

# DESCRIPTIVE STUDY ON THE SITUATION OF THYROID DISEASES WHICH REQUIRED HOSPITALIZATION IN ROMANIA IN THE LAST DECADE

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## INTRODUCTION

Thyroid diseases occupy an important place in health problems, affecting millions of people, this type of pathology is one of the most common forms of endocrine dysfunction. It is estimated that in the world approximately 200 million people have this type of condition, predominantly women, in a ratio of 8:1 compared to men. [1] Thyroid hyperfunction, in its most common form Graves' disease, is estimated to affect approximately 2-3% of the general population, a meta-analysis of European studies establishes the average value of the prevalence rate at 0.75% of the general population and an incidence rate of 51/100,000 inhabitants/year. [2] Thyroid hypofunction, through the most common form Hashimoto's autoimmune thyroiditis, has a global prevalence of 1%, but subclinical hypothyroidism occurs in approximately 4% of the population.[1] Hypothyroidism is a widespread condition worldwide, the main causes being iodine deficiency and Hashimoto's autoimmune thyroiditis. The prevalence of hypothyroidism globally varies, some areas such as India, South East Asia, the Arabian countries, Great Britain have high values, over 2% in the general population, while other areas in the USA, Australia, southern Europe have values below 0.5%. However, data is not available in many countries/areas. In Europe, the prevalence ranged from 0.37% to 3.8%, including both diagnosed cases and subclinical forms, and the estimated incidence of hypothyroidism was 226 cases/100,000 inhabitants/year. [3]. In children, approximately 1 in 2000-4000 children have congenital hypothyroidism. [3], [7]. Worldwide, approx. 2 billion people are at risk of iodine deficiency, which can lead to thyroid damage, iodine intake (2021) being insufficient in most of the Asian area, especially the Southeast area and regions of Africa, surplus being registered in some areas of Central and South America and Africa. [3] Thyroid nodules are more commonly diagnosed in iodine-deficient areas, while Graves' disease and Hashimoto's thyroiditis are more commonly found in iodine-deficient areas. [4] Autoimmune thyroiditis is the most common autoimmune disease in women of childbearing age, global prevalence values vary from area to area, depending on the socioeconomic level between 4.8–25.8% in women and 0.9 -7.9% in men. A systematic literature review and meta-analysis performed in 2022 [5] indicates a global prevalence of Hashimoto's thyroiditis of 7.5% (95%CI 5.7–9.6%), while in less developed countries the prevalence was 11.4 (95% CI 2.5–25.2%), in developed countries the value was 8.4 (95%CI 5.6–11.8). In Africa (14.2 [95% CI 2.5–32.9%]),

*Thyroid impairment is one of the most common endocrine dysfunctions, around 200 million people in the world are diagnosed with one of the forms of thyroid dysfunction, and women are most often affected. In addition to cases with a definite diagnosis, there are also subclinical, undiagnosed forms that are estimated to affect approximately four times the population, for example in the case of hypothyroidism. Romania is no exception, cases of thyroid dysfunction are frequent in the general population, also the female effect being more important. Knowledge of the dynamics of the evolution of the specialized casuistry allows the establishment of the prophylactic and therapeutic measures necessary for the best possible management of the disease.*

**Keywords:** thyroid dysfunction, hospitalization episodes, Romania

Oceania (11.0% [95% CI 7.8–14.7%]), South America and Europe 8.0, 7.8% (95% CI 0.0–29.5%) in North America, and 5.8 (95% CI 2.8–9.9%) in Asia. [5] And thyroid cancer is the 2nd most common malignancy in women of childbearing age, with the incidence increasing on average over the last 30 years by about 4% each year. [6] According to Globocan 2022, thyroid cancer ranks 7th, with a value of 821,214 new cases, in both sexes, all ages, most cases registering in Asia (72.6%), Europe ranking 2nd with 9.6% of the total, and the prevalence of cases is 10.5%. Mortality for both sexes from thyroid cancer is highest in Asia (61.3% of total deaths), in Europe it is 12.4%. [8] In Romania, the prevalence of hypothyroidism is estimated at 4.5%, in the population over 14 years old, 700,000 people being diagnosed with this type of disease, more women, a ratio of 8:1 compared to men. Autoimmune thyroiditis has a prevalence of 3 %, in the adult population, women being more frequently affected. Hyperthyroidism has a lower prevalence, about 1-2% in women and 0.1-0.2% in men. The frequency of thyroid nodules in the general population is about 4%, and of these 5% are malignant tumors. [9]

Given the increased frequency of this type of endocrine dysfunction in Romania as well, it is necessary to know the dynamics of the population's degree of affect, and the study/analysis of the frequency of hospitalization episodes, therefore of the cases requiring tertiary medical care, best reflects the extent of the phenomenon. The present study analyzes the evolution of episodes of thyroid disease requiring hospital admission over the last ten years, the results of which are presented below.

## OBJECTIV

Identification at national, regional and local level of the geographical distribution of hospitalization episodes in patients with thyroid disease, as well as the temporal evolution of their number, in the period 2014-2023.

## METHODOLOGY

A descriptive, retrospective study was carried out, which used data from the National DRG

Database, data reported in the continuous hospitalization regime by Romanian hospitals in a contractual relationship with the National Health Insurance House. In accordance with the provisions of the Order. no. 1782/576/2006 regarding the registration and statistical reporting of patients receiving medical services under continuous hospitalization and day hospitalization, with subsequent additions and changes, National Institute of Health Services Management (NIHSM) collects and processes the minimum set of data at patient level for cases treated under continuous and day hospitalization.

The study used data that were reported in the period 2014-2023, aiming at the analysis of data on hospitalization episodes in patients with thyroid disease in Romania, in the aforementioned hospitals (admissions under continuous hospitalization regime). The data were selected using the ICD-10-AM classification, were extracted and analyzed the records from the observation sheets, which most frequently had one of the following codes as the main diagnosis: E01-Thyroid disorders and related conditions related to iodine deficiency, Excludes: congenital iodine deficiency syndrome (E00.-), hypothyroidism due to subclinical iodine deficiency (E02); E02-Hypothyroidism due to subclinical iodine deficiency, E03- Other hypothyroidisms, Excludes: hypothyroidism related to an iodine deficiency (E00-E02) and postprocedural hypothyroidism (E89.0); E04- Other non-toxic goiters, Excludes: diffuse congenital goiter (E03.0), NOS (E03.0), parenchymal goiter (E03.0) and iodine deficiency goiter (E00-E02); E05- Thyrotoxicosis [hyperthyroidism] Excludes: chronic thyroiditis with transient thyrotoxicosis (E06.2) and neonatal thyrotoxicosis (P72.1); E06- Thyroiditis, Excludes: postpartum thyroiditis (O90.5); E07- Other thyroid disorders. In accordance with the provisions of Law 190/2018 and Art. 13 of EU Regulation no. 679/2016, personal data are deleted at the time of transmission to NIHSM, and the identification of persons for the purpose of analysis is based on the encrypted personal identification code.

The age of the patients was calculated in completed years, as the difference between the date of admission and the date of birth. The data was processed using the software program SQL Server Management Studio Express 2005, the subsequent processing and analysis was carried out using the SPSS and Excel programs. The analysis was performed according to a series of demographic and socioeconomic variables, such as age, length of hospitalization, status at discharge, etc., information included in the minimum data set reported in the DRG system by hospitals. The data interpretation and presentation was made in the form of tables and graphs.

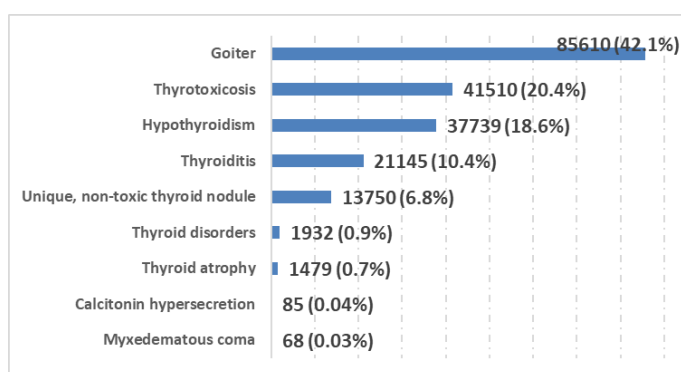
## RESULTS

The data extracted from the national DRG database were processed, analyzed and interpreted in relation to a series of demographic variables and socioeconomic characteristics (sex, age, place of residence, duration of hospitalization, in-hospital mortality rate, status at discharge) following the geographical distribution and evolution timeline of hospitalization episodes in patients with thyroid conditions, from hospitals in our country, in the period 2014-2023.

### 1. Total number of hospitalization episodes for patients with thyroid conditions, registered in Romania, in the period 2014-2023

The total number of continuous hospitalization episodes in patients with thyroid conditions registered in Romania, in the period 2014-2023, was 203318 episodes, of which most were diagnosed as goiter (42.1%), a fifth as thyrotoxicosis (20.4%), almost a fifth hypothyroidism (18.6%), 10% thyroiditis and almost 7% single thyroid nodule – graph no 1.

**Graph no. 1. Total number of hospitalization episodes and type of main diagnosis at discharge, in patients with thyroid disease, recorded in the period 2014-2023, at national level**



Within each category, the following predominate as the main diagnosis at discharge: nontoxic multinodular goiter (61%) - graph no. 2, other specified hypothyroidism (64%) - graph no. 3, Thyrotoxicosis with diffuse goiter (55%) - graph no. 4, Thyroiditis autoimmune (78.4%)-graph no. 5.

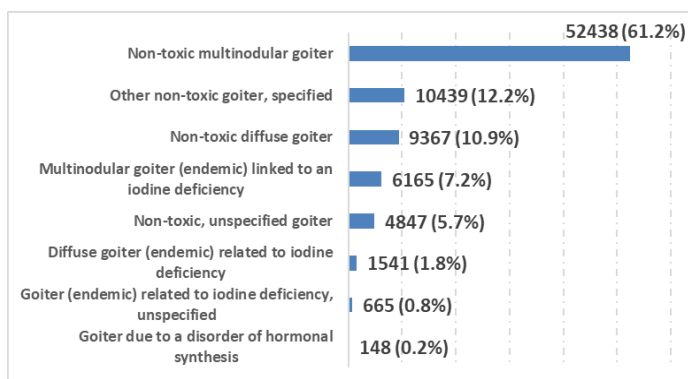
### 2. Temporal evolution in terms of hospitalization episodes of patients with thyroid disease, in Romania, in the period 2014-2023

The temporal evolution of the hospitalization episodes in patients with thyroid disease during this period can be seen in graph no. 6. The situation of hospitalizations is relatively constant in the period before the coronavirus pandemic, with certain not very large variations from one year to the next, the maximum number being recorded in 2014, while the minimum was observed in 2017. In the 2020s, 2021 and 2022 hospitalizations decreased approximately 3 times compared to the initial observation period, with 2023 registering values close to the pre-pandemic years, as hospital activity returned to normal.

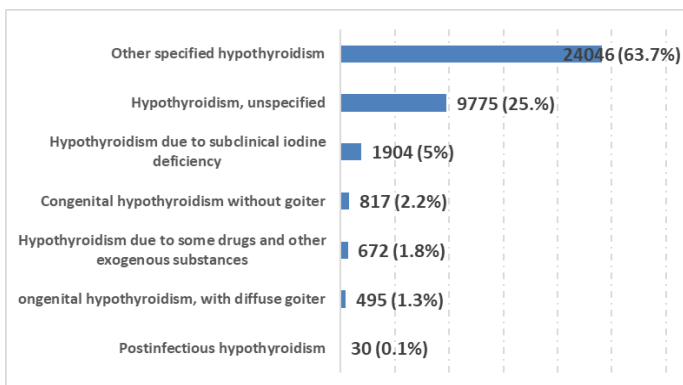
### 3. Distribution of hospitalization episodes of patients with thyroid disease, depending on the discharge department

The most episodes of hospitalization in patients with thyroid disease were recorded in the wards of endocrinology (65% of the total), general surgery (18%) and internal medicine (8%). Lower percentages were recorded in the departments of oncological surgery and diabetes, nutrition and metabolic diseases.

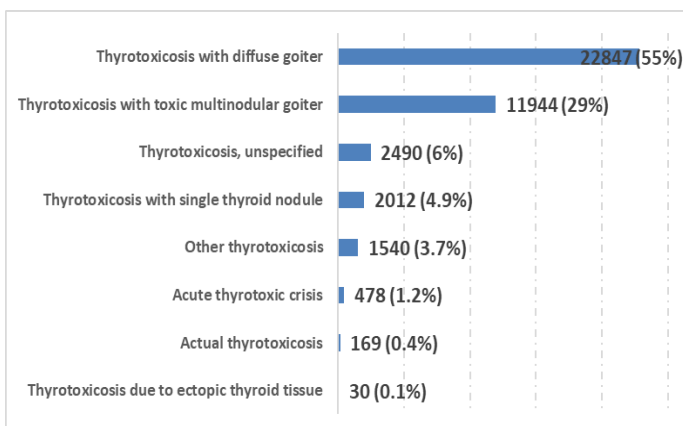
**Graph no. 2. The total number of hospitalization episodes for patients diagnosed with goiter, recorded in the period 2014-2023, at national level**



**Graph no. 3. The total number of hospitalization episodes for patients diagnosed with hypothyroidism, recorded in the period 2014-2023, at national level**



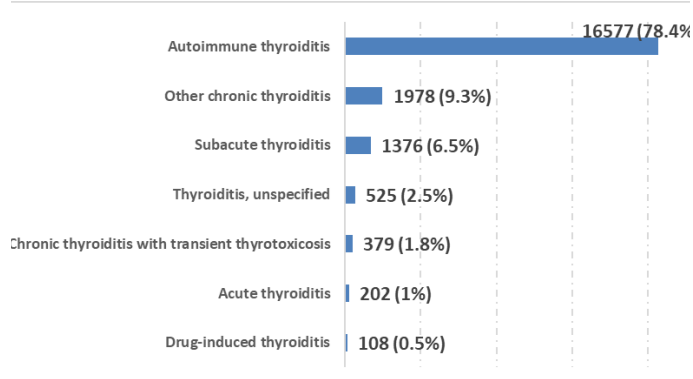
**Graph no. 4. The total number of hospitalization episodes for patients with a discharge diagnosis of thyrotoxicosis, recorded in the period 2014-2023, at national level**



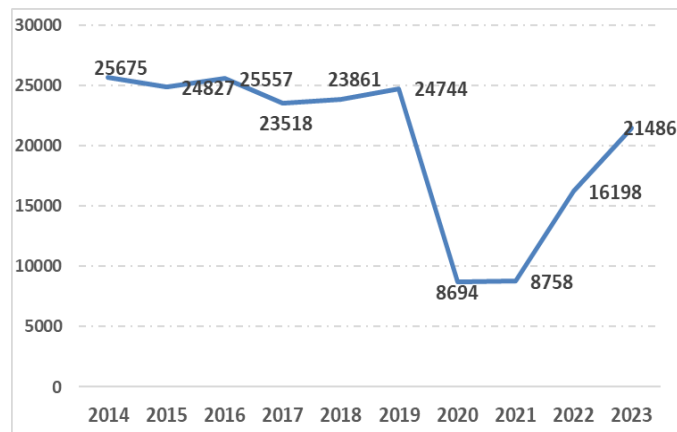
**4. Distribution of hospitalization episodes for patients with thyroid disease, at regional and local level, in the period 2014-2023**

From the point of view of the residential environment where the patients with this diagnosis come from, it is noted that the most episodes of hospitalization were registered in the case of patients from the urban environment (65.5%), the distribution of cases by type of main diagno-

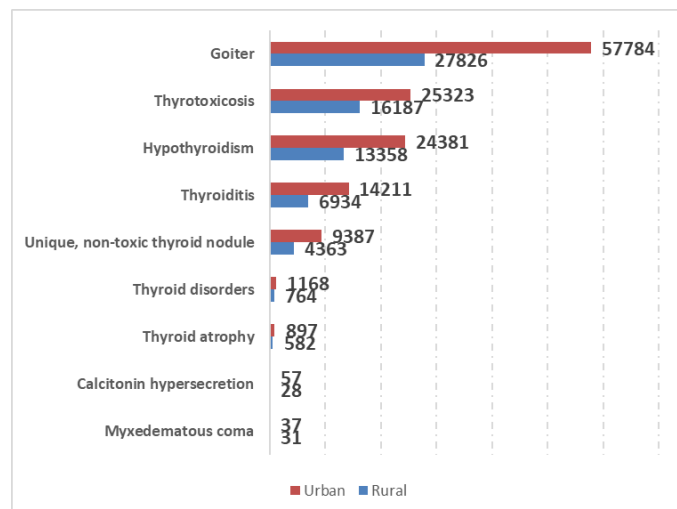
**Graph no. 5. The total number of hospitalization episodes for patients diagnosed with thyroiditis, recorded in the period 2014-2023, at national level**



**Graph no. 6 Evolution of the total number of hospitalization episodes, in patients with thyroid disease, recorded in the period 2014-2023, at national level**



**Graph no. 7. Distribution of hospitalization episodes in patients with thyroid disease, depending on the patient's place of residence, in Romania, in the period 2014-2023**

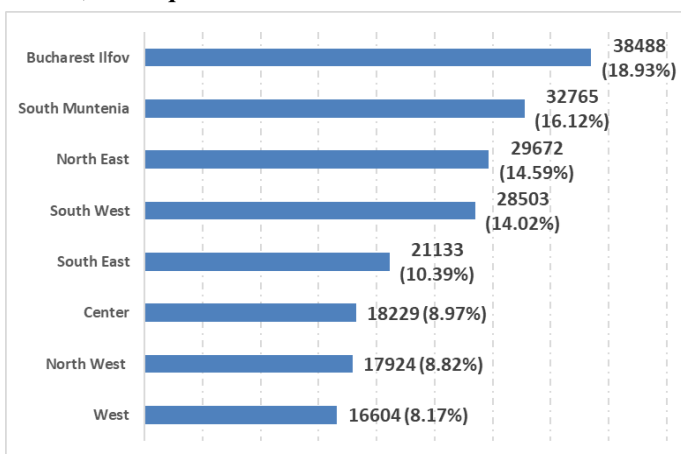


sis upon discharge and the patient's residential environment can be seen in graph no. 7

At the regional level, the most episodes of hospitalization for patients with thyroid disease were registered



**Graph no. 8 Distribution of hospitalization episodes in patients with thyroid disease, at the regional level in Romania, in the period 2014-2023**



during the study period in the regions of Bucharest-Ilfov (19% of the national total), South, North-East and South-West (16, respectively 15 and 14 %). The West and North-West regions with approximately 8-9% had the fewest hospitalizations - graph no. 8.

Relative to the number of inhabitants (the average population of the last 10 years in each region), the descending order of the regions that recorded episodes of hospitalization of patients with thyroid disease was: Bucharest Ilfov region (167.53 episodes/10,000 inhabitants), South region West (147.3 episodes/10,000 inhabitants), South (111.30 episodes/10,000 inhabitants), West (94.39 episodes/10,000 inhabitants), North East region (91.99 episodes/10,000 inhabitants), South East region ( 87.61 episodes/10,000 inhabitants), Center (78.7 episodes/10,000 inhabitants) and the North West region (70.15 episodes/10,000 inhabitants) - graph no. 9.

At the local level, the most episodes of hospitalization were registered between 2014-2023 in the municipality of Bucharest, which has approximately three times more episodes than the next leading counties Bacău and Vâlcea - graph no. 10.

Compared to the population of each county (calculated as the 10-year average), graph no. 11 shows a change in the ranking, first places with Vâlcea (253.4 episodes/10,000 places), Constanța (239, 8 episodes/10,000 people) and Galați counties (193.8 episodes/10,000 people), and on the last places counties of Covasna, Ialomița and Mehedinți.

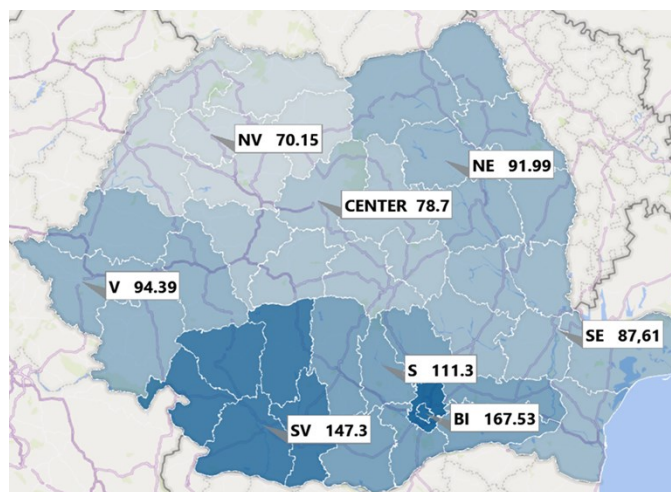
#### 5. Distribution of hospitalization episodes in patients with thyroid disease, according to patient's gender

Of the total number of episodes of hospitalization with this type of main diagnosis at discharge, recorded during the study period, most belonged to women, approximately 88%, the distribution of cases according to the type of diagnosis and gender can be seen in graph no. 12.

#### 6. Distribution of hospitalization episodes in patients with thyroid disease, depending on the patient's age

The analysis of the data by age groups shows that for the entire study period, most episodes of hospitaliza-

**Graph no. 9. Distribution of hospitalization episodes for patients with thyroid disease, depending on the population (10-year average) at regional level, in Romania, between 2014-2023**



tion were registered in adults over 40 years old (84% of the total), with the highest percentages recorded in the 60-69 years and 50-59 years – graph no. 13. The average age of those hospitalized during this period was 54 years, the average age values being the highest in patients diagnosed with thyroid atrophy (59.07 years) or myxedematous coma (63.56 years).

#### 7. Distribution of hospitalization episodes in patients with thyroid disease, according to the average duration of hospitalization

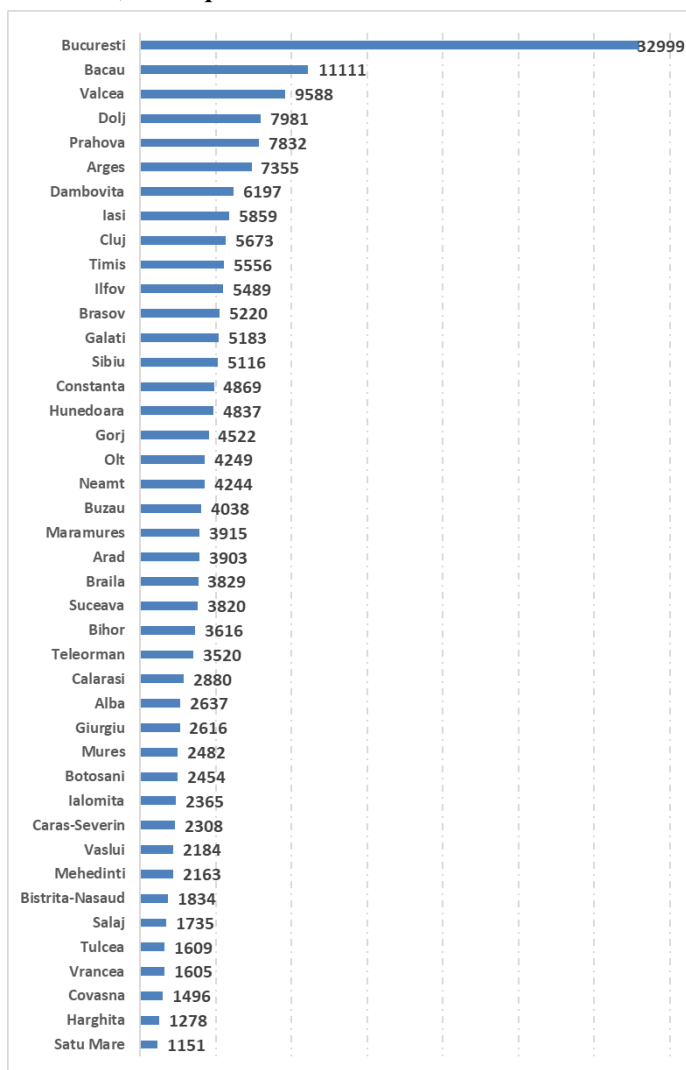
The average length of hospitalization in patients with thyroid disease was in the period 2014-2023 of 4.24 days, varying throughout the study period, the maximum value being observed in the initial years 2014 and 2015 (4.74 days, respectively 4.76 days), the minimum value being recorded in 2023 – 3.37 days. The highest average values of the duration of hospitalization were registered in patients hospitalized for severe forms of thyroid involvement, myxedematous coma (8.44 days), thyroid atrophy (5.41 days) or thyrotoxicosis (4.48 days).

#### 8. Distribution of hospitalization episodes in patients with thyroid disease, according to the patient's discharge status and in-hospital mortality rate

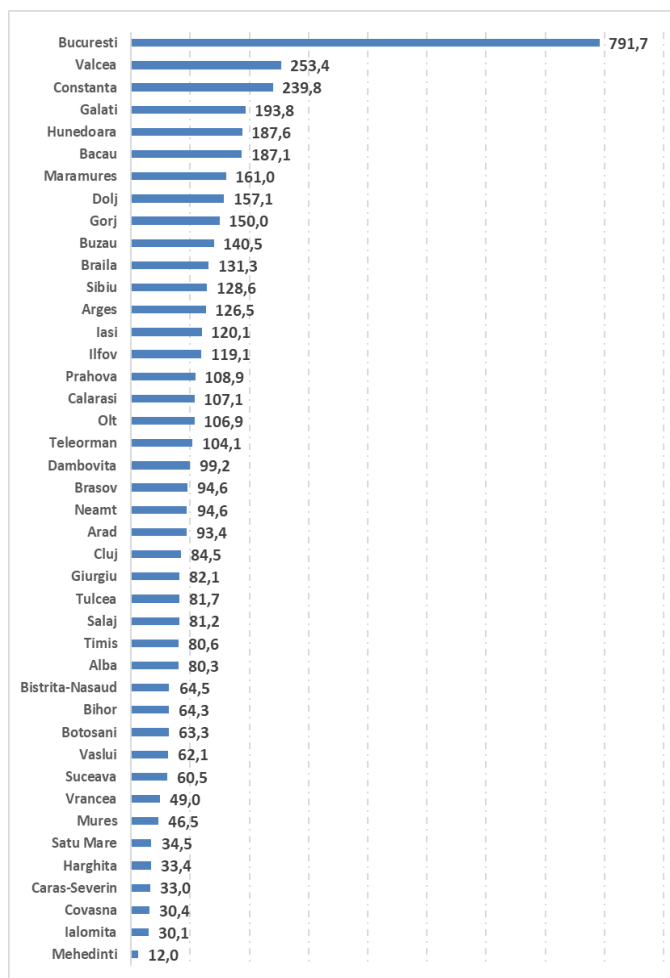
Depending on the patient's condition at discharge, the data analysis indicates that of the total number of episodes in patients with thyroid disease, most of them were discharged in an improved condition (61.2% of the total). Were cured 17.48%, while about 21.23% were discharged as stationary. Extremely low percentages, 0.06% had an aggravated condition at discharge or died (0.03%) – graph no. 14.

The calculated rate of in-hospital mortality was 0.03% over the entire study period, its values oscillating between 0.01% in 2017 and 0.08 in 2021. Most of the deceased came from the elderly diagnosed with goiter, myxedematous coma, hypothyroidism.

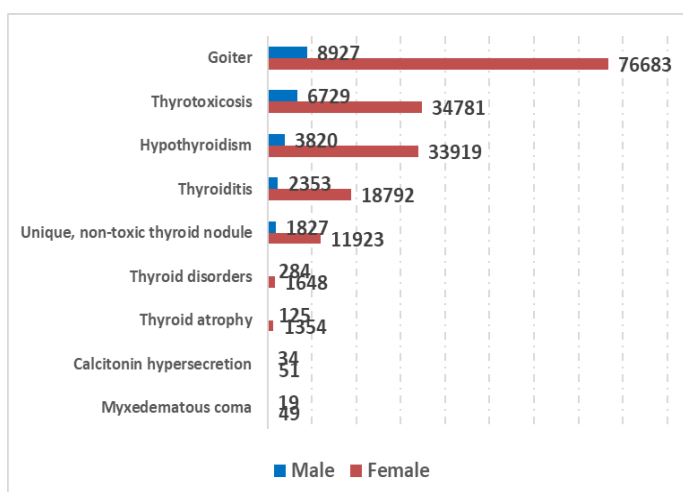
**Graph no. 10. Distribution of hospitalization episodes for patients with thyroid disease, at local/county level, in Romania, in the period 2014-2023**



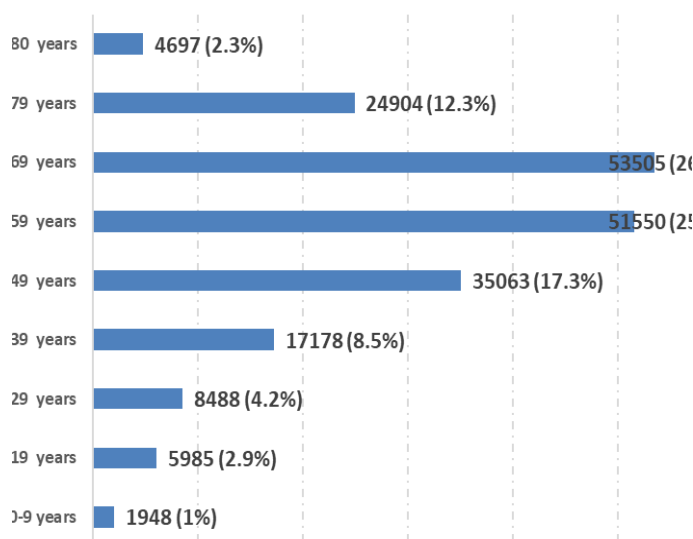
**Graph no. 11. Distribution of hospitalization episodes for patients with thyroid disease, at local/county level, depending on the population (10-year average) of each county, in the period 2014-2023**



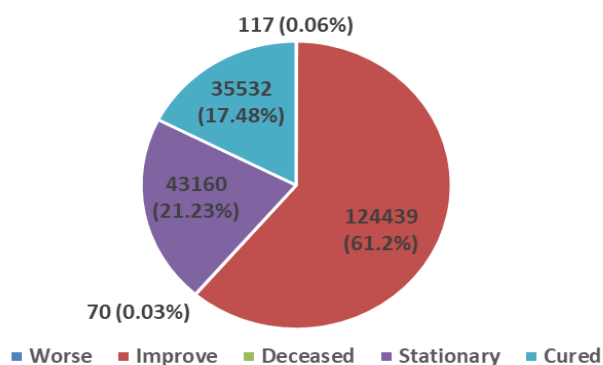
**Graph no. 12 Number of hospitalization episodes in patients with thyroid disease, according to patient's gender and type of diagnosis, 2014-2023, at national level**



**Graph no. 13 Hospitalization episodes in patients with thyroid disease, depending on the patient's age, in the period 2014-2023, at national level**



Graph no. 14. The number of hospitalization episodes for patients with thyroid disease, depending on the discharge status of the patients, in Romania, in the period 2014-2023



## CONCLUSION

The conclusions that emerge from the analysis of the data from the period 2014-2023, regarding the hospitalization of patients with thyroid disease are the following:

- The total number of hospitalization episodes for patients diagnosed according to the National DRG with one of the codes E01-07, in the period 2014-2023 was 203318 episodes;
- The temporal evolution of the number of episodes of hospitalization due to thyroid conditions is relatively constant in the period before the coronavirus pandemic, with certain not very large variations from one year to the next, while in the period 2020-2022 hospitalizations decreased approximately 3 times compared to of the previous period;
- Most hospitalizations were recorded in the departments of endocrinology, general surgery and internal medicine, and small percentages in the departments of oncological surgery and diabetes, nutrition and metabolic diseases;
- In terms of the main diagnosis at discharge, most episodes were recorded for the diagnosis of goiter type (42.1%), one fifth as thyrotoxicosis, almost one fifth hypothyroidism, one tenth thyroiditis and almost 7% single nodule thyroid; In the case of each type of diagnosis mentioned, the most frequently recorded were the diagnosis of nontoxic multinodular goiter, other specified hypothyroidism, thyrotoxicosis with diffuse goiter, and autoimmune thyroiditis;
- More than half of those hospitalized come from the urban environment;
- The analysis of the spatial distribution of hospitalizations by these types of diagnosis indicates a predominance in terms of the absolute frequency of cases in the Bucharest-Ilfov regions (a fifth of the national total), South, North-East and South-West, while compared to population the leading regions were: Bucharest Ilfov, South West and South;
- On a local level, the highest absolute frequencies of the number of hospitalizations were recorded in the municipality of Bucharest (three times more episodes than the next leading counties) Bacău and Vâlcea, and relative to the population of each county separately, the first plac-

es were Bucharest, Vâlcea, Constanta and Galați counties;

- The vast majority of hospitalizations due to thyroid damage belonged to women, the biggest differences between the sexes being observed in the case of goiters, hypothyroidism and thyroiditis;
- From the point of view of the age of the patients, the hospitalizations in the case of adults over 40 years of age predominated, with the most episodes occurring in the age groups 60-69 years and 50-59 years. The average age of those hospitalized during this period was 54 years, the average age values being the highest observed in patients diagnosed with thyroid atrophy (59.07 years) or myxedematous coma (63.56 years);
- The average duration of hospitalization for these patients was 4.24 days, varying over the study period, from a maximum of 4.76 days in 2015 to 3.37 days in 2023. The highest average values of the duration of hospitalization were registered in the case of patients with severe forms of thyroid disease, myxedematous coma (8.44 days), thyroid atrophy (5.41 days) or thyrotoxicosis (4.48 days);
- More than half of the episodes ended with discharge in an improved condition or cured cases, the unfavorable cases from the point of view of the patient's condition being extremely few, and the death rate during hospitalization varied within low limits, between 0.01% in year 2017 and 0.08 in 2021, deaths occurring mainly in elderly patients, diagnosed with goiter, myxedematous coma or hypothyroidism.

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