

# Main epidemiological features of COVID-19 cases admitted in a first line defence hospital from Bucharest, Romania

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## ABSTRACT

In this retrospective unicenter study we aimed to outline the key features of the first 100 cases of COVID-19 hospitalized in our clinic after designation of it as front line unit for hospitalization of these cases. Thus, the average age of cases was 44.7 years (SD: 15.9) and the prevalence of female was 57.4%. By age groups, prevalence of young patients (7.8%) was significantly ( $p < 0.05$ ) lower than the prevalence of adult patients (77.2%). The most prevalent occupation (31.7%) was healthcare worker. The most frequent exposure to source of infection was represented by attending healthcare facilities (44.6%), followed by having contact with COVID-19 confirmed/suspect case (30.7%), and recent international travel (18.8%). Of the 30% of cases in which at least one health precondition was recorded the most prevalent (13.9%) of such condition was chronic cardiovascular disease including high blood pressure. In regard with severity, to note that 6 patients died within 14 days of hospital admission, all fatalities have occurred in very old patients and 83.3% of them had chronic kidney disease. In the end, we express the hope that data outlined in this paper will help for better management of COVID-19 pandemic.

**Keywords:** COVID-19, SARS-CoV-2, first line defence hospital, hospital admission, epidemiological features

## BACKGROUND

On January 30, 2020, The World Health Organization (WHO) declared the outbreak provoked by the novel coronavirus (2019-nCoV) a public health emergency of international concern (1). On March 11, 2020, WHO characterised COVID-19 as a pandemic (2). This follows after, on the last day of 2019, Chinese authorities officially announced that they were managing an outbreak of pneumonia with an unknown cause. On January 7, 2020, the idiopathic pneumonia was reported to have been caused by a new coronavirus, and information regarding the organism has been made available to researchers around the world (3).

WHO tentatively named this new virus as the 2019 novel coronavirus (2019-nCoV). As epidemiologic characteristics of this new disease are unknown, they are being investigated based on comparisons with the clinically similar Severe Acute Respiratory Syndrome and the Middle East Respiratory Syndrome. Rapid investigation and determination of epidemiologic characteristics of new infectious diseases is crucial in order to limit the transmission and to attain a desirable treatment outcomes through early diagnosis and management. Sharing of crucial data by epidemiologists around the world is highly critical and it could help to definitively determine characteristics of this new in-

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fectious disease and to prevent its additional spread accordingly.

Similarly with other works based on assesment of a small sample of cases at the beginning of epidemic (3,4), this paper is an risk assesment of the first 100 of COVID-19 cases admitted in our first line defence infectious and tropical diseases clinic, cases in which the infection source, the mechanism of transmission and susceptible host were clarely discened making possible to generate incidences, prevalences, 95% confident limits and also regression coeficients for trend. These parameters, which are not simply to be calculate during the community transmission phase of the patogen, are needed by policy makers to make estimations of supplies and also to take highly effective control decisions (including unfriendly) in accordance with field reality, avoiding in this way improvisations and guessing.

## OBJECTIVE

Aim of this work was to emphasize the main epidemiological features of COVID-19 cases admitted in our 490 beds first line system hospital in order to provide basically notions for control measures to the persons in charge.

## METHODS

### Data set

In Bucharest, Romania, timely evolving of COVID-19 epidemic/pandemic implied appearance in the first tempo of imported cases, followed by a second tempo, dominated by locally transmitted cases with easily to recognisable source of infection (e.g. health-care facility or confirmed/suspect persons) and the third tempo defined as community transmission period, dominated by cases to whom it is imposible to associate a source and a transmission mechanism of infection. Our sample includes COVID-19 cases, belonging to the first and second tempos of epidemic, cases admited in our hospital between 05/03/2020 and 24/03/2020.

### Source of data

All data were withdrawn from the case based surveillance form (5), which represents the legal document destined to vehiculate socio-demografic, clinical and epidemiological information related to each

confirmed COVID-19 case, from operational level up to decision taken level.

### Case definition

A confirmed COVID-19 case is a Bucharest municipality resident, with at least one positive result by real-time reverse-transcription-polymerase-chain-reaction (RT-PCR) assay for 2019-nCoV or a genetic sequence that matches 2019-nCoV (6).

### Time profile

Epidemic curve shape was built through assortment of cases by a calendar week's rank based on hospital admission date (e.g. a case with hospital admission date of March 12<sup>th</sup> was allocated to the week ranked 11<sup>th</sup>). The trend in the number of cases per week was assesed by linear regression.

### Data management

An EpiInfo data base (7) was powered with data contained in the surveillance form and interogated as needed. Signification – software default of 0.05 was accepted for statistical signification.

### Sampling

It was not necessary as all cases fullfiled including criteria were enlisted consecutively in the study set.

### Ethical approval

Data collection of casses was determinated by the relevant National Task Force to be part of a continuing public health outbreak investigation and were thus considered exempt from institutional review board approval.

## RESULTS

A total of 101 cases of COVID-19 fulfilled including criteria; the mean age of cases was 44.7 years (SD: 15.9) (IQR: 36-53 years);

By gender, 58 of the patients were female and 43 were male (table 1); incidence of cases by gender was similar: (5.10 vs 4.31) [(relative risk (RR): 1.18; 95% confidence interval (CI): (0.80-1.71);  $\chi^2$ : 0.70; p value: 0.4031)].

**TABLE 1.** Prevalence (%) and incidence of the COVID-19 admitted cases by gender

Gender	No. (percents) (95% confidence limits)	Incidence (cases/10 <sup>5</sup> habitants)
Female	58 (57.4%) (47.2%-67.2%)	5.10
Male	43 (42.6%) (32.8%-52.8%)	4.31
Total	101 (100.0%)	4.74

By age groups the most prevalent was “Adult” group (77.2%) (table 2); the higher incidence was also calculated in the “Adult” group of age.

Incidence of cases in “Adult” was statistical significant higher than in the “Junior” group (5.59 vs. 2.17) [(RR: 2.57; 95%CI: (1.24-5.31);  $\chi^2$ : 6.94; p: 0.0084], but was similar with incidence in the “Senior” age group [(RR: 1.38; 95%CI: (0.79-2.40);  $\chi^2$ : 1.32; p: 0.2512].

**TABLE 2.** Prevalence (%) and incidence of the cases by age group

Age group ID and range	No. (percents) (95% confidence limits)	Incidence (cases/10 <sup>5</sup> habitants)
Junior (0-19 yrs)	8 (7.9%) (3.5%-15.0%)	2.17
Adult (20-64 yrs)	78 (77.2%) (67.8%-85.0%)	5.59
Senior (65 + yrs)	15 (14.9%) (8.6%-23.3%)	4.05
Total	101 (100.0%)	4.74

## Exposure

Prevalence of the cases by the nature of exposure ranged from 5.9% in community aquired class until to 44.6% for exposure in the healthcare facilities class (table 3).

**TABLE 3.** Prevalence (%) of the cases by exposure type – sorted in descended order

Circumstances of exposure within 14 days prior to hospital admission –*)	No. (percents of total)	95% confidence limits
Attended healthcare facility	45 (44.6%)	36.7%-54.8%
Had contact with confirmed suspect case	31 (30.7%)	21.9% – 40.7%
Undertook recent international travel	19 (18.8%)	11.7%-27.8%
None of above (community aquired)	6 (5.9%)	(2.2%-12.5%)
Total	101 (100.0%)	-

\*) Selected the most plausible exposure when multiple were reported

Prevalence of exposure class by gender was similar [ $\chi^2$ : 5.05; degree of freedom (df): 3; p: 0.1676], but the prevalence of cases by age group differed significantly [ $\chi^2$ : 13.63; df: 6; p: 0.0340]. The most prevalent

exposure in the “Junior” group (50.0%) was by contact with a confirmed/suspect case, while the most prevalent exposure of the “Adult” group (47.4%) and “Senior” group (46.7%) was consumed by attending a healthcare facilities (table not shown here).

## Occupation

Healthcare worker was found the most prevalent occupation (31.7%) (table 4).

**TABLE 4.** Cases' prevalence by occupation – sorted in descended order, except category “Others”

Occupation *	No. (percents of total)	95% confidence limits
Healthcare worker	32 (31.7%)	22.8%-41.7%
Retired	14 (13.9%)	7.8%-22.2%
Public services worker	9 (8.9%)	4.2%-16.2%
Unemployed	7 (6.9%)	2.8%-13.8%
Student (6-24 years of age)	7 (6.9%)	2.8%-13.8%
Preschool child (aged under 7 years)	3 (3.0%)	0.6%-8.4%
Other occupation	29 (28.7%)	20.1%-38.6%
Total	101 (100.0%)	-

## Health preconditions

No health precondition listed in the surveillance form was found in a number of 70 of our cases (69,9%); for the rest of cases the most prevalent noted health precondition was chronic cardiovascular disease including high blood pressure (13.9%) (Table 5).

**TABLE 5.** Health preconditions associated with COVID-19 cases, sorted in descended order, except category “None”

Health preconditions *	No. (percents of total)	95% confidence limits
Chronic cardiovascular disease including HBP	14 (13.9%)	7.8% – 22.2%
Oncologic/haematologic chronic disease	5 (5.0%)	1.6%-11.2%
Chronic kidney disease including dialysed	5 (5.0%)	1.6%-11.2%
Chronic liver disease	2 (2.0%)	0.2%-7.0%
Immunodeficiency	2 (2.0%)	0.2%-7.0%
Type 2 diabetes	1 (1.0%)	0.0%-5.4%
Chronic pulmonary disease including BPOC	1 (1.0%)	0.0%-5.4%
Pregnancy	1 (1.0%)	0.0%-5.4%
None	70 (69.9%)	59.3%-78.1%
Total	101 (100.0%)	-

\*) There were selected the most severe ones, if multiple health precondition were reported per subject.

## Signs/Symptoms

Due to nature of case definition based solely on laboratory result we excluded analysis of signs/symptoms found at hospital admission.

## Severity

6 patients died within 14 days of hospital admission – below are listed the main features of died patients:

- Cases fatality rate (CFR): 5.9% (95% CL:2.2%-12.5%)
- 83.3% of the fatal cases reported with chronic kidney disease
- All fatal cases (100.0%) belong to the “Senior” age group
- Gender was distributed equal between fatal cases.

## Time profile

During the first three consecutive weeks the frequency of COVID-19 cases admitted in hospital increased from 4 cases in the week ranked 10<sup>th</sup> until to 76 cases in the most recent complete week (Table 6). The results of linear regression of cases frequencies per week rank were as follows: correlation coefficient ( $r^2$ ): 1.00; regression coefficient ( $\beta$ ): 36 cases; std error: 0.577; F-test: 3888.0; p value: 0.0000.

**TABLE 6.** Frequency of new cases per calendar week rank

Week rank (date end Sunday)	No. hospital admissions
10 <sup>th</sup> (08/03)	4
11 <sup>th</sup> (15/03)	41
12 <sup>th</sup> (22/03)	76
13 <sup>th</sup> (29/03)*	17

\*) incomplete – see study sample' size

## DISCUSSION

### Age & gender

In our data set we found an average age of 44,7 years (SD: 15.9) including 58 males and 54 women. By contrast, at the beginning of the COVID-19 outbreak, Chinese researchers described an average age

of 55.5 years (SD 13.1) including 67 men and 32 women (4,8). We can speculate that the older patients might have increased CFR in China. Also to note the weak representation of children and teenagers (7.8%) in our data set.

### Occupation

The most striking result of our assessment was the unexpected high prevalence of healthcare worker among reported occupations (31.7%). We think that this is due a superspreading effect, a phenomenon reported frequently at the beginning of an epidemic (9,10). However, we like to stress that “longer duty hours, and suboptimal hand hygiene after contacting with patients were linked to COVID-19” were validated risk factors between healthcare workers (11).

### Cases fatality rate

CFR found in this report is higher than the one reported in China (12). However, to note that the total number of COVID-19 cases (i.e. CFR's denominator) is likely higher due to inherent difficulties in identifying and counting mild and asymptomatic cases.

### Time profile

Because of the superspread effect, we avoided to proceed to an estimation of reproductiv number ( $R_0$ ) as other researchers did (13). Instead we scrutinized the trend based on linear regression, which confirmed our empirical observation that in the first 3 consecutive weeks of the epidemic there was a strong growth of weekly number of cases ( $r^2$ : + 0.95); prognosed rate of weekly increase was  $\beta = 30.5$  cases.

## CONCLUSION

In this retrospective unicenter study we aimed to outline the key features of the first 100 cases of COVID-19 hospitalized in our clinic after designation of it as front line unit for hospitalization of these cases.

We expressed the hope that data outlined in this paper will help for better management of COVID-19 pandemic.

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