

EVALUATION OF EXTERNAL RESPIRATORY FUNCTIONS ACCORDING TO THYROID FUNCTION IN PATIENTS WITH BRONCHIAL ASTHMA AND AUTOIMMUNE THYROIDITIS

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Abstract. *The authors argue that the increase in the size of the thyroid gland and the presence of thyroid hormone indicators in the state of subclinical or manifest hypothyroidism prevent a sharp decrease in external respiratory functions.*

At the same time, the quality of life of patients with bronchial asthma decreases, the risk of complications and death increases.

Keywords: *bronchial asthma, autoimmune thyroiditis, hypothyroidism, respiratory function, euthyroidism.*

The urgency of the problem. Bronchial asthma belongs to the group of multifactorial diseases, and its development is affected not only by various external environmental factors, but also by the endocrine status. Due to its geographic location, the Republic of Uzbekistan is located in the region of severe iodine deficiency, and the incidence rate of various diseases of the thyroid gland, including autoimmune thyroiditis, is high. Both autoimmune thyroiditis and bronchial asthma have similar features in their pathogenesis, including an increase in autoimmune inflammatory factors, interleukin 1 and 6, and high levels of cytokines, which increases the frequency of their co-occurrence [1,7,8,13].

Autoimmune thyroiditis is the most common thyroid disease and is characterized by an initial thyrotoxic phase, followed by a short euthyroid phase and a lifelong hypothyroid phase. This disease is considered dangerous due to its complications to the cardiovascular system, nerves and other systems. A late diagnosis of autoimmune thyroiditis, the development of other comorbid pathologies in these patients, encourages the development of Mummoni or aggravation. Such diseases include bronchial asthma.

Sidorov L. D., Popova N. V. According to the works of et al., bronchial asthma lasts more than 1.5 years in some patients with endogenous and exogenous AD, and with the development of genetic predisposition to allergies and autoimmune changes, the thyroid gland is involved in the pathological process. As the severity and duration of BA, the degree of hypoxia, the level of treatment with inhaled drugs and glucocorticosteroids increases, the degree of changes in the thyroid system also increases; In patients with BA, changes in the thyroid gland are often accompanied by a decrease in the number and functional activity of T-lymphocytes, lymphoid infiltration of the thyroid gland, the appearance of antithyroid antibodies, and an increase in the titer of thyroperoxidase antibodies. The authors mentioned that these changes increase the manifestations of autoimmune thyroiditis [3,6,9].

Bondar I. A. and Kudelya L. M. studied the effect of hypothyroidism on the course of bronchial asthma. The purpose of the study was to compare the characteristics of the clinical course of BA and FVD in patients with BA. Patients with BA and AIT were compared with patients with bronchial asthma without thyroid pathology. Accordingly, the clinical presentation of bronchial asthma was more pronounced in hypothyroidism, and the number of both daytime and evening attacks was observed. Most of these patients were diagnosed with atrophic endobronchitis, which

is associated with the development of slow sputum or dry sputum in patients with hypothyroidism. Another noteworthy point is that these patients did not have a need for hormones in the treatment of bronchial asthma [2,4,11].

Based on the above information, it can be said that autoimmune thyroiditis and bronchial asthma often occur together. The hypothyroid stage of autoimmune thyroiditis has a significant impact on the course and number of attacks of bronchial asthma, and it is associated with the development of atrophic endobronchitis in most cases [5,10,12].

The purpose of the study. Assessment of external respiratory functions according to thyroid enlargement and thyroid function in patients with bronchial asthma and autoimmune thyroiditis. Research materials and methods. There were 250 patients with bronchial asthma and autoimmune thyroiditis involved in the study. According to the status of thyroid hormones, they are divided into the following groups:

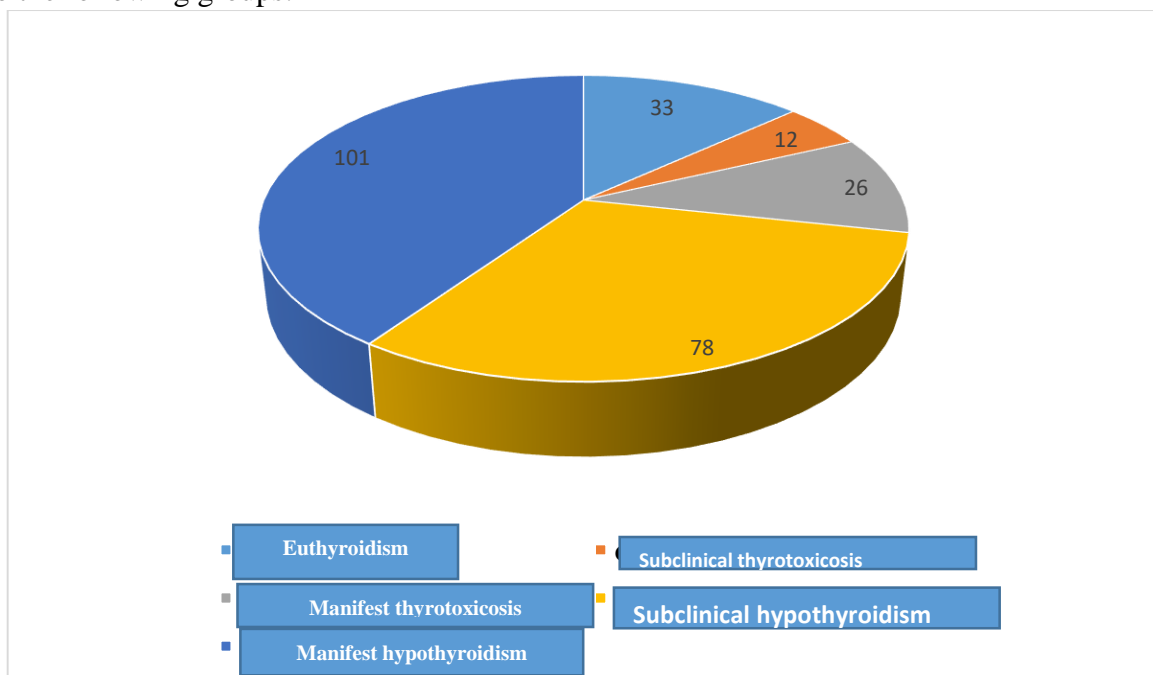


Figure 1. Distribution of patients in the study according to thyroid hormone levels.

Accordingly, there were 33 patients in the euthyroid stage, 12 patients in the subclinical thyrotoxicosis stage, 26 patients in the manifest thyrotoxicosis stage, 78 patients in the subclinical hypothyroidism stage, and 101 patients in the manifest hypothyroidism stage. According to thyroid enlargement, patients were divided into 3 groups.

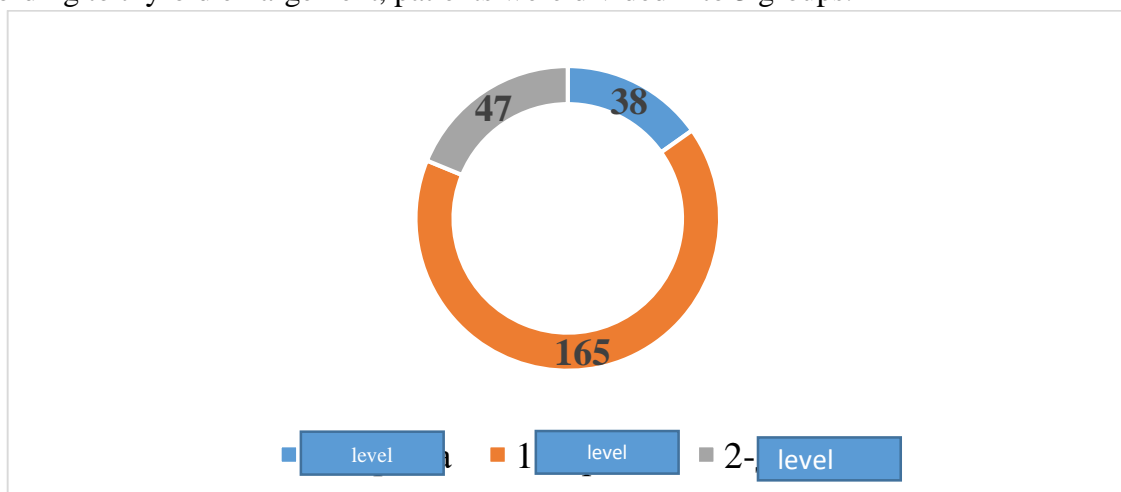


Figure 2. Distribution of patients according to the degree of thyroid enlargement.

According to the WHO classification, there were 38 patients with 0 degree enlargement, 165 patients with 2 degree enlargement, and 47 patients with 2 degree enlargement. Research results. Patients with autoimmune thyroiditis were assessed for bronchial asthma and external respiratory function according to thyroid enlargement (Table 1).

Table 1

Assessment of external respiratory functions according to thyroid gland enlargement in patients with bronchial asthma of the 1st degree

Indicators	0-level n=8	1-level n=23	2-level n=7
Age	47,2±1,03	49,5±1,03	54,8±1,05
Gender, A/Э	5/3	16/7	5/2
OFV1 (l)	1,79±0,2	1,76±0,2	1,76±0,2
HTS (l)	2,93±0,3	2,99±0,3	2,90±0,3
Tiffno index	0,7±0,02	0,7±0,02	0,68±0,02

According to the table above, there was no reliable difference between the groups when examining external respiratory function indicators according to the degree of thyroid enlargement. Thus, thyroid gland enlargement did not show a sharp change in the indicators of OFV1, OTS and Tiffno index among patients of the first degree of bronchial asthma. Now, patients with bronchial asthma of the 1st degree were studied according to the status of thyroid hormones (Table 2).

Table 2

Indicators of external respiratory function according to thyroid function in patients with 1st degree of BA

Indicators	OFV1 (l)	HTS (l)	Tiffno
Euthyroidism	2,24±0,2	3,2±0,3	0,7±0,02
Subclinical thyrotoxicosis	2,1±0,2	3,0±0,3	0,7±0,02
Manifest thyrotoxicosis	1,94±0,2	2,9±0,3	0,67±0,02
Subclinical hypothyroidism	1,42±0,2	2,84±0,3	0,5±0,02
Manifest hypothyroidism	1,35±0,2*	2,71±0,3	0,5±0,02*

Note: *- difference is reliable compared to euthyroid group (*-P<0.05)

According to the table above, external respiratory function was compared between the groups, and the group of patients with manifest hypothyroidism was reliably different from the euthyroid group according to OFV1 and Tiffno index. However, OTS did not show a reliable difference between the groups. This indicates that the formation of hypothyroidism leads to a number of disorders of external respiratory functions. There were 67 patients of the 2nd degree of bronchial asthma, whose external respiratory functions were studied according to the enlargement of the thyroid gland (Table 3).

Table 3

Assessment of external respiratory functions according to thyroid gland enlargement in patients with bronchial asthma of the 2nd degree

Indicators	0-level n=11	1-level n=47	2-level n=9
Age	49,5±1,03	53,8±1,03	51,9±1,03
Gender, A/Э	7/4	28/19	6/3
OFV1	1,82±0,2	1,67±0,2	1,54±0,2
HTS	2,76±0,3	2,75±0,3	2,68±0,3
Tiffno index	0,7±0,02	0,64±0,02	0,6±0,02

When patients with bronchial asthma of the 2nd degree were studied, the female gender predominated among these patients. Although the increase in the size of the thyroid gland led to a decrease in external respiratory function indicators, the difference between them did not meet the level of reliability.

Table 4

Indicators of external respiratory function according to thyroid function in patients with BA level 2

Indicators	OFV1	HTS	Tiffno index
Euthyroidism	1,98±0,2	2,84±0,3	0,7±0,02
Subclinical thyrotoxicosis	1,96±0,2	2,8±0,3	0,7±0,02
Manifest thyrotoxicosis	1,96±0,2	2,8±0,3	0,7±0,02
Subclinical hypothyroidism	1,48±0,11*	2,66±0,3	0,56±0,02*
Manifest hypothyroidism	1,38±0,11**	2,57±0,3**	0,54±0,02*

Note: *- difference is reliable compared to euthyroid group (*-P<0.05)

** - the difference compared to the euthyroid group is reliable (*-P<0.005)

According to this table, external breath indicators were compared according to thyroid function in patients with bronchial asthma of the 2nd degree, according to which a reliable difference was found between Tiffno index and OFV1 indicators not only in patients with manifest hypothyroidism, but also in patients with subclinical hypothyroidism.

Table 5

Assessment of external respiratory functions according to thyroid gland enlargement in patients with bronchial asthma grade 3

Indicators	0-level n=13	1-level n=51	2-level n=16
Age	51,1±1,03	49,8±1,03	55,2±1,03
Gender, A/Э	7/8	33/18	6/10
OFV1	0,86±0,01	0,80±0,01	0,71±0,01
HTS	1,70±0,2	1,67±0,2	1,53±0,2*
Tiffno index	0,51±0,02	0,49±0,02	0,49±0,02

Note: *- difference is reliable compared to euthyroid group (*-P<0.05)

In patients with bronchial asthma of the 3rd degree, there was no difference according to the age of the patients, but the incidence was higher in women. Of the external respiratory parameters, OTS showed a reliable inferior result among patients with grade 2 enlargement. This means that not only the state of thyroid hormones, but also the enlargement of the thyroid gland affects respiratory parameters.

Table 6

Indicators of external respiratory function according to thyroid function in patients with BA level 3

Indicators	OFV1 (l)	HTS (l)	Tiffno index
Euthyroidism	1,0±0,01	1,88±0,2	0,55±0,02
Subclinical thyrotoxicosis	0,85±0,01	1,68±0,2	0,51±0,02

Manifest thyrotoxicosis	0,86±0,01	1,70±0,2	0,51±0,02
Subclinical hypothyroidism	0,61±0,01*	1,4±0,2	0,44±0,02*
Manifest hypothyroidism	0,65±0,01*	1,42±0,2**	0,46±0,02*

Note: *- difference is reliable compared to euthyroid group (*-P<0.05)

** - the difference compared to the euthyroid group is reliable (*-P<0.005)

In this table, when patients are compared according to the level of thyroid hormones, there is a significant difference between OFV1 and Tiffno index in patients in the subclinical hypothyroidism group, and OTS in patients in the manifest hypothyroidism group (P<0.005), and between OFV1 and Tiffno index (P<0.05). showed the difference.

When patients with bronchial asthma of the 4th degree were studied, the general and thyroid status of the patients is reflected in the following tables.

Table 7

Assessment of external respiratory functions according to thyroid gland enlargement in patients with bronchial asthma grade 3

Indicators	0-level n=6	1-level n=43	2-level n=15
Age	51,1±1,03	49,8±1,03	55,2±1,03
Gender, A/Э	4/2	23/20	8/7
OFV1	0,86±0,01	0,80±0,01	0,71±0,01
HTS	1,70±0,2	1,67±0,2	1,53±0,2*
Tiffno index	0,51±0,02	0,49±0,02	0,49±0,02

Note: *- difference is reliable compared to euthyroid group (*-P<0.05)

No significant difference was observed between the age and gender of the patients. However, in patients with 2nd degree of thyroid gland, it is possible to see a reliable reduction of the OTS indicator.

Table 8

Indicators of external respiratory function according to thyroid function in patients with BA level 4

Indicators	OFV1	HTS	Tiffno index
Euthyroidism	0,66±0,02	1,44±0,2	0,46±0,02
Subclinical thyrotoxicosis	0,68±0,02	1,42±0,2	0,48±0,02
Manifest thyrotoxicosis	0,61±0,02	1,4±0,2	0,44±0,02
Subclinical hypothyroidism	0,37±0,02**	1,21±0,2**	0,31±0,02*
Manifest hypothyroidism	0,33±0,02**	1,1±0,2**	0,3±0,02*

Note: *- difference is reliable compared to euthyroid group (*-P<0.05)

** - the difference compared to the euthyroid group is reliable (*-P<0.005)

According to the above table, exacerbation of bronchial asthma was clearly reflected in patients with manifest and subclinical hypothyroidism. The reliability value of comparing these groups to the euthyroid group was P<0.005.

Combining the results obtained during the study, a comparative analysis of external respiratory functions according to thyroid hormones was carried out.

Forced Expiratory Breath (OFV1) in 1 second was compared, the results are shown below (Figure 3).

Comparison of OFV1 values according to thyroid hormone status and bronchial asthma levels

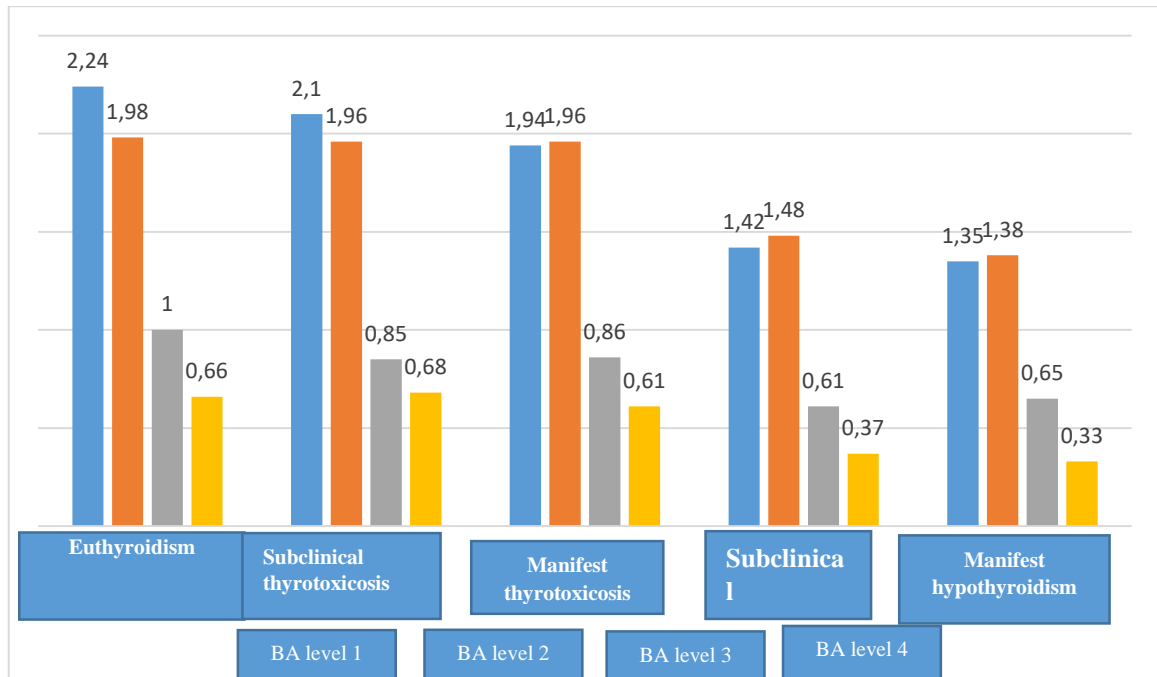


Figure 3. Comparison of OFV1 values according to thyroid hormone status and bronchial asthma levels

According to Figure 3, external respiratory functions decreased according to the severity of bronchial asthma. However, in patients with subclinical and manifest hypothyroidism, this indicator showed a reliable lower result compared to euthyroidism and thyrotoxicosis groups.

According to the results of the vital capacity of the lungs (Figure 4), the severity of bronchial asthma was accompanied by a sharp decrease in the vital capacity.

However, this rate reflected a reliably higher rate in euthyroid patients than in hypothyroid patients.

This means that the formation of hypothyroidism, the lack of thyroid hormones in the body damages all joints of the metabolism, and is manifested by the development of dystrophic changes in the mucous membrane of the internal organs.

Below is a description of the variation of the Tiffno index according to the levels of bronchial asthma.

The Tiffno index also reflected changes in other external respiratory functions, and in turn, no significant difference was observed in patients with thyrotoxicosis compared to patients with euthyroidism.

These changes are explained by the fact that thyroid hormones increase the sensitivity to catecholamines, which leads to dilatation of the bronchi.

Research results. Summarizing the above data, it can be concluded that the increase in the size of the thyroid gland and the indicators of thyroid hormones in the state of subclinical or manifest hypothyroidism significantly reduce the external respiratory functions. This reduces the quality of life of patients with bronchial asthma and increases the risk of complications and death. The development of atrophic endobronchitis and swelling observed in the mucous membranes in

hypothyroidism has a negative effect on the course of bronchial asthma. That is why timely diagnosis and treatment of this category of patients is considered important.

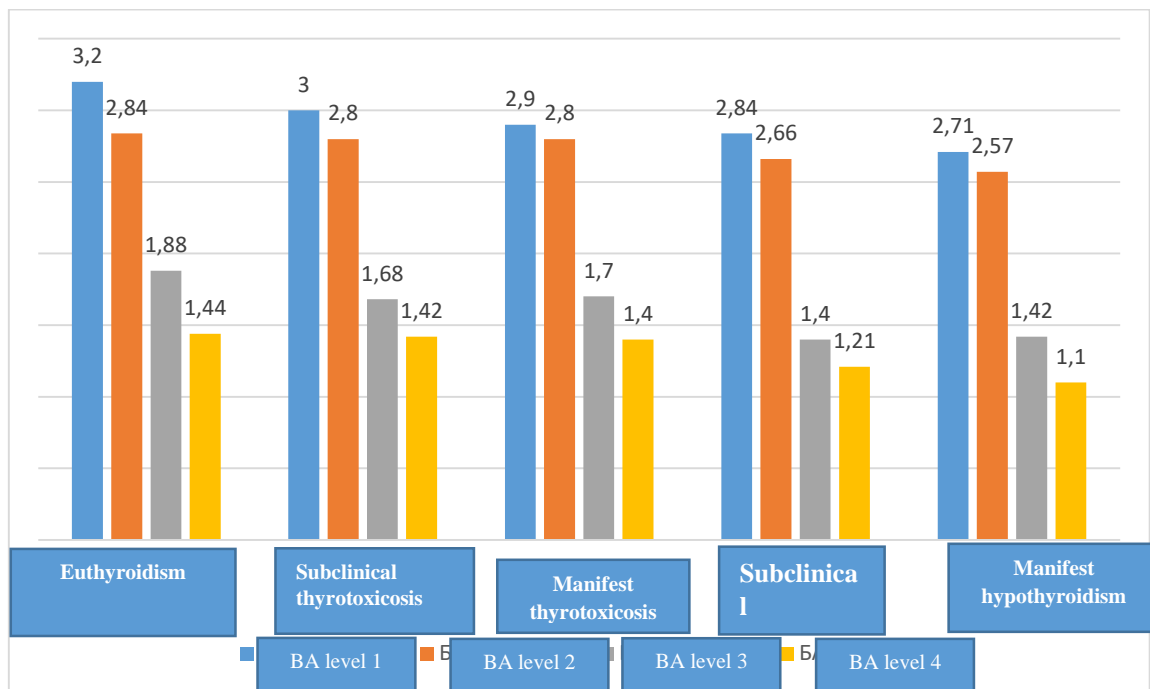


Figure 4. Comparison of HTS indicators according to the status of thyroid hormones and according to the levels of bronchial asthma

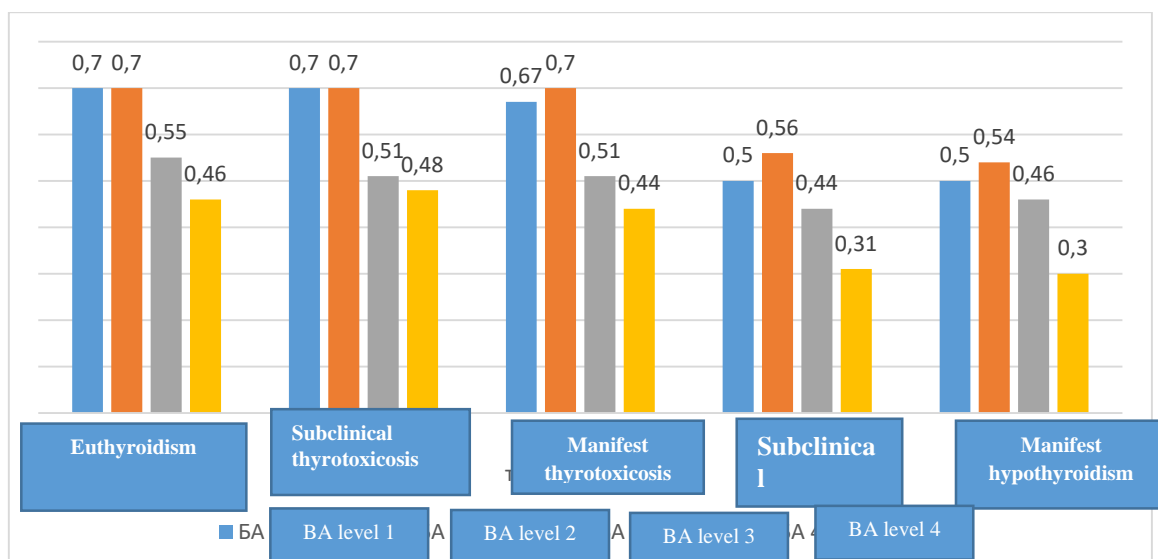


Figure 5. Comparison of Tiffno index indicators according to the status of thyroid hormones and according to the levels of bronchial asthma.

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