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# Relation between ABO Blood Groups and Thyroid Diseases of patients at Albedya city Libya

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**KEYWORDS**

ABO Blood Groups

**ABSTRACT:**

Introduction: In recent decades Several studies have been directed to investigate the association between blood groups and thyroid disorders.As any disorders in the thyroid gland may affect several body functions, such as differentiation, growth and reproduction through cooperative effect with other hormones. However, thus far, the findings of these studies have been contradictory. This investigation aims to examine the prevalence of different blood groups among patients with thyroid disorders.

Objectives: The current study aimed to investigate the relationship between thyroid gland diseases and gender, age and blood groups in patients in Albedya city, Libya.

Material and Methods: This study was conducted on 204 patients who had thyroid disorders including hypothyroidism and hyperthyroidism. We recorded demographic information, which included age, sex, test of thyroid hormone , and the patient's blood type.

Results:Out of a total of 204 subjects (90.2%) were female and (9.8) were male ,28 of subjects (13.8%) were normal, 107 of subjects (57.8%) were hyperthyroidism, and 69 subjects (33.8%) were hypothyroidism. Among the patients, 41.7% of the total subjects had blood group O+, 2% had blood group A+, 13.2% had blood group B+, and 64% had blood group AB- There was significant association between thyroid disorders and blood group (P=0.021).

Conclusion: subjects with O+ blood type exhibited a higher frequency of thyroid dysfunction compared to those with other blood types.

## Introduction

The human body is a complex structure and contains important organs and glands to perform vital functions. The Thyroid gland is one of the most significant glands in the human body , as it is a feature of a source of energy.It secrets hormones tetraiodothyronine (Thyroxin) or T4 and triiodothyronine or T3,which are responsible for metabolism , so any disorders in the thyroid gland may affect several body functions such as differentiation ,growth and reproduction through cooperative effect with other hormones(1).

Pituitary glands secrete TSH hormone, which affects the secretion of thyroid hormone through negative feedback. There is an opposite relationship between the secretion of pituitary and thyroid glands. As the level of thyroid hormones increases, the secretion of TSH decreases through negative feedback and this process is under the control of TRH, so the levels of T3 and T4 remain within the normal range(2).

Any defect in the thyroid gland can be related to the secretion of thyroid hormones that contribute to many causes :genetic causes including congenital hypothyroidism, congenital hyperthyroidism, inflammatory causes including thyroiditis, autoimmune causes including Hashimoto's thyroiditis, disorder Neoplastic: benign and malignant tumors, nutritional deficiency: endemic goiter, thyroid dysfunction is divided into two main categories: hyperthyroid and hypothyroid (3)

The two main diseases associated with a disorder in the production of thyroid hormones are: 1)Hypothyroidism is a condition known as

the insufficient production of thyroid hormone by the thyroid gland.The main causes are **Autoimmune Diseases:** Hashimoto's thyroiditis which is considered as a common cause, where the immune system attacks the thyroid gland.**Thyroid Surgery:** in this case patient subject to removing part or all of the thyroid gland so

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reduce hormone production.**Radiation Therapy:** Radiation is one of chemotherapeutic agent used to treat head and neck cancers can affect the thyroid. **Thyroiditis:** Inflammation of the thyroid gland can lead to both hyperthyroidism (initially) and then hypothyroidism. **Iodine Deficiency:** While less common in iodine-sufficient areas, iodine deficiency can contribute to hypothyroidism(4).

2).Hyperthyroidism (also called thyrotoxicosis) is this case there is expression of overactivity of tissue within the thyroid gland, leading to overproduction of thyroid hormones and the result is an excess of the circulating free thyroid hormones: thyroxine (T4), triiodothyronine (T3), or both **Causes:Graves' Disease:** An autoimmune disorder where antibodies stimulate the thyroid to produce excess hormones. **Thyroiditis:** Inflammation of the thyroid can initially cause hyperthyroidism due to the release of stored hormones.**Thyroid Nodules:** Benign or malignant nodules can sometimes produce excess thyroid hormone(5).

Many articles have discussed the relationship between the ABO blood group and various diseases, and a group of diseases associated with ABO blood group phenotypes have been identified. For example, a study showed the relationship between non-O blood groups and increased risk of myocardial infarction ( 6).

In another study by Bahar et al., which was directed at female patients with diabetes, the higher chance of developing CHD with blood group AB was indicated as a risk factor for developing CHD in women with T2DM(7).

Regarding the role of the immune system in diabetes, there are several studies that have shown the association of blood groups and diabetes. Several studies have associated O-Rh-negative and A-Rh-positive blood groups with diabetes (8), and others have connected diabetes with A blood groups; AB and Rh-positive are related (9).

In the past, around 1901, a German immunologist, Karl Landsteiner (10), Who was the first to state the presence of blood group antigens on red blood cells and antibodies against the same antigens in human serum? He determined that the serum of some people can agglutinate the red blood cells of other people, but it is not effective on the red blood cells of all people, and as a result, he divided people into A, B, AB, and O groups in terms of blood groups. In addition to blood group antigen, human red blood cells may also have D antigen, in which case they are called Rh positive. If the red blood cells do not have this antigen, they are Rh-negative.

On the other hand ,many studies have shown that the ABO blood group system is connected with a variety of cancers, primarily gastric, breast, and pancreatic, for example ,the relationship between blood group A and stomach cancer, group A and B blood group with periodontal diseases(11).

The study found that the O+ blood group had the highest distribution among the thyroid disease groups (solitary thyroid nodule, multinodular goiter, and cancer). This study suggests a viable association between blood type and thyroid disease, particularly when considering the Rh factor.(12).

No study has been conducted in east Libya regarding the relationship between blood groups and thyroid diseases. This study aimed to evaluate the frequency and correlation of ABO and blood groups in patients with thyroid disorders referred to the clinics in Albedya city ,and further classified the populations according to gender and age.

**METHOD**

Questionnaire Survey. The study was performed by collecting data from patients with a diagnosis of thyroid disease. Whether it is hyperthyroidism who continued levothyroxine treatment or hypothyroidism throughout this period were included in the study, in the period from March to August 2024, with a total of 204 subjects.

The main data which were collected are age, blood group and test of thyroid hormones. This study was approved by the Research and Ethical Committee of Omer-Almukhtar University

All information was obtained and analyzed by using statistics , and it was performed with respect to the main study aim.

**Results and Discussion:**

Table 1: illustrates the demographic of the total study (sample =204)

The present research consisted of 204 participants, of whom 184 were females and 20 were male .The average

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age was 35 years,the smallest age was 11 years and the oldest age was 78 years old.

The frequencies of blood groups

O+,A+,B+,AB- ,AB+,O-,were 41.7% ,24.5%, 13.2% , 6.4 % ,5.4 %,4.4%respectively.

Table 1 shows the demography of the total subject

| parameters | Total of subjects |
|---|---|
| **Number of subjects** | **204** |
| **gender**<br>**Female**<br>**Male** | <br>**90.2%**<br>**9.8 %** |
| **Age**<br>**Average Age**<br>**Max**<br>**Min** | <br>**35years**<br>**78 years**<br>**11years** |
| **blood group**<br>**O-**<br>**O+**<br>**A-**<br>**A+**<br>**B-**<br>**B+**<br>**AB-**<br>**AB+** | <br>**4.4%**<br>**41.9%**<br>**2%**<br>**24.6%**<br>**2%**<br>**13.3%**<br>**6.4%**<br>**5.4%** |

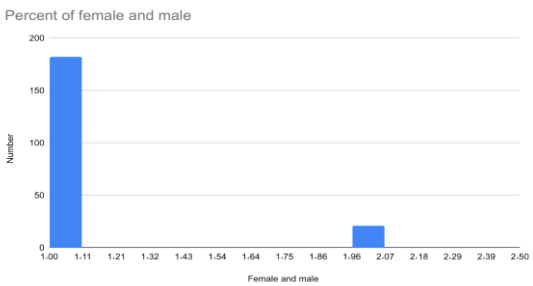


**Figure 1:Number of female and male**

This study was conducted in 204 subjects with thyroid disease including hypothyroidism and hyperthyroidism .

In this present study, females were subjected more than males,this effect may be related to different anatomical structures, Estrogen levels ,immune systems and genetic backgrounds of men and women.

In women, autoimmune thyroiditis may be induced by the accumulation of fetal cells in the maternal thyroid gland during pregnancy (painless postpartum thyroiditis)

Table 2:illustrates the relationship between gender and tests of thyroid hormone for patients.

| Gender | hyperthyroidism | hypothyroidism | normal |
|---|---|---|---|
| **female** | **99**<br>**48.5%** | **60**<br>**29.4%** | **25**<br>**12.3%** |
| **male** | **8**<br>**3.9%** | **9**<br>**4.4%** | **3**<br>**1.5%** |

Table3 :shows The frequencies of blood groups in relation to thyroid hormones test

O+,A+,B+,AB- ,AB+,O-,were 41.7% ,24.5%, 13.2% , 6.4 % ,5.4 %,4.4%respectively.The findings showed that the highest frequency of blood groups was related to blood group O+.

| Blood group | hyperthyroidism | hypothyroidism | normal | Total |
|---|---|---|---|---|
| **O+** | **55**<br>**27.0%** | **20**<br>**9.8%** | **10**<br>**9.4%** | **85**<br>**41.7%** |
| **A+** | **20**<br>**9.8%** | **22**<br>**10.8%** | **8**<br>**3.9%** | **50**<br>**24.5%** |
| **B+** | **16**<br>**7.8%** | **8**<br>**3.9%** | **3**<br>**1.5%** | **27**<br>**13.2%** |

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| | | | | |
|---|---|---|---|---|
| **AB-** | **3**<br>**1.5%** | **10**<br>**4.9%** | **0**<br>**0%** | **13**<br>**6.4%** |
| **AB+** | **5**<br>**2.5%** | **2**<br>**1%** | **4**<br>**2%** | **11**<br>**5.4%** |
| **O-** | **5**<br>**2.5%** | **3**<br>**1.5%** | **1**<br>**0.5%** | **9**<br>**4.4%** |
| **A-** | **2**<br>**1%** | **2**<br>**1%** | **1**<br>**0.5%** | **5**<br>**2.5%** |
| **B-** | **1**<br>**0.5%** | **2**<br>**1%** | **1**<br>**0.5%** | **4**<br>**2%** |

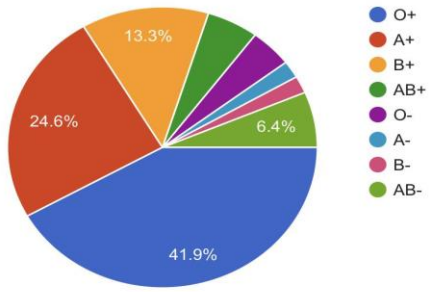


**Figure 2:Distribution of thyroid disease according to blood group.**

This finding was similar to Prakash et al.'s study and Murat et al reported a higher frequency of blood group O in patients with Hashimoto's thyroiditis(11).

Various studies have reported conflicting results regarding the association between ABO blood group and thyroid disorders.

A study conducted in India on 220 individuals with thyroid gland disorders showed that ABO blood group antigens are associated with thyroid hormone disorders. People with blood type O were more prone to thyroid disorders, followed by "A" and "B". Hypothyroidism was found to be the most common manifestation among blood group O and hyperthyroidism among blood groups A and B, while AB did not show such an association

Up to now, the exact mechanism of the relationship between ABO blood group and thyroid disorders, whether it is

Hyperthyroidism and hypothyroidism are not fully understood. However, there are some possible explanations.

Some thyroid disorders, such as hyperthyroidism (Graves' disease) and hypothyroidism (Hashimoto's thyroiditis), are caused by autoimmune responses, where the immune system incorrectly attacks the thyroid gland. ABO blood group antigens have been shown to play a vital role in immune responses, so they may be involved in autoimmune thyroid disorders .

Genetic factors may play a role in an increased possibility of thyroid disorders. Several studies have reported that

People with blood type "O" are more susceptible to thyroid disorders, while blood types "A" and "B" are more associated with hyperthyroidism.

Bio transformation is one of the main processes in the body which is regulated by thyroid hormones, which are controlled by thyroid-stimulating hormone (TSH), which is secreted from the pituitary gland. TSH binding and activity may be affected by ABO blood group antigens, leading to an imbalance in thyroid hormone levels and causing thyroid disorders.

In addition to the above cases, ABO blood group antigens are also included in inflammation and tissue damage processes. Differences in ABO blood group antigens may impact the inflammatory response in the thyroid gland and contribute to the development of thyroid disorders**.**

Also, all thyroid diseases have an autoimmune basis in Hashimoto's thyroiditis. The antithyroid immune response begins with activation of thyroid antigen–specific helper T cells. According to one theory, this activation results from infection with a virus that has a protein similar to a thyroid protein, although clear evidence for a viral cause is lacking. According to another theory, thyroid epithelial cells present their own intracellular proteins to T cells.

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Once helper T cells are activated, they induce B cells to secrete thyroid antibodies. The prevalence of high serum concentrations of thyroid antibodies varies according to race and ethnic background. In the third U.S. National Health and Nutrition Examination Survey of persons 12 years of age or older, high serum concentrations of thyroid antibodies were present in 14.3 percent of whites, in 10.9 percent of Mexican Americans, and in only 5.3 percent of blacks. The majority of patients with measurable thyroid antibody concentrations have normal thyroid function. In studies in England, 10%of postmenopausal women with high serum thyroid antibody concentrations had subclinical hypothyroidism and 0.5 % had overt hypothyroidism. The thyroid antibodies most frequently measured are those directed against thyroid peroxidase and against thyroglobulin. The former are closely associated with overt thyroid dysfunction, and their presence tends to correlate with thyroidal damage and lymphocytic inflammation.

Among patients with Hashimoto's thyroiditis, hypothyroidism is more likely to develop in smokers than in nonsmokers, a finding that may be related to the presence of thiocyanates in cigarette smoke.

**References:**

1.Norris,D,2007.Vertebrateendocrinology.Elsevieracademicpress4 ed.London).

2.Vowden P, Lowe AD, Lennox ES, Bleehen NM. Thyroid blood group isoantigen expression: a parallel with ABH isoantigen expression in the distal colon. British Journal of Cancer. 1986;53(6):721-5.

3.Matteucci E, Giampietro O. Epidemiology of cardiovascular disease in patients with type 1 diabetes: European perspective. Experimental and Clinical Endocrinology & Diabetes. .208-14:)04(226;2014).

4.Chaker L, Bianco AC, Jonklaas J, Peeters RP. Hypothyroidism. Lancet. 2017 Sep 23;390(10101):1550-1562. doi: 10.1016/S0140-6736(17)30703-1. Epub 2017 Mar 20. PMID: 28336049; PMCID: PMC6619426.

5.Mathew P, Kaur J, Rawla P. Hyperthyroidism. 2023 Mar 19. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2025 Jan–. PMID: 30725738.

6.Stumvoll M, Goldstein BJ, Van Haeften TW. Type 2 diabetes: principles of pathogenesis and therapy.The Lancet. 2005

.1333-46:)9467(365;

7.Bahar A, Asadian L, Abediankenai S, Namazi SS, Kashi Z. Coronary heart disease and ABO blood group in diabetic women: a case-control study. Scientific reports. .1-6:)1(9;2019.

8.Demir T, Tezel A, Orbak R, Eltas A, Kara C, Kavrut F. The effect of ABO blood types on periodontal status. European journal of dentistry. 2007;1(3):139.

9.Zhang H, Mooney CJ, Reilly MP. ABO blood groups and cardiovascular diseases. International journal of vascular medicine. .2012;2012.

10.Jukic I, Bingulac-Popovic J, Dogic V, Hecimovic A, Babic I, Batarilo I, et al. Evaluation of ABO blood groups as a risk factor for myocardial infarction.Blood transfusion. 2013;11(3):464.

11.Prakash B.G BARPM. ABO Blood Group and its Unusual Relationship with Thyroid Disorders. Indian Journal of Public Health Research & Amp; Development. 2020;11(5): .329-33

12.Azab Elsayed Azab, Rabia A M Yahya , Mohanad Al-Qazun and Mohammed Wedran .The Distribution of Thyroid Nodules and Thyroid Cancer Based on Certain Demographic Characteristics and Blood Groups of Patients at Sabratha National Cancer Institute in Western Libya.International Journal of Clinical Research and Reports,2025;DOI: 10.31579/2835-785X/084

13.https://www.ncbi.nlm.nih.gov/books/NBK2267/)

14.https://www.ncbi.nlm.nih.gov/books/NBK459466.