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RESEARCH

# DESCRIPTIVE STUDY REGARDING OBESITY HOSPITALIZATION EPISODES IN ROMANIA, IN THE LAST DECADE

***Dr. Carmen SASU***[1], *scientific researcher, PH senior specialist*
***Dr. Marius CIUTAN***[1], *scientific researcher, PH senior specialist*

[1] *National School of Public Health, Management and Professional Development, Bucharest*

***Obesity, a metabolic disease, has experienced in recent decades an evolutionary trend, constant, upward, affecting multiple age groups in the population, with a negative impact on current and future health, the disease being a risk factor in a considerable number of chronic degenerative diseases, and an important risk factor for premature death. Although included in the category of preventable diseases, the modern, alert lifestyle, ignoring healthy behaviors and rather adopting behaviors at risk for health makes it possible to triple the number of people who are now overweight or obese compared to the 70s. This fact represents an alarm signal and leads to the adoption and promotion of strategies aimed at reducing the scale of the phenomenon, with an emphasis on risk awareness in the population so that it actively contributes to the interventions undertaken by the health system and beyond.***

***Keywords: hospitalisation obesiti, Romania***

## INTRODUCTION

Obesity is defined as an abnormal physiological condition caused by excessive or abnormal accumulation of fat, with repercussions on health. A body mass index over 25 in adults characterizes overweight, while a value greater than or equal to 30 defines obesity. [1] The physical consequences of this type of nutritional imbalance, which are otherwise preventable, are serious, the increase in body mass index representing a major risk for the occurrence of chronic diseases such as cardiovascular diseases (especially heart disease and stroke), diabetes, muscle-skeletal diseases, but also tumor pathology (certain types of cancer, such as endometrial, breast, ovarian, prostate, liver, gallbladder, kidney and colon, correlating directly with the increased incidence of obesity). [1] Obesity is also one of the leading causes of premature death, accounting for 4.7 million deaths in 2017, or 8% of deaths globally, compared to 4.5% in 1990. [2] Income average/capita countries registered higher percentage than the global average, reaching up to 15% of all deaths and includes a number of countries in Eastern Europe, Central Asia, North Africa and Central America. [2] In children, obesity is associated with an increased risk of obesity in adulthood too, premature death and associated comorbidities. In addition, overweight or obese children face respiratory problems, increased risk of fractures, high blood pressure and heart disease, increased insulin resistance, but also psychological effects. [1]

Both overweight categories are common in both adults and adolescents or children, since 1975 the prevalence of obesity has almost tripled until 2016, when over 1.9 billion adults aged 18 and over were overweight, and of these over 650 million adults were obese. Globally, in 2016, 39% of overweight adults (39% men and 40% women) were registered, and 13% of adults were obese (11% men and 15% women). [1] If the current trend continues, it is estimated that by 2025, 2.7 billion adults will be overweight and over 1 billion will be obese. [3] Among children, in 2016, 340 million children and adolescents between 5-19 years old were overweight or obese, this year registering a percentage more than 4 times higher than in 1975, a dramatic increase from 4% to 18%. In 2017, one in five children and adolescents was overweight. [2] The gender situation is similar, 18% of girls and 19% of boys were overweight and 6% of girls and 8% of boys were obese in 2016. [1]

In Europe, the average is 23.3% overweight or obese adults, in the top of the most affected countries are Turkey -32.1%, Malta-28.9%, Great Britain-27.8%, Hungary-26.4 %, Lithuania-26.3%, Czech Republic-26.0%, Andorra-25.6%, Ireland-25.3% and Bulgaria-25.0%. [4] In the case of children, one in three children aged 6-9 is obese or overweight, with the most affected countries being Southern Europe, Greece, Italy, Spain, Bulgaria, Slovenia or Portugal. [5] At European level, there has been a tripling of the obesity rate since 1980, with obesity mortality at 10 -13% in various European regions, with obesity being the fourth most important risk factor for health and premature death on the continent. [6]

In Romania, in 2017 the prevalence of obesity in adults was 10.4%, and overweight were 52.5%, by sex there is similarity in the case of obesity, but important differences in the case of overweight people, men having a prevalence in this case of 59.2% compared to 46.3% for women. [5] The evolutionary trend of the phenomenon was an ascending one, increases being observed annually, from a share of 8.3% in 1975 to 22.5% in 2016. In 2017, the highest prevalence was registered in the counties Mehedinți (6421.4/100,000 inhabitants compared to the national average of 1633.6), Arad (3274.8) and Bihor (3244.4), and the lowest in Harghita (57.7), Bistrița-Năsăud (339.3) and Satu-Mare (354.7). [7] Regarding children, the data recorded between 2015-2017 for the age of 8 years indicate significant percentages in the category of overweight for both sexes, 30.6% of boys and 25.8% of girls falling into the overweight or obese categories. [8] Given the increasing prevalence of this condition each year, as well as the negative impact, with serious future health implications and the increased risk of premature death attributable to it, we consider that regular monitoring of the situation, especially in hospitalized complicated cases is a necessity, therefore the National School of Public Health, Management and Professional Development in Health, Bucharest (NSPHMPDH) conducted a study on the situation of hospitalization episodes for these patients in 2008-2019, the results of which will be presented in the following.

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## OBJECTIV

Identification at national, regional and local level of the geographical distribution of hospitalization episodes in the case of obese patients, as well as the temporal evolution of their number, in the period 2008-2019.

## METHODOLOGY

A descriptive, retrospective study was performed, which used data from the National DRG Database, data reported in a 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 on the registration and statistical reporting of patients receiving medical services in continuous hospitalization and day hospitalization, with subsequent completions and modifications, NSPHMPDH collects and processes the minimum set of patient-level data for cases treated in continuous and day hospitalization. The study used data that were reported in the period 2008-2019, following the analysis of data on hospitalization episodes in the case of obese patients in Romania, in the aforementioned hospitals (hospitalizations in continuous hospitalization). Data were selected using the ICD-10-AM classification, and records were extracted and analyzed from the observation sheets that most frequently had as main diagnosis one of the codes: E65-66, Obesity and other disorders with excess intake including: E65-Localized adiposity, E66.0-Obesity due to excess calories, E66.1-Drug-induced obesity, E66.2-Extreme obesity with alveolar hypoventilation Pickwickian syndrome, E66.8-Other obesity Morbid obesity, E66.9-Obesity, unspecified Simple obesity NOS. In accordance with the provisions of Law 190/2018 and of Art. 13 of EU Regulation no. 679/2016, personal data are deleted at the time of transmission to NSPHMPDH, and the identification of persons for the purpose of analysis is based on encrypted national identification code. The age of the patients was calculated in years of age, as the difference between the date of hospitalization and the date of birth. The data were processed using the SQL Server Management Studio Express 2005 software, further processing and analysis was performed using SPSS and Excel. The analysis was performed according to a series of demographic and socioeconomic variables, such as age, length of hospitalization, discharge status, etc., information included in the minimum set of data reported in the DRG system by hospitals. The interpretation and presentation were done in the form of tables and graphs.

## RESULTS

The interpretation of the data extracted, processed and analyzed from the national DRG was made in relation to a series of demographic variables and socioeconomic characteristics (sex, age, place of residence, length of hospitalization, in-hospital mortality rate, discharge status) following the geographical distribution and temporal evolution of the obese patients hospitalization episodes, from the hospitals in our country, in the period 2008-2019.

### 1. Total number of hospitalization episodes in obese patients, registered in Romania, in the period 2008 -2019

The total number of episodes of continuous hospitalization for obese patients registered in Romania in the period 2008-2019 was 47,815 episodes, of which more than a quarter (26.5% -12654 episodes) were recorded in children (0-15 years) and adolescents (16-19 years), the rest in adult patients (64% in people under 65 years and 9% in those over 65 years). From the point of view of the main diagnosis at discharge, most hospitalization episodes were diagnosed with obesity due to an excess of calories (73% of the total) -graph no 1. A small number of episodes of hospitalization had as diagnosis the following: unspecified obesity (approx. 11%), other obesity (8%) or extreme obesity with alveolar hypoventilation (6.5%).

### 2. Temporal evolution regarding the hospitalization episodes of obese patients, in Romania, in the period 2008-2019

The temporal evolution of the hospitalization episodes of obese patients during this period can be observed in graph no.2. It is found that the situation of hospitalizations is relatively constant, there are some not very large variations from one year to another, the maximum number being recorded in 2009, while the minimum was observed in 2012.

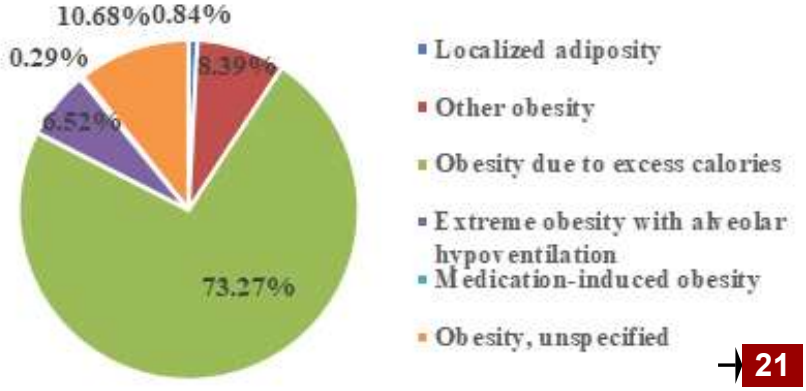
### 3. Distribution of hospitalization episodes of obese patients, according to the discharge ward

Most episodes of hospitalization for obese patients were recorded in the departments of general surgery (27% of the total), endocrinology (23%) and pediatrics (17%). Lower percentages were recorded in the departments of internal medicine, diabetes, nutrition and metabolic diseases or cardiology.

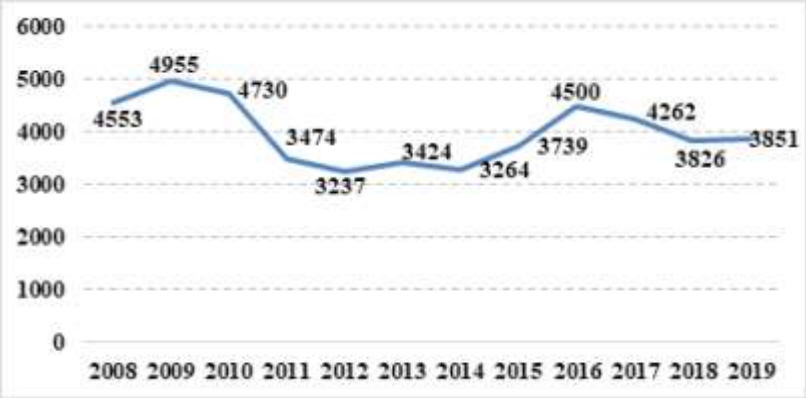
### 4. Distribution of hospitalization episodes for obese patients, at regional and local level, in the period 2008-2019

From the point of view of the residential environment where the patients with this diagnosis come from, it is

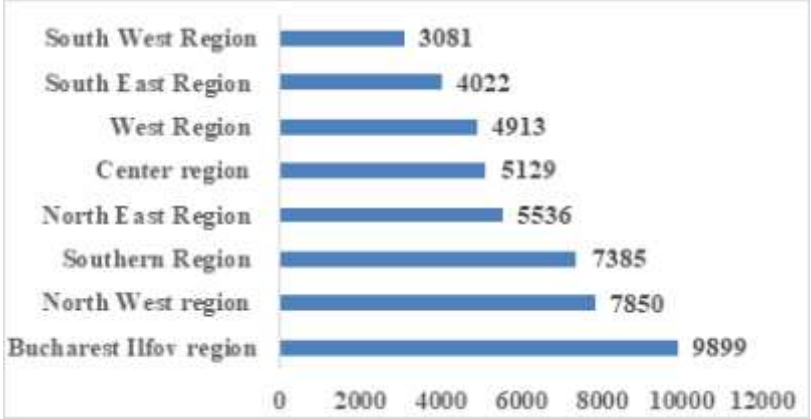
***Graph no.1. Total number of episodes reported in continuous hospitalization and type of main diagnosis at discharge, in obese patients, recorded in the period 2008-2019, at national level***



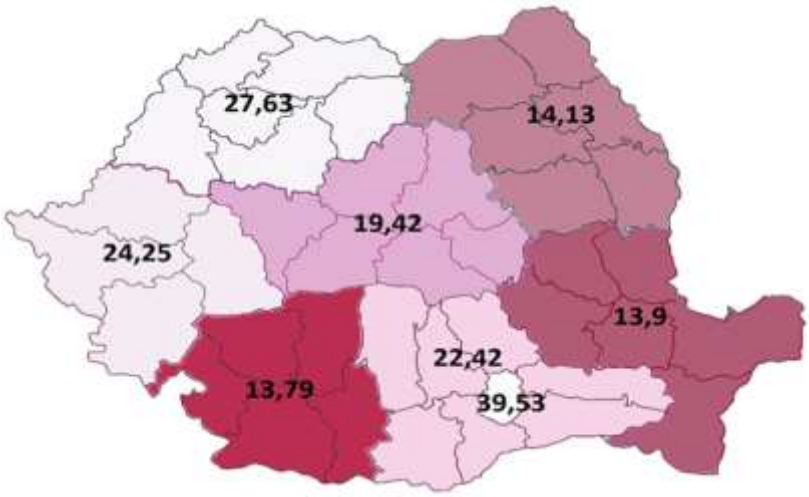
***Graph no.2. Evolution of the total number of episodes reported in continuous hospitalization, in obese patients, registered in the period 2008-2019, at national***




***Graph no.4. Distribution of hospitalization episodes in obese patients, at regional level in Romania, in the period 2008-2019***



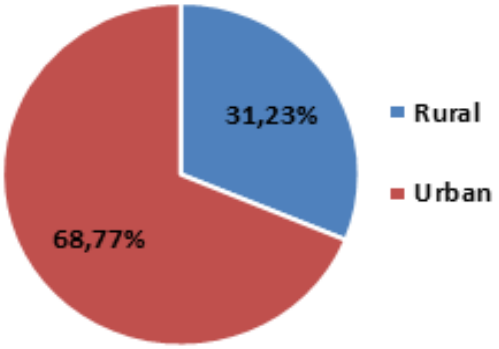

***Graph no. 5. Distribution of hospitalization episodes in obese patients, according to population, at regional level, in Romania, between 2008-2019***




found that most hospitalization episodes were registered in the case of patients from urban areas (69%) - graph no. 3.

At the regional level, most hospitalization episodes for obese patients were recorded during the study period in the regions of Bucharest-Ilfov (21% of the national total), North-West and South (16, respectively 15%). The

**Graph no. 3. Distribution of hospitalization episodes in obese patients, depending on the patient's place of**




South East and South-West regions with approximately 8% and 6% had the fewest hospitalizations - graph no.4.

Compared to the number of inhabitants, the descending order of the regions that recorded hospitalization episodes of obese patients was: Bucharest Ilfov region (39.53 episodes/10,000 inhabitants), North West region (27.63 episodes/10,000 inhabitants), West (24.25 episodes/10,000 inhabitants), South (22.42 episodes/10,000 inhabitants), Center region (19.42 episodes/10,000 inhabitants), North East region (14.13 episodes/10,000 inhabitants), South East (13,9 episodes/10000 inhabitants) and the South West region (13.79 episodes/10000 inhabitants) - graph no.5.

At the local level, most hospitalization episodes were registered between 2008-2019 in Bucharest, which has approximately three times more episodes than the following leading counties Cluj, Argeș, Timiș and Maramureș - graph no.6.

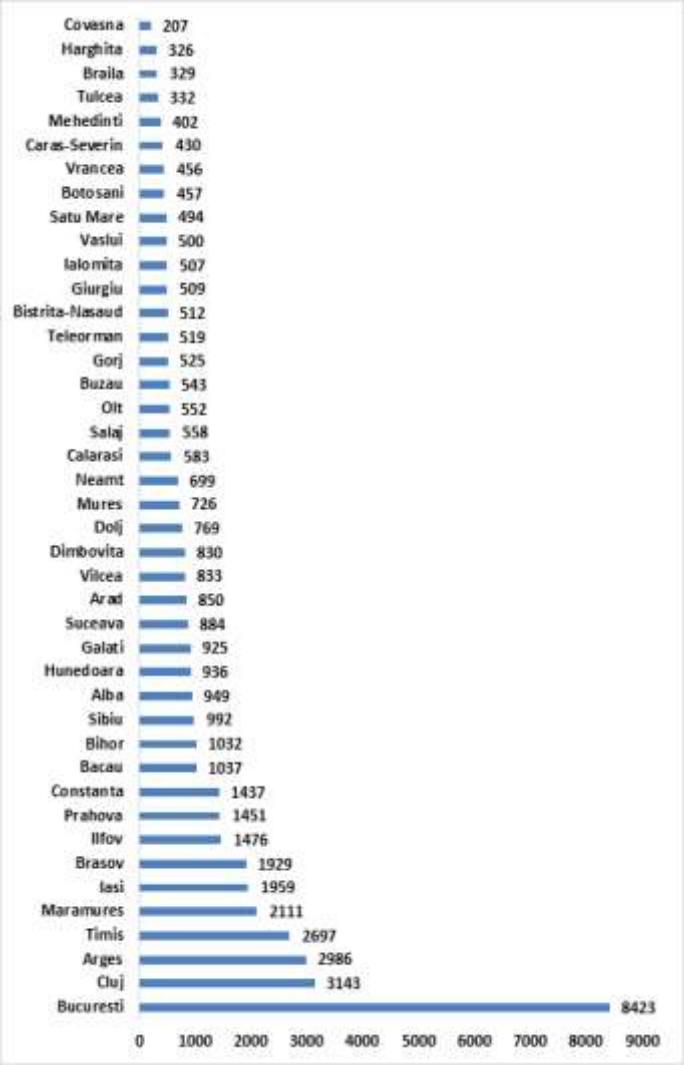
Compared to the population of each county, can be seen from graph no.7 a change in the ranking on the first places being Argeș (45.86 episodes/10000 inhabitants), Cluj (43.68 episodes/10000 inhabitants) și Ilfov counties (40.07 episodes/10000 inhabitants) and on the last counties of Brăila and Covasna, with almost 5 times fewer episodes than the leading counties.

## 5. Distribution of hospitalization episodes in obese patients, according to patient sex

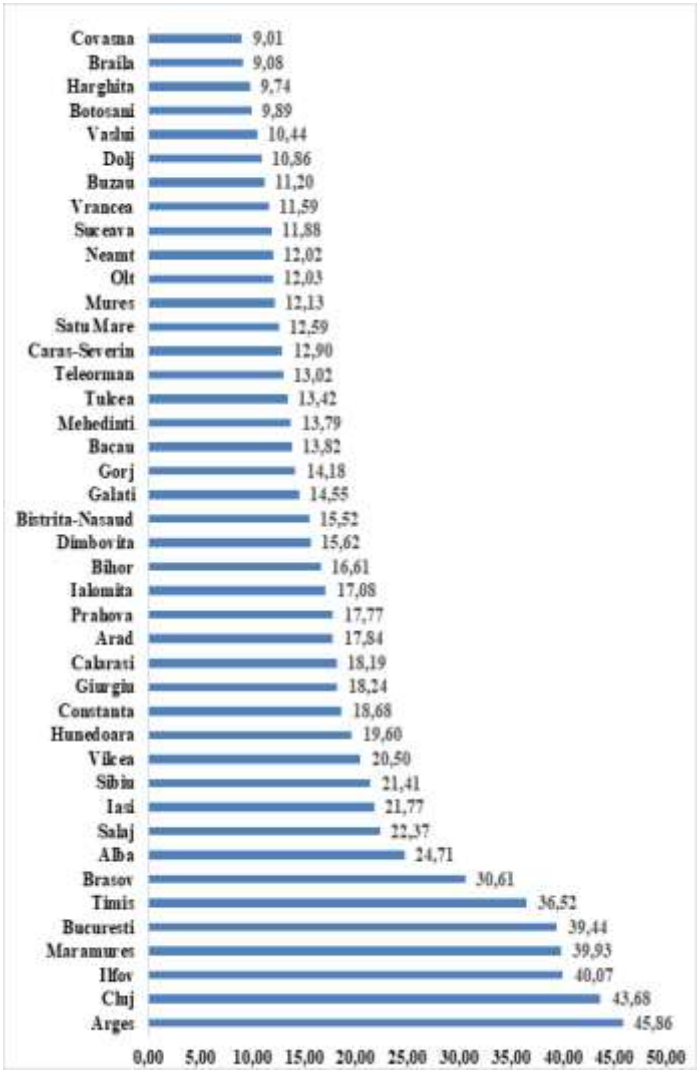
Of the total number of hospitalization episodes with the main diagnosis of obesity, recorded during the study period, most belonged to women, approximately 65% - graph no.8.

As an evolution over time, there is a reduction of about 16% in the number of hospitalization episodes throughout the study period, for both sexes. Women have registered fewer hospitalization episodes since 2010, reaching a reduction of almost 18% in 2019 compared to the initial year, the only years with increases in the number of hospitalizations being 2010 and 2016. For men, year 2009 and 2016 marked an increase in hospitalizations

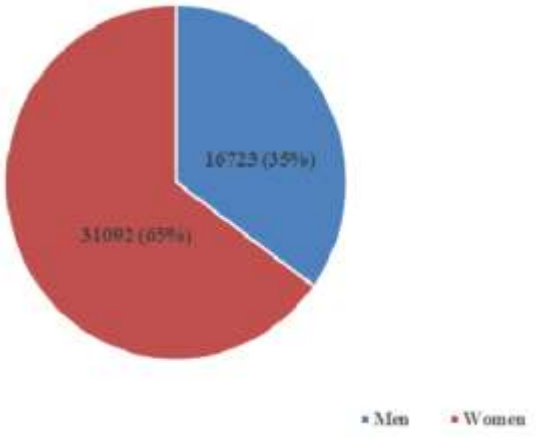
*Graph no. 6. Distribution of hospitalization episodes in obese patients, at local / county level, in Romania, during 2008-2019*




*Graph no. 7. Distribution of hospitalization episodes in obese patients, at local / county level, by population of each county, during 2008-2019*

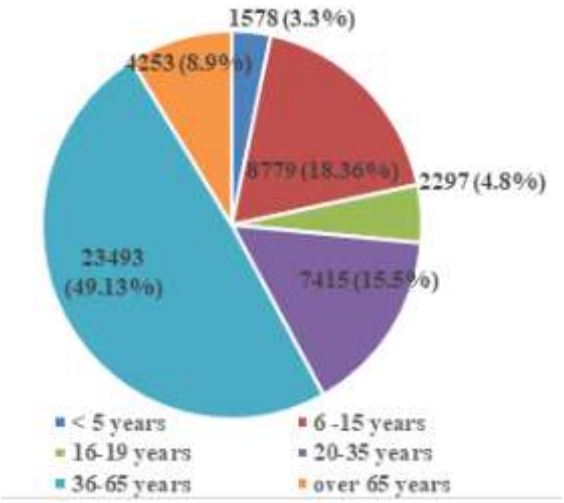



*Graph no. 8. Total number of episodes reported in continuous hospitalization, in obese patients, according to patient's sex, between 2008-2019, at national level*

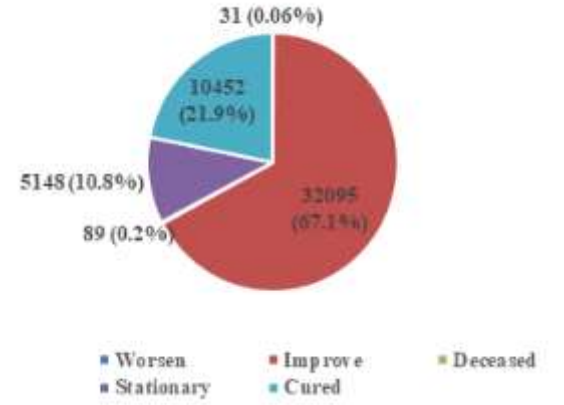



*Graph no. 9. Evolution of episodes number reported in continuous hospitalization, in obese patients, depending on the patient's sex, during 2008-2019, at national level*

***Graph no. 10. Number of episodes reported in continuous hospitalization, in obese patients, depending on patient's age, between 2008-2019, at national level***




***Graph no. 12. Number of hospitalization episodes in obese patients, depending on patients state of discharge, in Romania, during 2008-***

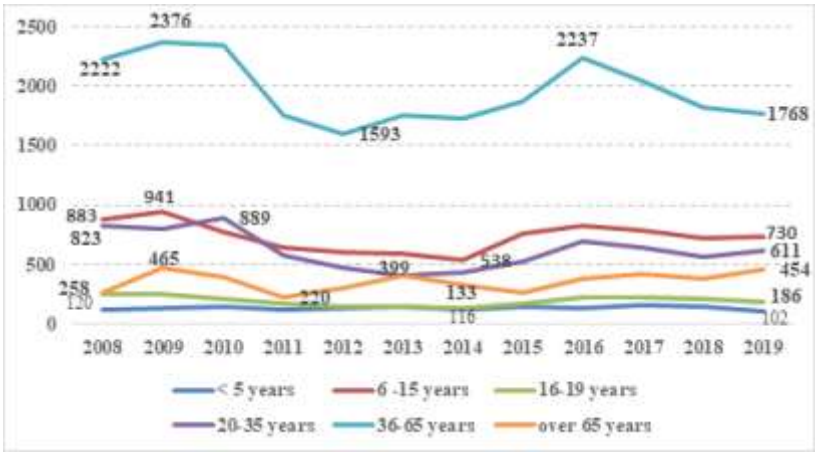



with this diagnosis, but the evolution of hospitalizations varied less than in the case of women, the reduction in the last year being about 11% compared to the first year - graph no. 9.

## 6. Distribution of hospitalization episodes in obese patients, according to patient age

The analysis of data by age groups shows that for the entire study period, most episodes of hospitalization were recorded in adults between 35-65 years (49%). The next age group affected is that of children, of which most hospitalizations occurred in children between 6-15 years (18%), adolescents and children under 5 years with much lower percentages (about 5 and 3%, respectively). And young people between

***Graph no. 11. Evolution of the total number of episodes reported in continuous hospitalization, in obese patients, depending on patient's age, between 2008-2019, at national level***




20-35 years old suffered hospitalizations with this diagnosis in a proportion of 15.5%, while only 9% of the elderly are in this category - graph no.10.

The evolutionary trend of the number of hospitalizations for all age groups was a decreasing one, except for the elderly group, where there was an increase of 76% in 2019 compared to 2008 - graph no.11. The most important reduction is found in the young age group (20-35 years) where the reduction was about 26%, while in children under 5 the reduction in hospitalizations was the lowest, 15%. The smallest variations observed during the study period were recorded in the categories of children under 5 years and adolescents (16-19 years).

## 7. Distribution of hospitalization episodes in obese patients, according to average length of hospitalization

The average duration of hospitalization in the case of hospitalization episodes for obese patients in continuous hospitalization was in the period 2008-2019 of 4.89 days, varying throughout the study period, the maximum value being observed in the initial years 2008 and 2009 (5.26 days, respectively 5.59 days) it decreases in 2018 and 2019 to the value of 4.39 days, respectively 4.32 days, the rest of the years varying between 4.6-5.15 days. The highest average values of the duration of hospitalization were registered in the case of obese patients hospitalized in the burns (40 days), acute psychiatry, (17.2 days) radiotherapy (16 days) or neurosurgery (15 days). The hospitals that recorded the highest values of hospitalization were those of psychiatry or recovery. As a type of pathology, severe forms record the highest values of hospitalization duration, patients with the main diagnosis at discharge Extreme obesity with alveolar hypoventilation, as well as other obesity, morbid obesity.

## 8. Distribution of hospitalization episodes in obese patients, depending on patient's discharge status and in-hospital mortality rate

Depending on the patient's discharge status, the analysis of the data indicates that of the total number of episodes reported in continuous hospitalization in obese patients, most patients were discharged in an improved state (67% of the total) or cured (22%). Approximately 11% of patients were discharged as stationary, and extremely small percentages, 0.06% had an aggravated condition at discharge or died (0.2%) - graph no. 12.

The calculated in-hospital mortality rate was 0.19% for the entire study period, with values ranging from 0.09% in 2008 to 0.29 in 2015. Most of the deceased were diagnosed at discharge with obesity due to a caloric excess (47.2%) or Extreme obesity with alveolar hypoventilation (35%).

## CONCLUSIONS

The conclusions that emerge from the analysis of data from 2008-2019, regarding the hospitalization of obese patients, are the following:

- The total number of hospitalization episodes in the case of patients diagnosed according to the National DRG with one of the codes E65-66, in the period 2008 -2019, was 47815 episodes;
- The temporal evolution of the number of hospitalization episodes due to obesity is a relatively constant one, with some not very big variations from one year to another, with maximum number of hospitalizations in 2009 and minimum in 2012;
- Most hospitalizations were registered in the departments of general surgery, endocrinology and pediatrics;
- In terms of the main diagnosis at discharge, almost three quarters of hospitalizations were for obesity due to excess calories, the remaining percentages include, one tenth unspecified obesity, and much lower percentages in severe forms of obesity - Other obesity Morbid obesity about 8% and extreme obesity with alveolar hypoventilation 6.5%;
- Almost three quarters of those hospitalized come from urban areas;
- The analysis of the spatial distribution of hospitalizations by obesity indicates a predominance in terms of absolute frequency of cases in the regions of Bucharest -Ilfov (one fifth of the national total), North-West and South, while relative to the population the leading regions are: Bucharest Ilfov, North West and West;
- Locally with the highest absolute frequencies of the number of hospitalizations were recorded in Bucharest (three times more episodes than the next leading counties) Cluj, Arges, Timis and Maramures, and compared to the population of each county, counties Argeș, Cluj and Ilfov;
- More than half of the number of hospitalizations due to obesity belonged to women, in terms of evolution over time, there was a reduction of about 16% in the number of hospitalization episodes throughout the study period, for both sexes. Women registered fewer episodes of hospitalization since 2010, reaching a reduction of almost 18% in 2019 compared to the initial year, and in the case of men the evolution of hospitalizations varied less than in the case of women, the reduction from the last year being about 11% compared to the first year of the studied period;
- In terms of age of the patients, almost half of the hospitalizations were observed in adults between 35-65 years and almost one-fifth of children between 6-15 years; The evolutionary trend for all age groups was a decreasing one, except for the elderly group, with an increase of 76% in 2019 compared to 2008. The most significant reduction, of more than a quarter of the episodes, is found in the young age group (20-35 years) while in children under 5 years the reduction of hospitalizations was the lowest.
- The average length of hospitalization for hospitalization episodes for obese patients in continuous hospitalization was 4.89 days, varying over the study period, from a maximum of 5.59 days in 2009 to 4,32 days in 2019. The highest average values of hospitalization were recorded in the case of obese patients admitted to the burns (40 days), acute psychiatry, (17.2 days) radiotherapy (16 days) or neurosurgery (15 days), the hospitals that recorded the highest values of hospitalization were those of psychiatry or recovery. As a type of pathology, the severe forms record the highest values of hospitalization duration, patients with the main diagnosis at discharge Extreme obesity with alveolar hypoventilation, as well as other obesity, morbid obesity;
- More than half of the episodes ended with discharged in an improved state or cured cases, the cases unfavorable in terms of the patient's condition being extremely few and deaths during hospitalization varied within low limits, between 0.09 and 0.29 % and especially affected patients with Obesity due to excess calories or Extreme Obesity with alveolar hypoventilation.

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