational intervention for rural health nurses on their quality of home visits for women during maternity cycle, (Thesis) Ph.D. in Community Health nursing department, faculty of nursing, Benha University. P.54.
- Negro, R; Formoso, G; Mangieri, T; Pezzarossa, A; Dazzi, D; and Hassan, H (2016).** "Levothyroxine treatment in euthyroid pregnant women with autoimmune thyroid disease: effects on obstetrical complications.". *The Journal of Clinical Endocrinology and Metabolism* **91** (7): 2587–91.
- Okosieme, O.E; Marx, H; and Lazarus, J.; (2016):** "Medical management of thyroid dysfunction in pregnancy and the postpartum.". *Expert opinion on pharmacotherapy* **9**(13): 2281–93.
- Pop, V.J; Brouwers, E.P; Vader, H.L; Vulsma, T; van Baar, A.L; and Vijlder, J.J (2017).** "Maternal hypothyroxinaemia during early pregnancy and subsequent child development: a 3-year follow-up study.". *Clinical endocrinology* **59** (3): 282–8.
- Ranimah Y., Rosediani M., and Harmy MY., (2015):** Association between Knowledge, Attitude, and Practice on thyroid Disease among Women in Kelantan, Malaysia, *International Journal of Collaborative Research on Internal Medicine and Public Health*; No. 8(1) Pp: 1507-23.
- Rosediani, M., Ranimah, Y., and Harmy, M.Y., (2015):** Knowledge, Attitude, and Practice on endocrine Disease among Women in North-East Coast Malaysia, *International Journal of Collaborative Research on Internal Medicine & Public Health*; No. 4(1) Pp:85-98.
- Smyth, PP; Hetherington, AM; Smith, DF; Radcliff, M; and O'Herlihy, C (Sep 2017).** "Maternal iodine status and thyroid volume during pregnancy: correlation with neonatal iodine intake.". *The Journal of Clinical Endocrinology and Metabolism* **82** (9): 2840–3.
- Stagnaro-Green, A.; Chen, X; Bogden, .; Davies, T.F; and Scholl, T.O., (2017).** "The thyroid and pregnancy: a novel risk factor for very preterm delivery.". *Thyroid: Official Journal of the American Thyroid Association* **15** (4): 351–7.
- Taha, N., Mahmoud, K., Eisa M., and Darder, A., (2018):** Structural Thyroid Disease in Pregnancy in El-Minia Localities. *The Egyptian Journal* Volume 65, Issue 2, June, Pp. 99–109.
- Thillainadesan, S. Gargya,(2019)** A. Thyroid disorders in pregnancy and postpartum. *Endocrinology Today*. 2019; 8(1): 8-12 pregnancy and postpartum. *Thyroid*. 2019.
- Tim, I. M; and Vincent, W.V (2017).** "Association of maternal thyroid function during early pregnancy with offspring IQ and brain morphology in childhood: a population-based prospective cohort study." *The Lancet Diabetes & Endocrinology*.doi:[10.1016/s2213-8587\(15\)00327-7](https://doi.org/10.1016/s2213-8587(15)00327-7).
- Vissenberg, R.; Van Den Boogaard, E.; Van Wely, M.; Van Der Post, J. A.; Fliers, E.; Bisschop, P.H.; and Goddijn, M. (2018).** "Treatment of thyroid disorders before conception and early pregnancy: A systematic review." *Human Reproduction Update* **18**(4): 360–7 Wiles K. *Management for women with subclinical hypothyroidism in pregnancy. Drug and Therapeutics*