

DESCRIPTIVE STUDY REGARDING SITUATION OF HOSPITALIZATION EPISODES DETERMINED BY THE MOST FREQUENT AFFECTIONS OF THE LARGE JOINTS – COX/GONARTHROSIS, IN ROMANIA, IN THE LAST DECADE

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Osteoarthritis is one of the main causes of disability, especially among the elderly population, over 65 years old, associated with a significant decrease in the quality of life, representing at the same time a burden for the patient, but also for the health system. Chronic, degenerative diseases, including osteoarthritis, with high frequency especially in developed countries require medical care and expensive treatments given to patients, therefore a good knowledge of the epidemiological situation, but also of the risk factors, as well as the associated comorbidities can represented a support for the decision-makers in the health policy of the countries in order to develop cost-effective policies in the field.

Keywords: coxarthrosis, gonarthrosis, hospitalization, Romania

INTRODUCTION

Among the chronic, degenerative, disabling conditions, predominantly affecting the elderly, but also the adult age categories, with an important influence on the patient's quality of life, but also representing a negative impact, at the same time on the health systems, are two joints' diseases, cox and gonarthrosis. The symptomatology associated with the two types of conditions involves a substantial burden on health, representing the major cause of physical activity limitation and functional disability, which over time progresses to the need for prosthetics of the affected joints. The case reference definition is symptomatic osteoarthritis of the hip, radiologically confirmed as Kellgren-Lawrence grade 2-4, where grade 2 includes the presence of at least one osteophyte and pain for at least one month in the past 12 months, and grades 3-4 include the presence symptoms, osteophytes and narrowing of the joint space, grade 4 also assuming deformity, plus pain for at least one month of the last 12 months.[1]

Statistical data on age-standardized incidence and DALYs rates by hip arthrosis, from 1990-2019, were collected using the Global Health Data Exchange (GHDx) as a working tool in a global collaboration. Epidemiological data from published systematic reviews, websites of international and governmental organizations, published reports, data from primary research (health and demographic surveys), databases, which allow comparative assessments of the disease burden in the case of 14 age groups, by gender and in total. The collected data comes from 204 countries, grouped into 21 regions, on the five income categories (low, middle low, medium, moderately high and high). The age-standardized rates regarding the incidence of cox arthrosis and DALYs were reported per 100,000 inhabitants, the rates for incidence, DALYs were estimated and the estimated annual percentage changes of the two parameters were also calculated in order to highlight the evolutionary trend in a specified time interval. According to published data, between 1990-2019 the global incidence of coxarthrosis increased from 0.74 million to 1.58 million, an increase of 115.4%, the age-standardized rate of coxarthrosis increased from 17.02/ 100,000 inhabitants in 1990 to

18.70/100,000 inhabitants in 2019, highlighting a scandent trend of 0.32. In men, the coxarthrosis incidence rate was 1.93 times higher compared to women, in contradiction with the trend of the standardized incidence rate in both sexes (male to female ratio=0.96). [1]

In the mentioned time frame, increases occurred in 194 countries, while decreasing values were evident only in Denmark, Iceland and Nigeria. In 2019 the highest standardized incidence rates were observed in the USA, Iceland and the UK, and the lowest in Korea, Yemen and Timor-Leste. High-income regions such as North America had the highest rates compared to Oceania or East Asia. The largest estimated annual percentage changes occurred in East Asia and the smallest in sub-Saharan Africa. [1] Regarding DALYs, it increased from 0.46 million to 1.04 million, a total increase of 126.97%, consistent with the increase in the age-standardized DALY rate from 11.54/100,000 inhabitants to 12.57/100,000 inhabitants, an increasing trend of 0.29 (0.27–0.32). In women, the increase in DALYs in the case of coxarthrosis was 1.13 times higher compared to men, consistent with the trend of the age-standardized rate of DALYs for both sexes (female/male ratio = 1.01). By region, Western Europe had the highest value of DALYs, compared to Oceania, the lowest. Relative to the level of economic resources, North America records the highest DALY value, while the lowest is in East Asia. Relative to age, the highest values of the two indicators are recorded between 60 and 64 years. [1]

Annals of the Rheumatic Diseases indicate values of more than 300 million cases of coxarthrosis and gonarthrosis in the year 2017, in the world, especially in developed countries, women being particularly affected (increase of approximately 10% compared to 1990), estimated prevalence, standardized with age of 3754.2/100,000 inhabitants, representing an increase of over 9% compared to 1990. In 2017 there were 15 million new cases, coxarthrosis and gonarthrosis and 9.6 million

years lived with disability, an increase of over 9.5% since 1990. [2] The most prevalent cases are in North America, North Africa, the Middle East and Australasia, and the fewest in sub-Saharan Africa. Most new cases were diagnosed in 2017 in North America, Australasia and Asia Pacific, with the fewest in East and Central Sub-Saharan Africa and East Asia. [2]

WHO estimates this condition as one of the 10 most disabling conditions in developed countries, affecting about 10% of men and 18% of women over 60 years of age. [3]

In Europe, in 2019, 57 million people were estimated to be affected, 54% more than 30 years ago, arthritis being one of the main causes of disability in the region, with 2 thousand years of healthy life lost. [4]

Data from European Health surveys (2008), survey carried out in 7 European countries indicate variations in the prevalence of clinically diagnosed osteoarthritis between different countries. The variations are between less than 5% in Romania and almost 25% in Hungary, the prevalence among women in all countries involved in the study being higher compared to that of men. In Romania, by gender, the prevalence was 4.5% for women and 1.5% for men. [5] The age-standardized prevalence in Romania was 2.8%, the lowest of the countries in the study (Hungary 18.3%, Czech Republic 10.3%, Malta 10.2%). Regarding mortality, a systematic review found moderate evidence of increased mortality among people with osteoarthritis compared to the general population, possibly due to reduced physical activity, due to reduced joint mobility and the presence of some comorbidities (obesity, cardiovascular diseases, diabetes, etc.) or the use of specific anti-inflammatory medication. [5] The statistical data regarding this type of condition are quite limited, partly due to the fact that the disease is chronic, slowly progressive, and it is difficult to establish the diagnosis at a given time. In order to outline an image as close as possible to reality, at least with regard to complicated cases, with a longer evolution in time, cases that required hospitalization and possible surgical intervention such as hip or knee replacement, the National School of Public Health, Management and Professional Development in Health, Bucharest (NSPHMPDHB) conducted a study regarding the situation of hospitalization episodes for these patients, in the period 2012-2021, the results of which will be presented in the following.

OBJECTIV

Identification at the national, regional and local level of geographical distribution of hospitalization episodes in the case of patients with conditions of large joints, such as cox/gon arthritis, as well as the temporal evolution of their number, in the period 2012-2021.

METHODOLOGY

The descriptive, retrospective study carried out, 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 who receive medical services under the regime of continuous hospitalization and day hospitalization, with subsequent additions and changes, National School of Public Health and Professional Development Bucharest (NSPHMPDHB) collects and processes the minimum set of data at the patient level for cases treated under the regime of continuous and day hospitalization.

The study used data that were reported in the period 2012-2021, aiming at the analysis of data on hospitalization episodes in the case of patients with cox/gonarthritis in Romania, in the aforementioned hospitals (admissions under continuous hospitalization regime). Data were selected using the ICD-10-AM classification, records were extracted and analyzed from the observation sheets that most frequently had one of the codes as the main diagnosis: M16 Coxarthrosis [arthrosis of the hip]; M16.0 Primary coxarthrosis, bilateral; M16.1 Other primary coxarthrosis, Primary coxarthrosis: - NOS and unilateral; M16.2 Coxarthrosis from dysplasia, bilateral; M16.3 Other dysplastic coxarthrosis, Dysplastic coxarthrosis: NOS and unilateral; M16.4 Post-traumatic coxarthrosis bilateral; M16.5 Other post-traumatic coxarthrosis, Post-traumatic coxarthrosis: NOS and unilateral; M16.6 Other secondary coxarthrosis, bilateral; M16.7 Other secondary coxarthrosis, Secondary coxarthrosis: NOS and unilateral; M16.9 Cox arthrosis, unspecified. In the case of gonarthrosis, the codes were used: M17 Gonarthrosis [arthrosis of the knee]; M17.0 Primary gonarthrosis, bilateral; M17.1 Other primary gonarthrosis, Primary gonarthrosis: NOS and unilateral; M17.2 Post-traumatic gonarthrosis bilateral; M17.3 Other post-traumatic gonarthrosis, Post-traumatic gonarthrosis: NOS and unilateral; M17.4 Other secondary gonarthrosis, bilateral; M17.5 Other secondary gonarthrosis, Secondary gonarthrosis: NOS and unilateral; M17.9 Gonarthrosis, unspecified. 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 NSPHMPDHB, and the identification of persons for the purpose of analysis is based on the encrypted personal identification number. 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 interpretation and presentation were made in the form of tables and graphs.

RESULTS

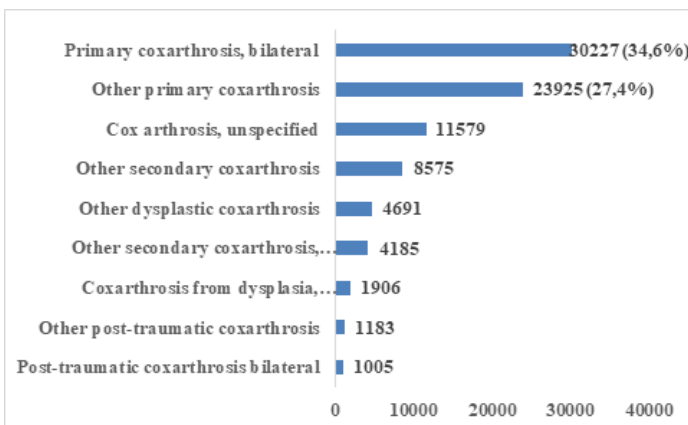
The processing, analysis and interpretation of the data extracted from the national DRG database was carried out in relation to a series of demographic variables and socioeconomic characteristics (sex, age, place of residence, duration of hospitalization, in-hospital mortality rate, status at discharge) following the geographical distribution and evolution temporal analysis of the

episodes of hospitalization of patients with hip arthrosis or knee arthrosis, in hospitals in our country, in the period 2012-2021.

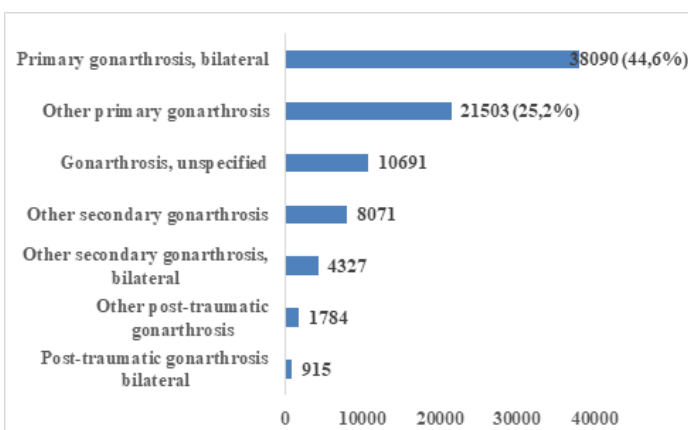
1. Total number of hospitalization episodes for patients with cox/gonarthritis, registered in Romania, in the period 2012-2021

The total number of continuous hospitalization episodes for patients with cox/gonarthritis registered in Romania, in the period 2012-2021, was 172,657 episodes, the weights of the two joint conditions being approximately equal, 50.5% of the hospitalization episodes concerned gonarthritis, and 49.4% coxarthrosis. In the case of hip damage, the most common cases (62%) were coded bilateral primary coxarthrosis or other primary coxarthrosis – graph no. 1. Knee joint damage was most frequently coded at discharge as bilateral primary gonarthritis or other primary gonarthritis (70%) – graph no. 2.

Graph no. 1. Total number of reported episodes of continuous hospitalization, with the main diagnosis at discharge coxarthrosis, recorded in the period 2012-2021, at national level



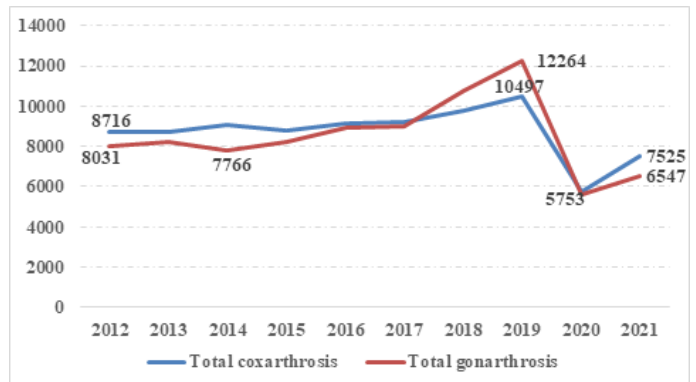
Graph no. 2. The total number of episodes reported in continuous hospitalization, with the main diagnosis at discharge of gonarthritis, recorded in the period 2012-2021, at the national level



2. Temporal evolution of hospitalization episodes for patients with cox/gonarthritis, in Romania, in the period 2012-2021

The temporal evolution of hospitalization episodes for patients with cox/gonarthritis during this period can be seen in graph no. 3. Situation of hospitalizations is relatively constant, with certain not very large variations from one year to another, the maximum number being recorded in 2019, while the minimum number of cases was observed in 2020.

Graph no. 3. Evolution of the total number of episodes reported in continuous hospitalization, in patients with cox/gonarthritis, registered in the period 2012-2021, at national level



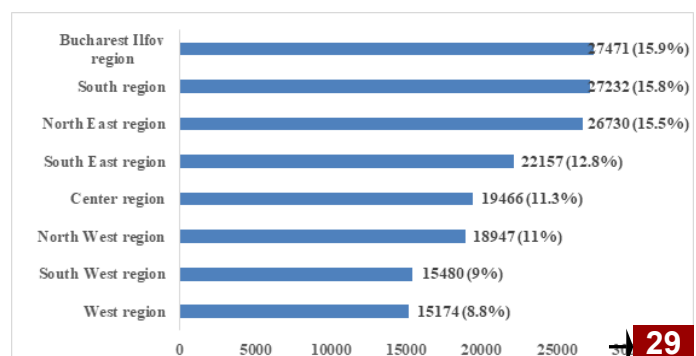
3. Distribution of hospitalization episodes for patients with cox/gonarthritis, depending on the discharge department

The most episodes of hospitalization for patients with cox/gonarthritis were registered in orthopedics/traumatology departments (86% of the total), with much fewer recorded in internal medicine (6.6%) and rheumatology departments (4%).

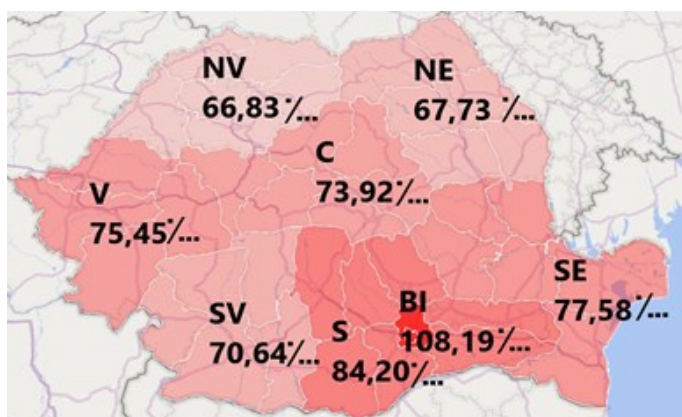
4. Distribution of hospitalization episodes for patients with cox/gonarthritis, at regional and local level, in the period 2012-2021

From the point of view of residential area where the patients with this diagnosis come from, it is noted that the most episodes of hospitalization were recorded in case of patients from urban areas (57%). Depending on the type of pathology that required hospitalization, the close proportions of the two conditions can be observed in the two environments of residence, with the slight predominance of

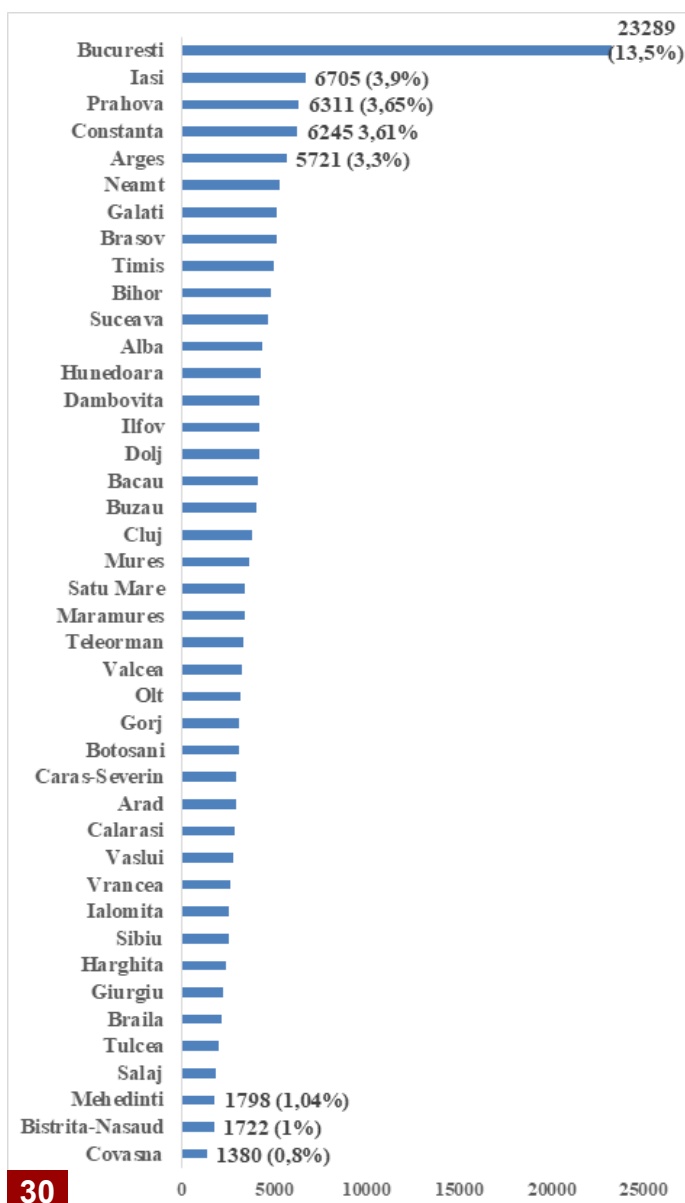
Graph no. 4. Distribution of hospitalization episodes for patients with cox/gonarthritis, at the regional level in Romania, in the period 2012-2021



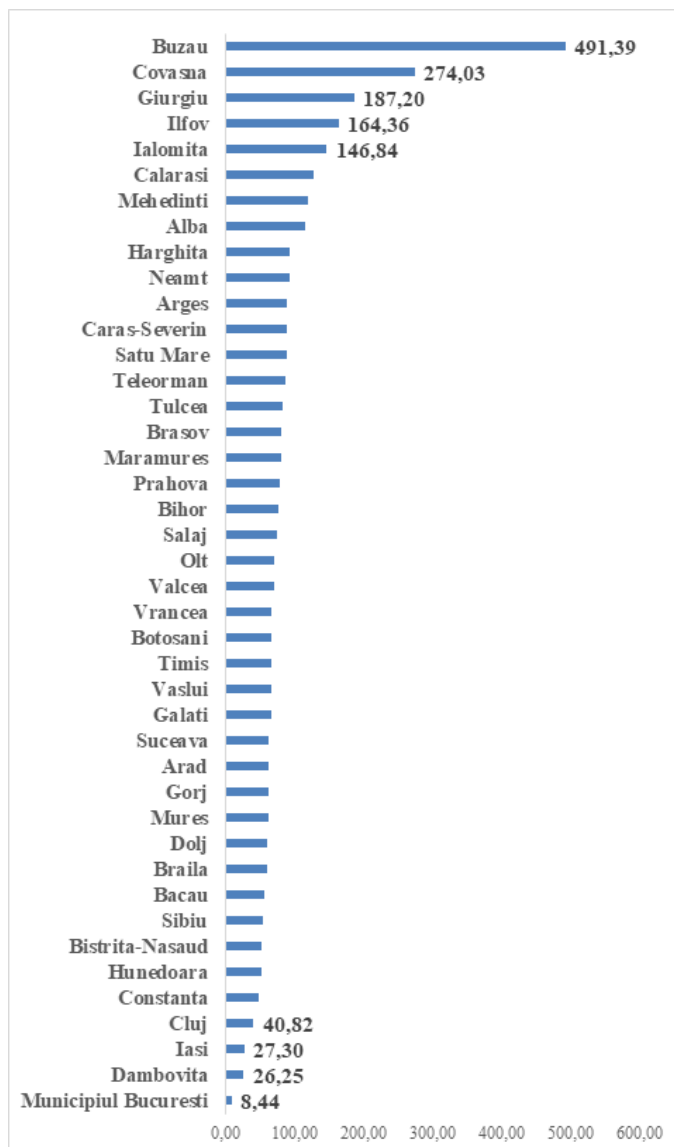
Graph no. 5. Distribution of hospitalization episodes for patients with cox/gonarthritis, depending on the population, at regional level, in Romania, between 2012-2021



Graph no. 6. Distribution of hospitalization episodes for patients with cox/gonarthritis, at local/county level, in Romania, in the period 2012-2021



Graph no. 7. Distribution of hospitalization episodes for patients with cox/gonarthritis, at local/county level, depending on the population of each county, in the period 2012-2021



gonarthritis in urban areas (49160 cases versus 48834) and coxarthrosis in the rural areas (38442 versus 36221). At the regional level, the most episodes of hospitalization for patients with cox/gonarthritis were registered during the study period in the regions of Bucharest-Ilfov (15.9% of the national total), South and North East with close values (15.8, respectively 15.5%). The West and South-West regions with approximately 8.8% and 9% had the fewest hospitalizations - graph no. 4.

Relative to the number of inhabitants, the descending order of regions that recorded episodes of hospitalization of patients with cox/gonarthritis was: Bucharest-Ilfov region (108.19 episodes/10,000 people), South region (84.2 episodes/10,000 people), South East (77.58 episodes/10,000 people), West (75.45 episodes/10,000 people), Center region (73.92 episodes/10,000 people), South West region (70.64 episodes/10,000 people), North East (67.73 episodes/10,000 people) and North West region (66.83 episodes/10,000 people) - graph no. 5.

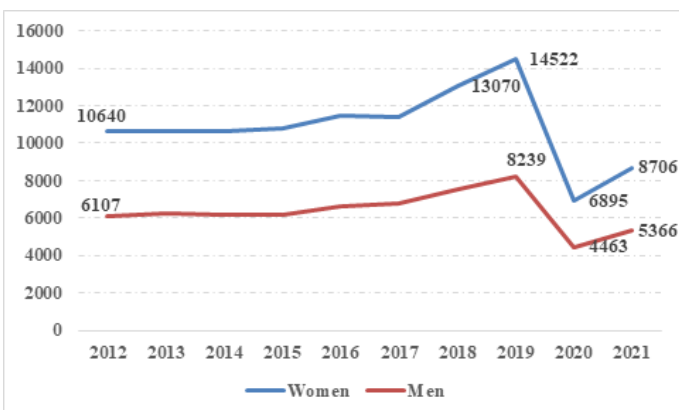
At the local level, the most episodes of hospitalization were recorded between 2012-2021 in the municipality of Bucharest, which has approximately three times more episodes than the following leading counties: Iași, Prahova, Constanța, Argeș - graph no. 6. In the last places, counties such as Covasna, Bistrita Năsăud, Mehedinți.

By population of each county, it can be seen from graph no. 7 that the counties of Buzău, (491.39 episodes/10,000 people), Covasna (274.03 episodes/10,000 people) and Giurgiu (187.2 episodes/10,000 people) are in first place and on the last, counties of Bucharest (8.44 episodes/10,000 people), Dâmbovița (26.25 episodes/10,000 people) and Iași (27.3 episodes/10,000 people).

5. Distribution of hospitalization episodes for patients with cox/gonarthrosis, depending on the patient's gender

Of the total number of episodes of hospitalization with the main diagnosis cox/gonarthrosis registered during the study period, most belonged to women, approximately 63%. The evolution over time was relatively constant for both conditions, with a maximum of hospitalized cases in 2019 (a 1.3-fold increase compared to the initial year) and a minimum in 2020 (a decrease of approx. 1.5 times) - graph no. 8.

Graph no. 8. Evolution of number of episodes reported in continuous hospitalization, in patients with cox/gonarthrosis, depending on the patient's gender, in the period 2012-2021, at national level



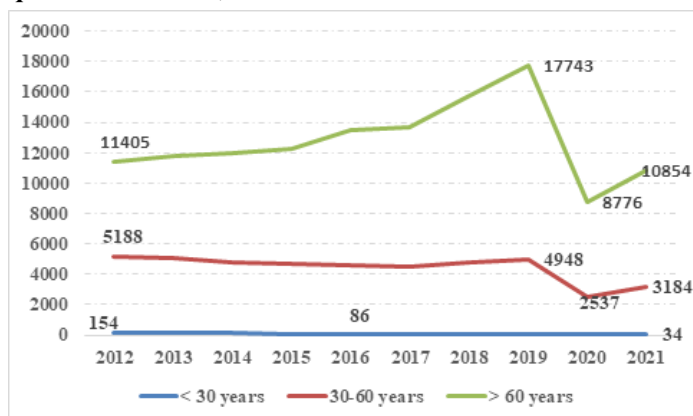
The analysis of the distribution of cases according to the patient's gender and the type of joint involvement indicates that most frequently women were hospitalized for gonarthrosis (57.4%), while men underwent hospitalizations for coxarthrosis (64.1%).

6. Distribution of hospitalization episodes for patients with cox/gonarthrosis, depending on the age of the patient

The analysis of data by age groups shows that for the entire study period, most episodes of hospitalization were recorded at ages over 60 years (74%). The next affected age group is that of adults between 30 and 60 years old (25.5%), and children and young people up to 30 years old had 0.49% of hospitalization episodes. The evolutionary

trend of the number of hospitalizations for patients over 60 was a constantly increasing one until 2019, the increase being 1.5 times compared to the initial year, then in 2020 and 2021 due to the limitation of hospital admissions, the number of hospitalizations was a reduced one. In the groups of adults and those under 30, the trend of hospitalizations was a decreasing one, in 2019 the number decreased by 1.04 times in the case of adults and 2.2 times in the case of children and young people - graph no. 9.

Graph no. 9. Evolution of the total number of episodes reported in continuous hospitalization, in patients with cox/gonarthrosis, depending on the patient's age, in the period 2012-2021, at national level



7. Distribution of hospitalization episodes in the case of patients with cox/gonarthrosis, according to the average duration of hospitalization

The average duration of hospitalization in the case of hospitalization episodes for patients with large joint damage (cox/gonarthrosis) was in the period 2012-2021 of 8.37 days, varying throughout the study period, the maximum value being observed in the years initial 2012 and 2013 (9.02 days, respectively 9.05 days) it decreasing in 2021 to the value of 6.82 days, the rest of the years varying between 7.4-8.9 days. By types of location, a value of 8.88 days is obtained for coxarthrosis and 7.03 days for gonarthrosis. Within each category, the maximum values were found for other primary coxarthrosis 10.03 days and other primary gonarthrosis 8.11 days. There are no significant differences in terms of the average length of hospitalization between the two sexes (8.38 days for women, 8.35 days for men). Depending on the age category, the highest values were recorded in people over 60 years old, in the case of coxarthrosis, the value was 9.08 days, and in the case of gonarthrosis, 6.87 days, by comparison, people from the 30- 60 years registering values of 8.23 days in the case of hospitalization for coxarthrosis and 5.36 days in the case of gonarthrosis.

8. Distribution of hospitalization episodes for patients with cox/gonarthrosis, depending on 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 reported in continuous hospitalization for

patients with cox/gonarthrosis, the vast majority of patients were discharged in an improved condition (87.6% of the total), cured being less than a tenth (9.4%). Extremely low percentages, 0.09% had an aggravated condition at discharge or died.

The calculated in-hospital mortality rate was 0.09% during the entire study period, its values oscillating between 0.059% in 2014 and 0.123% in 2015. Most of the deceased (108) had a diagnosis of joint damage from coxarthrosis category, especially primary coxarthrosis bilateral (39 deceased), compared to 43 deceased gonarthrosis patients, especially among those with primary gonarthrosis bilateral.

CONCLUSIONS

The conclusions emerging from the analysis of the data from the period 2012-2021, regarding the hospitalization of patients with cox/gonarthrosis are the following:

- The total number of hospitalization episodes for patients diagnosed according to the National DRG with one of the codes M16.0-M16.9 and M17.0-M17.9 in the period 2012-2021 was 172657 episodes, the most frequent (62%) registering cases coded primary coxarthrosis bilateral or other primary coxarthrosis. Knee joint involvement was most frequently coded at discharge as primary gonarthrosis bilateral or other primary gonarthrosis;
- The temporal evolution of the number of episodes of hospitalization due to cox/gonarthrosis is relatively constant, with certain not very large variations from one year to the next, with the maximum number of hospitalizations being recorded in 2019, while the minimum number of cases was observed in the year 2020;
- Most hospitalizations were recorded in orthopedics/traumatology departments and much less in internal medicine and rheumatology departments;
- More than half of those hospitalized come from the urban areas, being hospitalized predominantly for gonarthrosis, while rural patients suffered mostly from coxarthrosis;
- The analysis of the spatial distribution of hospitalizations due to cox/gonarthrosis indicates a predominance of cases in Bucharest-Ilfov (a fifth of the national total), South and North East regions, while by population the leaders are: Bucharest Ilfov, South and South East;
- On a local level, the highest absolute frequencies of hospitalizations were recorded in the municipality of Bucharest, with approximately three times more episodes than the following leading counties, Iași, Prahova, Constanța, Argeș, and by population of each county, on the first places are the counties of Buzău, Covasna and Giurgiu;
- As the main diagnosis of cox/gonarthrosis, most hospitalizations belonged to women, in terms of evolution over time this was relatively constant for both conditions, with a maximum number of hospitalized cases

in 2019 (a 1.3-fold increase compared to the initial year) and a minimum in 2020 (a decrease of approx. 1.5 times). Most frequently women were hospitalized for gonarthrosis, while men underwent hospitalizations for coxarthrosis;

- From the point of view of the age of the patients, almost three quarters of the hospitalizations were registered at ages over 60 years, and a quarter at adults between 30 and 60 years old. The evolutionary trend in patients over 60 was constantly increasing until 2019, then in 2020 and 2021 due to the limitation of hospital admissions, the number of hospitalizations was reduced. In the groups of adults and under 30 years, the trend of hospitalizations was a decreasing one, the most important reduction (a quarter of the total) in the young age group (20-35 years).
- The average length of hospitalization in the case of hospitalization episodes for patients with large joint damage (cox/gonarthrosis) was in the period 2012-2021 of 8.37 days, with a maximum value in the initial years 2012 and 2013 (9.02 days, respectively 9.05 days) decreasing in 2021 to the value of 6.82 days. By types of location, a value of 8.88 days for coxarthrosis and 7.03 days for gonarthrosis. Within each category, the maximum values were found for other primary coxarthrosis 10.03 days and other primary gonarthrosis 8.11 days, between the two sexes there are no important differences, and depending on the age category, the highest values is recorded in people over 60 years old, in the case of coxarthrosis, the value was 9.08 days, and in the case of gonarthrosis, 6.87 days;
- Depending on the patient's condition at discharge, the data analysis indicates that the vast majority of patients were discharged in an improved condition and only extremely small percentages, had an aggravated condition at discharge or died.
- The calculated in-hospital mortality rate was 0.09% over the entire study period, with values between 0.059% in 2014 and 0.123% in 2015. Most of the deceased (108) had a diagnosis of joint damage from coxarthrosis category, especially primary coxarthrosis bilateral (39 deceased), compared to 43 deceased gonarthrosis patients, especially among those with primary gonarthrosis bilateral.

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