

INFLUENZA HOSPITALIZATION EPISODES IN ROMANIA, ANALYSIS OF THE LAST 5 YEARS

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INTRODUCTION

Influenza viruses belong to the family Orthomyxoviridae and are of three types. Types B and C, although pathogenic to humans, have low genetic variability, do not have subtypes and rarely cause epidemics. In contrast, the influenza A virus, which affects both humans and animals, has a wide genetic variability (with minor, seasonal and major mutations), has increased virulence and is responsible for major epidemics and pandemics. Depending on the antigenic transmembrane glycoproteins, haemagglutinin (H or HA), which secures the host cell and neuraminidase (N or NA) receptor binding, which allows detachment of newly formed viral particles from the surface of the respiratory epithelial cells, classification and naming of the viral strains are performed. [1].

According to WHO, the current human subtypes are A (H1N1) and A (H3N2). The first of these is also called A (H1N1) pdm09, because it has caused the 2009 pandemic, replacing subtype A (H1N1), which had circulated previously.

International statistical data show that seasonal influenza can affect up to 20% of the population, depending on the type of virus in circulation, and the associated mortality can be substantial. According to these statistics, about 65,000,000 people die annually from this cause globally, the number of deaths in the European region being 72,000 [2].

In Romania, virologic surveillance has identified the following situation (data for the 2019-2020 influenza season not available at the moment) [3-6]:

Influenza season 2015-2016	Influenza season 2016-2017	Influenza season 2017-2018	Influenza season 2018-2019
1526 influenza viruses detected	758	1751	2310
107 deaths from influenza virus confirmed	22 deaths with influenza virus confirmed	129 deaths from influenza virus confirmed	199 deaths from influenza virus confirmed

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AIM. Analysis of the morbidity hospitalized by influenza, analysis carried out taking into account the minimum set of data at the patient level.

METHOD. a descriptive, retrospective study, which used data from the National DRG Database, data reported under continuous hospitalization by the hospitals in Romania in contractual relationship with the National Health Insurance House.

RESULTS. In the period 2015-2019 was 102797 episodes, influenza has represented 0.5% of the total episodes of hospitalization at national level. Most frequent type was influenza pneumonia, with virus or with unidentified influenza virus counting together double compared to the episodes of hospitalization through the other codifications. The temporal evolution of the episodes of hospitalization due to influenza during this period was an ascending one, in 2019 registering more than double compared to the number of hospitalization episodes in 2015 and the most important increases being observed at the level of 2018 and 2019. Frequently, hospitalized influenza was registered preponderantly for women with extreme ages (0-9 years, respectively 60 years) from counties such as Bucharest, Ilfov, Cluj, Dâmbovița, with viral pneumonia as diagnosis and an average hospital stay of 5.85 days and hospital mortality rate of 1.85%.

CONCLUSIONS. In the current context of increasing year by year the number of cases with severe acute respiratory infections, which require hospitalization, as well as the increase in the number of deaths among patients hospitalized with influenza, we consider that information and education measures are a priority for population health. These mesurers will limit the serious impact of these acute conditions not only at the individual level, but through a better educated population from the point of view of hygiene and sanitation knowledge, sanogenic behaviors and healthy lifestyle, in order to tend to reduce the social, economic and health impact of these cases.

Keywords: influenza, viral, pneumonia, Romania, hospital

However, as most cases of influenza are diagnosed clinically, and apart from the epidemic periods, the similar symptoms can be determined by other pathogens (rhinoviruses, adenoviruses, respiratory syncytial virus, etc.), in the literature there are defined two entities used in reporting cases: Influenza-like Illness (ILI), for which the definition of the case includes fever above 38° C, with sudden onset, dysphagia and cough, respectively Severe acute respiratory disease (SARI), for this to be added dyspnea and the need for hospitalization.

In the reports of the National Center for Surveillance and Control of Communicable Diseases for the analyzed period, the reported cases of type ILI and SARI are much more numerous than those with confirmed influenza virus, the reports coming from all types of medical units in the health system. The present study proposes an analysis of the morbidity hospitalized by influenza, analysis carried out taking into account the minimum set of data at the patient level, reported through the DRG system to the National School of Public Health, Management and Professional Development, Bucharest (NSPHPDB).

OBJECTIVE

Identification at national, regional and local level of the geographical distribution of hospitalization episodes due to influenza, as well as the temporal evolution of their number, in the period 2015-2019. →

METHODOLOGY

The present article is based on a descriptive, retrospective study, which used data from the National DRG Database, data reported under continuous hospitalization by the hospitals in Romania in 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 completions and modifications, NSPHPDB collects and processes the minimum patient-level data set for the cases treated during continuous and day hospitalization.

The data used in this study were reported in the period 2015-2019. The analysis of the data regarding the episodes of hospitalization by influenza in Romania was followed, in the hospitals mentioned above (hospitalizations under continuous hospitalization). The data were selected using ICD-10-AM classification, the records from the observation sheets that had as main diagnosis one of the codes were extracted and analyzed: Influenza with other respiratory manifestations, influenza virus identified - J10.1, Influenza with others respiratory manifestations, unidentified virus - J11.1, Influenza with other manifestations, influenza virus identified - J10.8, Influenza with other manifestations, unidentified virus - J11.8, Influenza influenza, influenza virus identified - J10.0, Influenza influenza, unidentified virus - J11.0. In accordance with the provisions of Law 190/2018 and Article 13 of EU Regulation no. 679/2016, the personal data are deleted at the moment of transmission to NSPHPDB, and the identification of the persons for the purpose of the analysis is made on the basis of encrypted PNC.

The age of the patients was calculated in fulfilled years, as a difference between the date of admission 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 programs. The analysis was performed according to a series of demographic and socioeconomic variables, such as patient's sex, age, length of hospitalization, etc., information included in the minimum data set reported in the DRG system by hospitals. Interpretation and presentation were done in the form of tables and graphs

RESULTS

Data interpretation was performed in relation to a number of demographic variables and socioeconomic characteristics (sex, age, length of hospitalization, intra-hospital mortality rate, outpatient

status), following the geographical distribution and temporal evolution of the main types of influenza, diagnosed / admitted to hospitals in our country in the period 2015-2019.

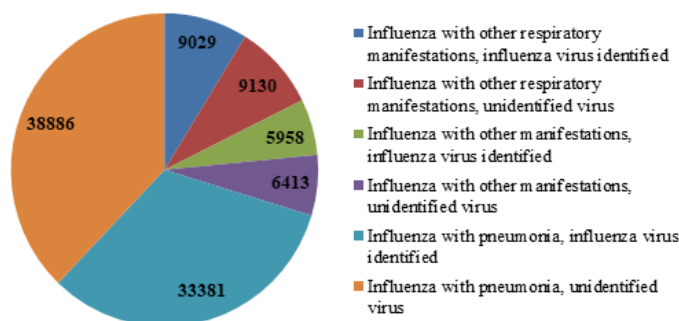
1. Total number of continuous hospitalization episodes, registered in Romania, between 2015-2019

The total number of continuous hospitalization episodes for patients with influenza registered in Romania, in the period 2015-2019 was 102797 episodes, representing 0.5% of the total episodes of hospitalization at national level during this period. By types of influenza hospitalized during that period, the most common were influenza pneumonia, with unidentified virus - 37.8% of the national level and influenza pneumonia, with influenza virus identified - 32.5%, together counting for double compared to the episodes of hospitalization through the other codifications. The number of influenza hospitalization episodes throughout the study period can be traced in graph no.1

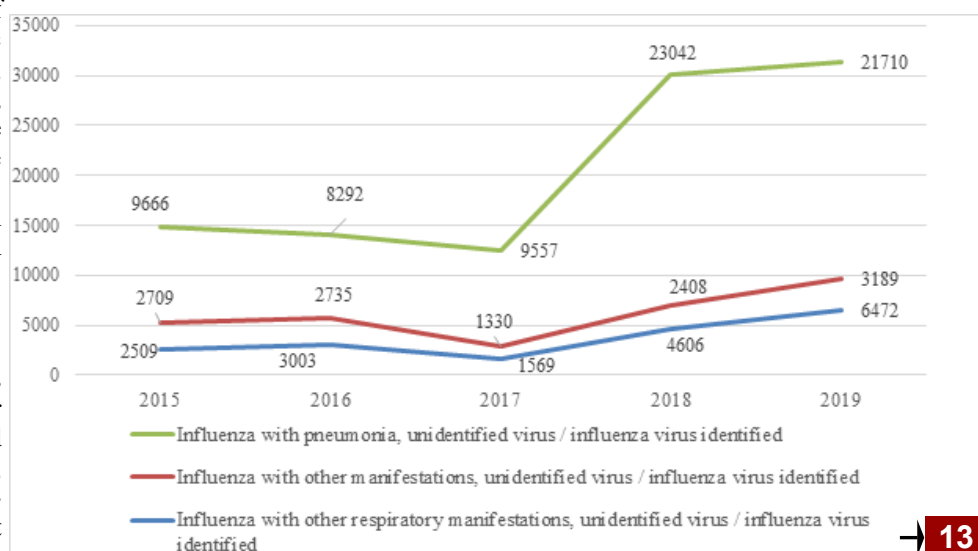
2. The temporal evolution of the hospitalization episodes due to influenza in Romania, in the period 2015-2019

The temporal evolution of the episodes of hospitalization due to influenza during this period was an ascending one,

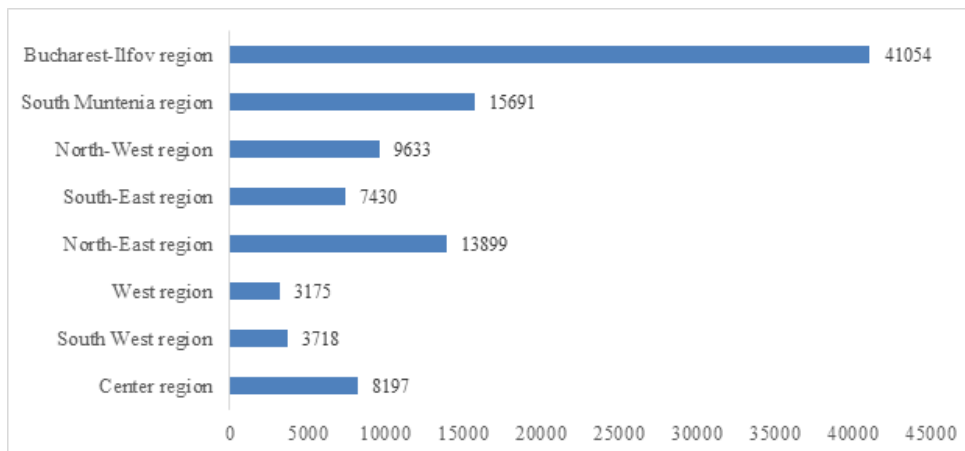
Graph no. 1. Influenza episodes that resulted in continuous hospitalization, in Romania, between 2015-2019



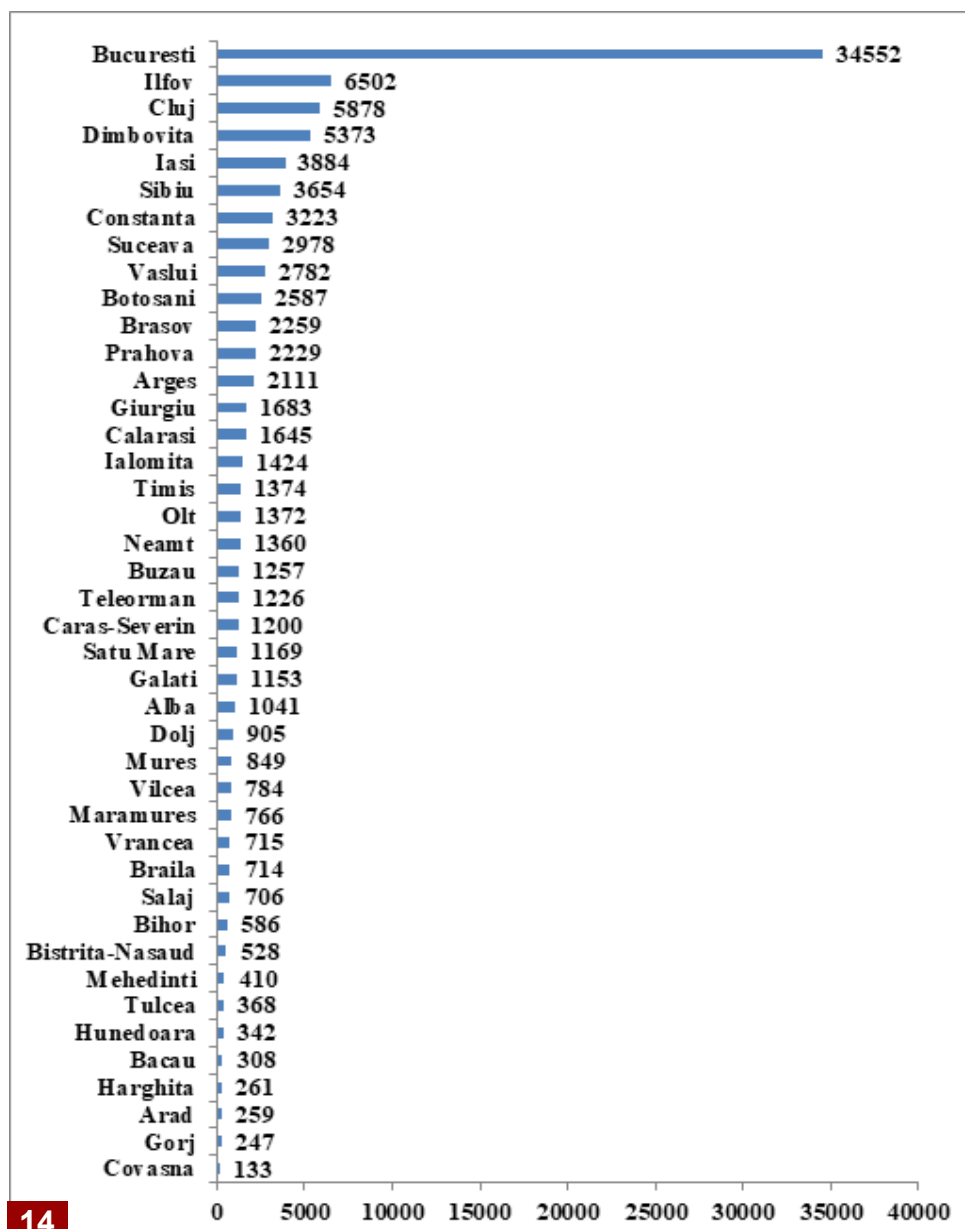
Graph no. 2. Evolution of the total number of episodes reported under continuous hospitalization, by influenza, registered between 2015-2019, at national level



Graph no. 3. Distribution of hospitalization episodes due to influenza, at regional level in Romania, between 2015-2019



Graph no. 4 Distribution of hospitalization episodes due to influenza, at local / county level, in Romania, between 2015-2019



in 2019 registering more than double compared to the number of hospitalization episodes in 2015 (31371 in 2019 as against 14884 in 2015), the most important increases being observed at the level of 2018 and 2019 (graph no.2).

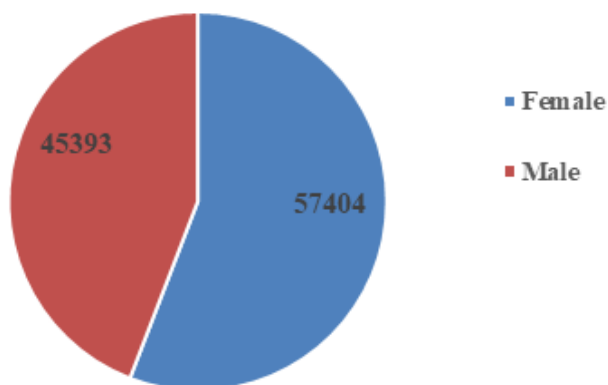
One of the possible causes of this evolution is the low level of influenza vaccine coverage in our country, which in the whole population had values of 3.2% in the 2015-2016 season, 2.5% in the 2016-2017 season and 5.2 % in the 2017-2018 season, compared to other European countries, where the flu vaccine coverage among the adult population was 60% in the Netherlands, 21.6% in Hungary, 50% in Italy, 56.1% in Spain, etc. A slightly better situation is reported by our country in terms of healthcare personnel, where vaccine coverage varies between 30.2% and 34% over the same period, as well as for persons in long-term care units, where they have been reached values of 69% [7].

3. Distribution of influenza hospitalization episodes, at regional and local level, between 2015-2019

At regional level, most episodes of hospitalization due to influenza were registered in the study period in the Bucharest-Ilfov (40% of the national total), South-Muntenia (15.3%) and North-East regions (13, 5% of the national total). The West and South-West regions recorded the fewest episodes of hospitalization by this main diagnosis, below 4% each - graph no. 3. At local level, the most episodes of influenza hospitalization were registered between 2015-2019 in Bucharest, Ilfov, Cluj and Dâmbovița counties, at the opposite pole being Covasna, Gorj, Arad and Harghita counties, with the fewest hospitalization episodes. (graph no. 4)

Regarding Influenza with other respiratory manifestations, with the identified / unidentified influenza virus, the most episodes of hospitalization were recorded in Bucharest (8560 episodes), Cluj (1533 episodes) and Iași (1202 episodes).

Graph no. 5. The number of hospitalization episodes due to influenza, according to the patient's gender, in Romania, between 2015-2019



In the case of influenza with pneumonia, most hospitalizations were registered in Bucharest (36485 episodes), Cluj and Dâmbovița, under 400 cases, and for Influenza with other manifestations the highest number of hospitalization episodes is also found in Bucharest (7771 episodes), Sibiu and Iasi, under 1000 admissions.

4. Distribution of hospitalization episodes due to influenza, according to the sex of the patient

Of the total number of hospitalization episodes due to influenza at national level, the data analysis indicates that most were female (55.8% of the total) - graph no. 5

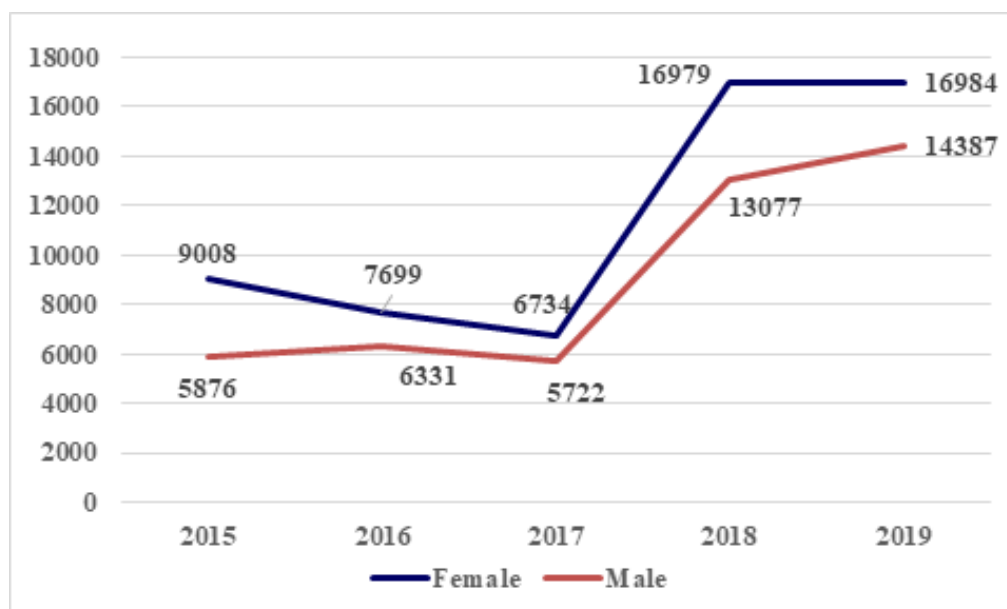
The evolution of hospitalization episodes number during the study period was an ascendant in both sexes, in 2019 the increase in the number of hospitalizations under continuous hospitalization compared to 2015, being higher

in the case of women approx. by 53% compared to an increase of approx. 41% for men - graph no. 6.

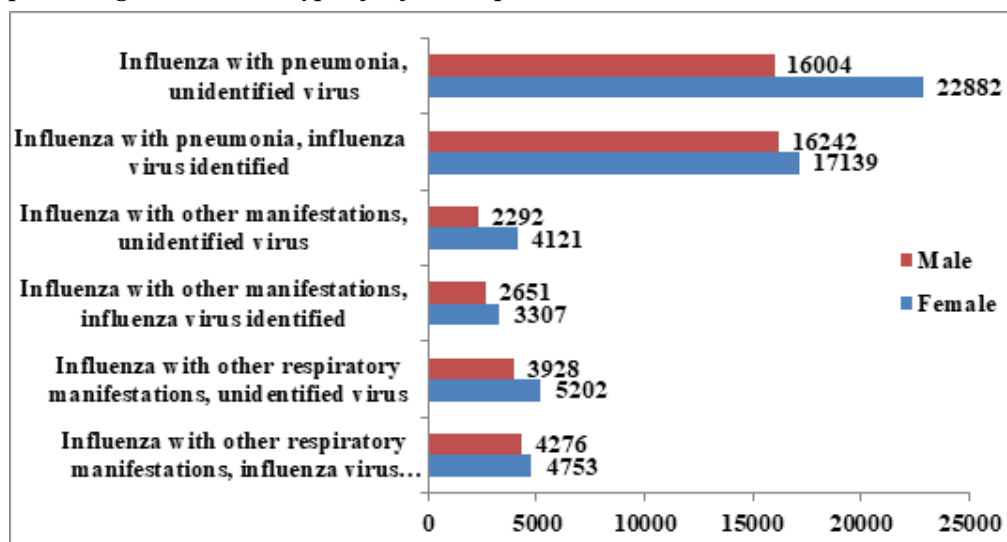
In both women and men, the most frequent hospitalizations were determined by the episodes of influenza with pneumonia, followed by those of influenza with other respiratory manifestations - graph no. 7.

The study of the distribution in hospitalization episodes number according to the patient's gender indicates that for both sexes, the most admissions took place in Bucharest and Ilfov, Cluj and Dâmbovița counties, the most patients having as diagnosis pneumonia with the identified virus or unidentified. The areas with the lowest number of hospitalization episodes were for men Covasna and Bacău counties (under 100 cases during the entire study period), and for women Covasna and Harghita counties.

Graph no. 6. Evolution of the number of hospitalization episodes due to influenza, according to the patient's gender, in Romania, between 2015-2019



Graph no. 7. The number of hospitalization episodes due to influenza, according to the patient's gender and the type of influenza presented, in Romania, between 2015-2019

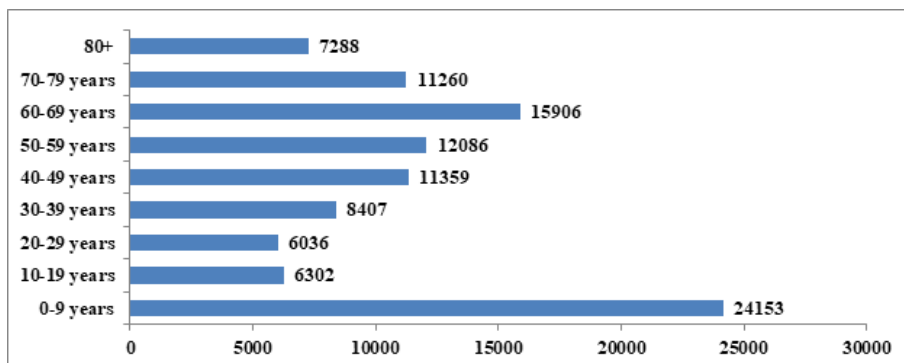


5. Distribution of hospitalization episodes due to influenza, according to the patient's age

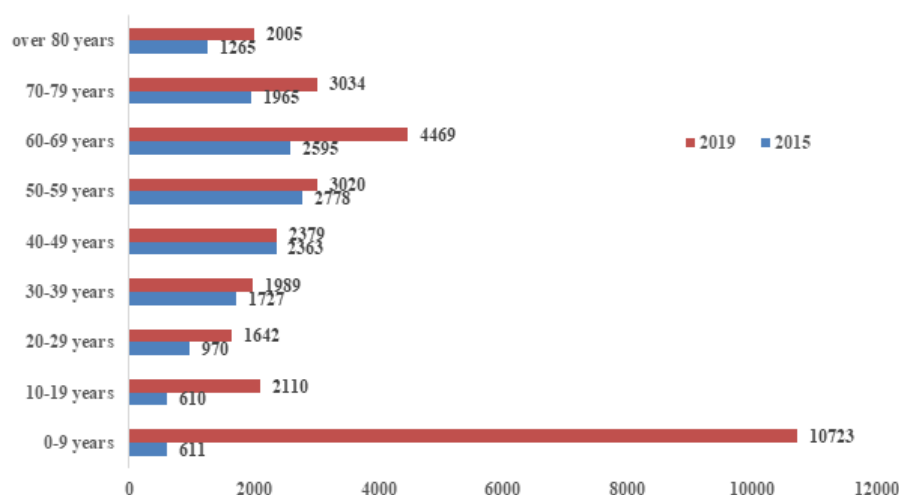
The analysis of the data by age groups indicates that at national level, for the entire study period, most episodes of hospitalization were registered in the extreme age categories, respectively 0-9 years (23.5% of the national total) and over 70 years (18%).

Important percentages → 15

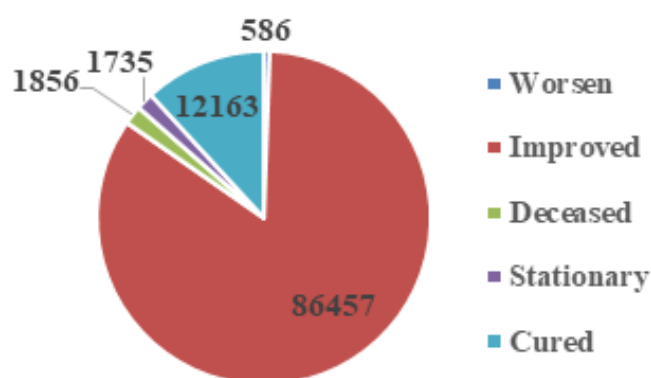
Grafic nr.8. Distribuția numărului episoadelor de spitalizare datorate gripei, în funcție de grupele de vârstă ale pacienților, în România, în perioada 2015-



Graph no. 9. Evolution of the hospitalization episodes number due to influenza, according to the age groups of patients, in Romania, in 2019 compared to 2015



Graph no. 10. The number of hospitalization episodes due to influenza, according to the discharge status of patients, in Romania, in the period 2015-2019



are also found in the age categories of 50-59 years (12%) or 60-69 years (15%) - graph no. 8

In all age groups, most hospitalizations were registered for pneumonia.

From the point of view of the evolution of hospitalization episodes number, it can be seen that in the extreme age groups 0-9 years and over 60 years, there was a significant

increase of the admissions in 2019 compared to 2015, practically to none of age categories. there is no reduction of this number - graph no. 9.

In the age group 0-9 years most hospitalized cases were registered in Bucharest and Ilfov, Cluj, Dâmbovița counties, and the fewest in Botoșani, Bacău and Hunedoara counties (under 30 episodes). Over 60 years old, patients were hospitalized with this diagnosis especially in Bucharest, Cluj and Dâmbovița counties, the fewest hospitalizations occurring in Covasna, Harghita, Gorj and Arad counties, under 100 episodes of hospitalization during the whole period.

6. Distribution of hospitalization episodes due to influenza, depending on the average length of stay

The average duration of hospitalization in the case of episodes of hospitalization for influenza under continuous hospitalization was 5.85 days during the period 2015-2019, varying throughout the study period, the maximum value was recorded in 2015 - 6.15 days, falling in 2019 to 5.66 days, the trend being a slow and steadily decreasing one. The highest average value of hospitalization was registered in the case of influenza with pneumonia - 6.27 days, also with a decreasing tendency from 8 days in 2016 to an average value of 6.09 days in 2019. The average value most reduced for flu cases with other manifestations, unidentified virus - 4.93 days.

The highest average lengths of hospitalization for influenza were recorded in the hospitals in Arad counties (9.52 days), Caraș-Severin (9.11 days), and Giurgiu (8.57 days), and the lowest in Ialomița (3.94 days), Covasna (4.36) and Mehedinti (4.91 days).

7. Distribution of hospitalization episodes due to influenza, depending on the patient's discharge status and the in-hospital mortality rate

Depending on the patient's discharge status, the data analysis indicates that out of the total number of episodes reported in continuous hospitalization due to influenza, the majority of patients were discharged in an improved condition (84% of the total). 12% of patients were cured, 1.7% were declared stationary, and small percentages, less than 2% died or aggravated - graph no. 10.

The calculated intra-hospital mortality rate from influenza was 1.8% over the entire study period, with a slowly increasing trend from 2015, from 1.2% to 2.3% in 2019, the most high value registering in 2016 - 2.6%, and the lowest in 2017 - 1.1%. Most deaths were registered in the categories: influenza pneumonia with identified virus (68% of all influenza deaths), in persons over 60 years (66% of all deaths).

CONCLUSIONS

In the period studied 2015–2019, in Romania a percentage of 0.5% of the total episodes of hospitalization under continuous hospitalization was determined by the flu. The most common cause of hospitalization according to DRG classification was influenza pneumonia, unidentified virus or identified influenza virus, representing together a double number compared to the episodes of hospitalization through the other codifications. Other causes were influenza with other respiratory manifestations with unidentified virus or identified influenza virus and influenza with other manifestations with unidentified virus or identified influenza virus.

The evolutionary trend of hospitalizations during the study period was an ascending one, the number doubling in 2019 compared to 2015, the most important increase being observed in the last two years.

As a spatial distribution, most of the hospitalized patients came from the Bucharest-Ilfov region or the South-Muntenia and North-East regions, the best represented counties from this point of view being Bucharest, Ilfov, Cluj, Dâmbovița counties, but also Iasi and Sibiu counties in case of influenza with other manifestations.

The most frequently affected were women, as an absolute number of the hospitalization episodes and in terms of the increasing tendency of hospitalizations until 2019, with more than half compared to 2015. In fact, the upward trend is also observed in the case of men. The most common cause of hospitalization for both sexes was influenza pneumonia with unidentified virus or identified influenza virus. Most hospitalizations were registered by patients of both sexes from Bucharest and Ilfov, Cluj and Dâmbovița counties. The areas with the lowest number of hospitalization episodes for men were Covasna and Bacău counties, and for women Covasna and Harghita counties.

From the age point of view, the most affected, in the sense that they suffered the most hospitalizations, were the patients from the extreme ages 0-9 years (about a quarter of the total) and over 60 years (about one fifth of the total).), most of them with influenza with pneumonia. None of the age categories showed any reduction in the number of hospitalizations during the study period, the tendency of hospitalizations being ascending, especially in the last two years. Most cases of hospitalized children were registered in Bucharest and Ilfov, Cluj, Dâmbovița counties, and the fewest in Botoșani, Bacău and Hunedoara counties. While in the category over 60 years old, the patients were hospitalized especially in Bucharest, Cluj and Dâmbovița counties, the fewest hospitalizations occurring for patients from Covasna, Harghita, Gorj and Arad counties.

The average length of hospitalization for this type of illness, at national level, for the entire study period was 5.85 days and it registered a value reduction over time, slowly and continuously decreasing, with almost a tenth of the value. the highest, observed in 2015. The highest value, but also the most important reduction was registered for the flu with pneumonia. The highest average lengths of hospitalization for influenza were registered in hospitals in the West (Arad and Caraș-Severin) and South-Muntenia (Giurgiu) regions, and the lowest in Center (Covasna) and South-West regions (Mehedinti).

More than three quarters of hospitalized influenza patients were discharged improved and only small percentages, less than 2% deceased or aggravated, the calculated intra-hospital mortality rate from influenza being between 2015-2019 of 1.8%, with a slowly increasing trend from 2015 to 2019. Most deaths were registered in the categories: influenza pneumonia with identified virus, in people over 60 years old.

In the current context of increasing year by year the number of cases with severe acute respiratory infections, which require hospitalization, as well as the increase in the number of deaths among patients hospitalized with influenza, we consider that information and education measures are a priority. for population health. These measures will limit the serious impact of these acute conditions not only at the individual level, but through a better educated population from the point of view of hygiene and sanitation knowledge, sanogenic behaviors and healthy lifestyle, in order to tend to reduce the social, economic and health impact of these cases.

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