Karakteristike COVID-19 u primarnoj zdravstvenoj zaštiti u Beogradu (Srbija) i uticaj socio-demografskih karakteristika ispitanika na vakcinaciju

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Characteristics of COVID-19 infection in Primary Healthcare in Belgrade, Serbia and influence of socio-demographic features of the participants on vaccination status

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Sažetak

Uvod. Pandemija korona virusa je počela 2019. godine od kada je zaražen veliki broj ljudi širom sveta. Simptomi infekcije su široko definisani, ali još uvek nedostaje pregled laboratorijskih abnormalnosti pronađenih kod pacijenata sa infekcijom.

Cilj studije je bio opis kliničkih i laboratorijskih karakteristika pacijenata obolelih od COVID-19 infekcije u Beogradu (Srbija) i uticaj socio-demografskih karakteristika ispitanika na vakcinaciju.

Metod. Istraživanje je sprovedeno kao studija preseka u periodu od oktobra do novembra 2021. godine. U studiju su uključeni pacijenti koji su u ovom periodu posetili Kovid ambulantu doma zdravlja i kod kojih je potvrđena infekcija virusom Sars-CoV-2. Podaci su prikupljeni pregledom zdravstvenog kartona pacijenta, retrospektivno. Podaci su analizirani deskriptivnom statistikom i Pirsonovim χ^2 testom, i analizirani su SPSS 20.

Rezultati. U istraživanju je učestvovalo 207 Sars-CoV-2 pozitivnih pacijenata, od kojih je bilo 56% osoba ženskog pola, a najveći broj ispitanika bio je u starosnoj grupi 51–60 godina (22,7%). Vakcinisano je 42% ispitanika. Najčešći simptomi koje su ispitanici prijavljivali bili su: povišena telesna temperatura (82,1%), kašalj (49,8%), malaksalost (32,9%), zapušen nos (29,5%), bol u grlu (17,9%), glavobolja (12,1%), bol u telu (11,1%), gubitak ukusa i mirisa (8,2%), dijareja (2,4%). Pneumoniju je imalo 17,4% ispitanika, povišene vrednosti CRP 29%.

Zaključak. Najčešće kliničke karakteristike obolelih od COVID-19 u Beogradu (Srbija) bile su povišena telesna temperatura, kašalj, malaksalost. Pneumoniju je imalo 17,4% pacijenata. Najveći broj pacijenata je imao normalan laboratorijski nalaz krvne slike, ali povišene vrednosti CRP (29%). Vakcinisanih nekom od trenutno dostupnih vakcina bilo je 42%, od kojih je bez komorbiditeta bilo 52,9%.

Ključne reči: Covid-19, kliničke karakteristike, CRP, vakcinacija

Abstract

Introduction. The coronavirus pandemic began in 2019 and since then a huge number of people have been infected worldwide. The infection symptoms are widely defined and yet the panel of laboratory abnormalities found in infected patients is missing.

Objective. We aimed to describe the clinical and laboratory features of the COVID-19 patients in Belgrade (Serbia) and the influence of socio-demographic features of the participants on vaccination status.

Method. The research was performed as a cross-sectional study from October to November 2021. The included patients were the ones who visited the COVID outpatient clinic of the Primary Healthcare Center (PHC) and tested positive for Sars-CoV-2 virus infection. The data were gathered by reviewing retrospectively the patients` health charts. The data were analyzed by descriptive statistics, Pearson`s χ^2 test, and we used the SPSS 20.

Results. The research included 207 Sars-CoV-2 positive patients, of whom 56% were of the female sex and the majority of the participants were in the 51–60 age group (22.7%). There were 42% of the vaccinated participants. The most common symptoms the participants complained of were: fever (82.1%), cough (49.8%), malaise (32.9%), stuffed nose (29.5%), throat pain (17.9%), headache (12.1%), body pains (11.1%), loss of smell and taste (8.2%), diarrhea (2.4%). Pneumonia was found in 17.4% of the participants and high CRP values in 29%.

Conclusion. The most common clinical features of the COVID-19 patients in Belgrade (Serbia) were fever, cough, and malaise. Pneumonia was found in 17.4% of the patients. The majority of the patients had normal lab work but 29% had elevated CRP. There were 42% of vaccinated patients with either of the four available vaccines and 52.9% were without comorbidities.

Keywords: COVID-19, clinical features, CRP, vaccination

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Uvod

Pandemija korona virusa je počela 2019. godine od kada je zaražen veliki broj ljudi širom sveta. COVID-19 nastavlja da raste opterećujući zdravstveni sistem na globalnom nivou i značajni napori su usmereni na borbu i upravljane ovom bolešću.

Simptomi COVID-19 bolesti uključuju povišenu telesnu temperaturu, kašalj, malaksalost, bol u grlu i telu, dok manje uobičajeni simptomi uključuju glavobolju, vrtoglavicu, kratak dah, povraćanje, dijareju, gubitak apetita[1,2,3].

Simptomi infekcije su široko definisani, ali još uvek nedostaje pregled laboratorijskih nepravilnosti pronađenih kod pacijenata sa COVID-19. Veliki broj pacijenata pokazao je laboratorijske promene varijabli kompletne krvne slike, parametara koagulacije i zapaljenskih faktora. Laboratorijski nalaz može uključivati limfopeniju i povišene vrednosti leukocita, sedimentacije eritrocita, D-dimera, C-reaktivnog proteina, feritina[4,5,6]. Laboratorijski markeri su neophodni za praćenje i predviđanje ozbiljnosti COVID-19 bolesti, koja je neophodna po samog pacijenta, ali i za raspoređivanje resursa koje se mora pažljivo planirati, posebno u kontekstu disajne podrške[7,8,9]. Pored simptoma kliničke slike, laboratorijskih markera kod pacijenata koji su pozitivni na koronavirus, može se raditi i RTG pluća koji se preporučuje za dijagnozu zapaljenja pluća i praćenje progresije bolesti[10,11].

Vakcinacija kao jedan od najisplativijih i najuspešnijih zdravstenih intervencija za prevenciju bolesti, bila bi od velikog značaja za razumevanje faktora koji utiču na prihvatanje vakcinacije, ali i identifikovanje samog uticaja vakcinacije na populaciju. Među istraživačima u mnogim studijama nije postojala sveobuhvatna povezanost između najispitivanijih varijabli, pola, starosti, bračnog statusa i drugo, i uticaja vakcinacije[12,13,14].

Kako je bolest relativno nova, mnogo je neizvesnosti u pogledu znanja o virusu, kliničkim i laboratorijskim karakteristikama bolesti koja je dovela do mnogih zabluda u opštoj populaciji, ali i među zdravstvenim radnicima. Stoga je prepoznata potreba sprovođenja daljih istraživanja, definisanja kliničkih, laboratorijskih karakteristika bolesti i uticaja vakcinacije.

Cilj

Cilj studije je bio opis kliničkih i laboratorijskih karakteristika pacijenata obolelih od COVID-19 u Beogradu (Srbija) i uticaj socio-demografskih karakteristika ispitanika na vakcinaciju.

Metod

Istraživanje je sprovedeno kao studija preseka, u periodu od oktobra do novembra 2021. godine. U studiju su

Introduction

The coronavirus pandemic began in 2019 and since then a huge number of people have been infected worldwide. COVID-19 continues to grow, burdening the health systems globally and significant efforts are being aimed at fighting and managing the disease.

The symptoms of the COVID-19 disease include high fever, cough, malaise, throat, and body pains. Less common symptoms are headache, dizziness, shortness of breath, vomiting, diarrhea, and loss of appetite[1,2,3].

The infection symptoms are widely defined but still, the panel of lab work features characteristic of the COVID-19 patients is missing. A great number of patients had lab changes in CBC (complete blood count), coagulation panel, and inflammatory factors. Lab work features may include lymphopenia and high leucocyte count, elevated ESR (erythrocyte sedimentation rate), D-dimer, C-reactive protein (CRP), feritine[4,5,6]. Laboratory markers are necessary for following and predicting the severity of COVID-19 disease, which is of importance for the patients but also resources management, which should be carefully planned, especially in the context of respiratory support[7,8,9]. Besides symptoms, clinical features, and laboratory markers in positive COVID patients, chest X-ray (CXR) may be performed. It is recommended, as a part of pneumonia diagnosis, as well as, the follow-up of the disease progression[10,11].

Vaccination is one of the most cost-effective and successful health interventions for disease prevention. It is of great importance to understand the factors that influence vaccination acceptance but also to identify the influence of vaccination on the population. The researchers in many studies haven`t found an all-around connection between the most researched variables, such as gender, age, marital status, etc., and vaccination impact.[12,13,14]

Since the disease is relatively new, there is a lot of uncertainty in our knowledge of the virus, clinical and laboratory features of the disease that led to many fallacies in the general population but among healthcare workers as well. There is obviously the need to carry on with further research, defining clinical and laboratory features of the disease, as well as the impact of vaccination.

Objective

We aimed to describe the clinical and laboratory features of the COVID-19 patients in Belgrade (Serbia) and the influence of socio-demographic features of the participants on vaccination status.

Method

The research was performed as a cross-sectional study from October to November 2021. The included patients were

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uključeni pacijenti koji su u ovom periodu posetili Kovid ambulantu (KA) doma zdravlja i kod kojih je potvrđena infekcija virusom Sars-CoV-2 pozitivnim antigen ili PCR testom nazofaringsa. Podaci su prikupljeni pregledom zdravstvenog kartona pacijenata, retrospektivnim pregledom medicinske dokumentacije. Analizirane su socio-demografske karakteristike (pol, godine starosti), da li su pacijenati vakcinisani, komorbiditeti, karakteristike infekcije virusom Sars-CoV-2 (simptomi infekcije, nalaz krvne slike (leukociti i leukocitarna formula), RTG pluća); Podaci o vakcinaciji: da li su pacijenati vakcinisani prema postojećem protokolu, bilo kojom trenutno dostupnom vakcinom; Komorbiditeti: od koje se hronične bolesti leče pored trenutne COVID-19 bolesti (kardiovaskularne (KVS), endokrinološke, psihijatrijske, neurološke, respiratorne, nefrološke, maligne).

Podaci su analizirani deskriptivnom statistikom i Pirsonovim χ^2 testom. Rezultati su prikazani kao učestalost izraženu u procentima (%), a Pirsonov χ^2 test je korišćen za utvrđivanje razlike između pojave pneumonije i varijabli od značaja, i uticaj vakcinacije i socio-demografskih karakteristika. Podaci su analizirani upotrebom statističkog paketa SPSS 20. Kriterijum za statističku značajnost bio je p< 0,05.

Rezultati

U istraživanju je učestvovalo 207 Sars-CoV-2 pozitivnih pacijenata, 116 (56%) osoba ženskog pola i 91 (44%) muškog pola. Najveći broj pacijenata (47) je imao između 51–60 godina starosti (22,7%). Vakcinisano je 87 (42%) pacijenata (Tabela 1).

the ones who visited the COVID outpatient clinic (COC) of the Primary Healthcare Center (PHC) and tested positive for Sars-CoV-2 virus infection, either with a Rapid Ag test, or PCR of nasopharynx. The analyzed data included socio-demographic characteristics (gender, age), their vaccination status, comorbidities, features of the Sars-CoV-2 infection (infection symptoms, CBC panel- leucocytes and leucocyte formula, CXR); Vaccination status: are they vaccinated according to protocol with any of the available vaccines; Comorbidities: what are the other diseases they suffer from, beside COVID-19 (cardiovascular, endocrine, psychiatric, neurological, respiratory, nephrological, malignant).

The data were analyzed using descriptive statistics and Pearson`s $\chi^2$ test. The results were shown as frequencies (%), and Pearson`s χ^2 test was used to establish the difference between pneumonia occurrence and the variables of importance, the influence of vaccination, and socio-demographic characteristics. The data were analyzed using the SPSS20 statistical package. The criteria for statistical significance was p< 0,05.

Results

There were 207 Sars-CoV-2 positive patients, who took part in our research, 116 (56%) were females and 91 (44%) were males. The majority of patients (47) were in the 51–60 age group (22,7%). There were 87 (42%) vaccinated patients (Table 1).

Tabela 1. Socio-demografske karakteristike ispitanika
Table 1. *Socio-demographic features of the participants*

Varijable/ Variables	N (%)
Pol / Gender	
Muškarci /Male	91 (44)
Žene / Female	116 (56)
Godine starosti / Age	
≤ 30	35 (16,9)
31–40	29 (14,0)
41–50	44 (21,3)
51–60	47 (22,7)
61–70	31 (15,0)
≥ 71	21 (10,1)
Vakcinisan / Vaccination	
Ne / No	120 (58,0)
Da / Yes	87 (42,0)
Komorbiditeti / Comorbidities	
Bez / None	125 (60,4)
KVS / CVD	37 (17,9)
Endokrinološki / Endocrine	27 (13,0)
Psihijatrijski / Psychiatric	4 (1,9)
Neurološki / Neurological	3 (1,3)
Respiratorni / Respiratory	6 (2,9)
Nefrološki / Nephrological	3 (1,4)
Maligni / Malignant	2 (1,0)

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Najčešći simptomi koje su pacijenati prijavljivali bili su: povišena telesna temperatura - 170 (82,1%), kašalj - 103 (49,8%), malaksalost - 68 (32,9%), zapušen nos - 61 (29,5%), bol u grlu - 37 (17,9%), glavobolja - 25 (12,1%), bol u telu - 23 (11,1%), gubitak ukusa i mirisa - 17 (8,2%), dijareja - 5 (2,4%) (Tabela 2).

The most common symptoms the patients complained of were: fever - 170 (82,1%), cough - 103 (49,8%), malaise - 68 (32,9%), stuffed nose - 61 (29,5%), throat pain - 37 (17,9%), headache - 25 (12,1%), body pains - 23 (11,1%), loss of smell and taste - 17 (8,2%), diarrhea - 5 (2,4%) (Table 2).

Tabela 2. Simptomi COVID-19 infekcije
Table 2. *Symptoms of COVID-19 infection*

Varijable / Variables	N (%)
Temperatura / Fever	
Ne / No	37 (17,9)
Da / Yes	170 (82,1)
Malaksalost /Malaise	
Ne / No	139 (67,1)
Da / Yes	68 (32,9)
Kašalj / Cough	
Ne / No	104 (50,2)
Da / Yes	103 (49,8)
Gubitak ukusa i mirisa /Loss of smell and taste	
Ne / No	190 (91,8)
Da / Yes	17 (8,2)
Dijareja / Diarrhea	
Ne / No	202 (97,6)
Da / Yes	5 (2,4)
Glavobolja / Headache	
Ne / No	182 (87,9)
Da / Yes	25 (12,1)
Bol u telu / Body pain	
Ne / No	184 (88,9)
Da / Yes	23 (11,1)
Bol u grlu / Throat pain	
Ne / No	170 (82,1)
Da / Yes	37 (17,9)
Zapušen nos / Stuffed nose	
Ne / No	146 (70,5)
Da / Yes	61 (29,5)

Najveći broj pacijenata je imao normalan laboratorijski nalaz krvne slike (77,3%), limfociti niži (< 20,0x10^9/L), granulociti viši (>72,0x10^9/L) 12,6%; limfociti viši (> 46,0x10^9/L), granulociti niži (< 44,0x10^9/L) 10,1%; povišene vrednosti CRP imalo je 29% pacijenata. Pneumoniju je imalo 17,4% pacijenata (Tabela 3).

The majority of the patients had normal CBC (77,3%), lower lymphocyte count (< 20,0x10^9/L), elevated granulocyte count (> 72,0x10^9/L) 12,6%; elevated lymphocyte count (> 46,0x10^9/L), lower granulocyte count (< 44,0x10^9/L) 10,1%; elevated CRP was found in 29% of patients. There were 17,4% of patients with pneumonia (Table 3).

Tabela 3. Laboratorijske i RTG karakteristike COVID-19
Table 3. Laboratory and X-ray features of COVID-19

Varijable / Variables	N (%)
Krvna slika / CBC	
Normalna /Normal	160 (77,3)
Limfociti viši, granulociti niži / Elevated lymphocytes, lower granulocytes	21 (10,1)
Limfociti niži, granulociti viši / Elevated lymphocytes, lower granulocytes	26 (12,6)
CRP / CRP	
Normalan / Normal	147 (71)
Povišen / Elevated	60 (29)
RTG pluća / CXR	
Nije rađen / Not performed	117 (56,5)
Normalan / Normal	54 (26,1)
Pneumonija / Pneumonia	36 (17,4)

Postojala je statistički značajna razlika između pacijenata koji su imali pneumoniju izazvanu infekcijom korona virusom i godina starosti obolelih, i povišenih vrednosti CRP (p< 0,001). Nije postojala statistički značajna razlika pojave pneumonije u odnosu na pol i laboratorijski nalaz krvne slike (Tabela 4).

There was a statistically significant difference between patients with pneumonia caused by coronavirus and participants` age, and elevated CRP (p< 0,001). There was no statistically significant difference between pneumonia occurrence and gender and CBC (Table 4).

Tabela 4. Karakteristike ispitanika i pneumonije kod pacijenata lečenih ambulantno
Table 4. Characteristics of the participants and pneumoniae in patients treated in the outpatient

Varijable / Variables	Pneumonija / Pneumonia N (%)	p-vrednost / p-value
Pol / Gender		
Muškarci /Male	14 (38,9)	0,792
Žene / Female	22 (61,1)	
Godine starosti / Age		
≤ 30	1 (2,8)	
31–40	2 (5,6)	
41–50	5 (13,9)	**< 0,001**
51–60	13 (36,1)	
61–70	5 (13,9)	
≥ 71	10 (27,8)	
Krvna slika / CBC		
Normalna / Normal	25 (69,4)	
Limfociti viši, granulociti niži / Lymphocytes elevated, granulocytes lower	6 (16,7)	0,096
Limfociti niži, granulociti viši / Lymphocytes lower, granulocytes elevated	5 (13,9)	
CRP / CRP		
Normalan / Normal	4 (11,1)	**< 0,001**
Povišen / Elevated	32 (88,9)	

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Postojala je statistički značajna razlika kod vakcini-sanih pacijenata u odnosu na godine starosti i komorbiditet (Tabela 5).

There was a statistically significant difference between vaccinated patients in relation to age and comorbidities (Table 5).

Tabela 5. Socio-demografske karakteristike ispitanika i vakcinacija
Table 5. *Socio-demographic characteristics of the participants and vaccination status*

Varijable / Variables	Vakcinacija / Vaccination N (%)	p-vrednost / p-value
Pol / Gender		0,228
Muškarci / Male	34 (39,1)	
Žene / Female	53 (60,9)	
Godine starosti / Age		
≤ 30	6 (6,9)	
31–40	6 (6,9)	
41–50	23 (26,4)	**< 0,001**
51–60	25 (28,7)	
61–70	12 (13,8)	
≥ 71	15 (17,2)	
Komorbiditeti / Comorbidities		
Bez / None	46 (52,9)	
KVS / CVD	19 (21,8)	
Endokrinološki / Endocrine	9 (10,3)	
Psihijatrijski / Psychiatric	4 (4,6)	**0,048**
Neurološki / Neurological	2 (2,3)	
Respiratorni / Respiratory	4 (4,6)	
Nefrološki / Nephrological	1 (1,1)	
Maligni / Malignant	2 (2,3)	

Diskusija

Dok se epidemija COVID-19 u Srbiji i dalje širi, detalji kliničkih, laboratorijskih karakteristika ostaju delimično shvaćeni. Naša studija prikazuje važnost KA kao mesta prvog kontakta tokom COVID-19 epidemije, brzim otkrivanjem potencijalno zaraženih osoba, brzim postavljanjem dijagnoze bolesti, utvrđivanjem simptoma i blagovremene terapije. Cilj naše studije je opis kliničkih i laboratorijskih karakteristika kod pacijenata obolelih od COVID-19.

Klinička manifestacija COVID-19 bolesti je široka, od asimptomatskih do fatalnih ishoda. Najčešći simptomi i njihova učestalost u našem istraživanju su: povišena telesna temperatura (82,1%), kašalj (49,8%), malaksalost (32,9%). I druga istraživanja su pokazala sličnu učestalost ovih najče-šćih simptoma[15]. Povišena telesna temperatura jeste najčešći simptom infekcije, ali nisu svi pacijenti imali ovaj simptom bolesti[16,17].

Ispitanici u našem istraživanju koji su imali COVID-19 bolest od komorbiditeta najčešće su se lečili od bolesti KVS (17,9%) i endokrinoloških bolesti (13%). Slična stopa za-stupljenosti komorbiditeta je bila i kod ispitanika iz Kine[18].

Discussion

While the COVID-19 outbreak in Serbia is still spreading, the details of clinical and laboratory features are still partially understood. Our study shows the importance of COC, as a place of the first contact during the COVID-19 outbreak. It provides fast detection of potentially infected persons, fast diagnosing, symptom evaluation, and timely therapy. We aimed to review clinical and laboratory features of COVID-19 infected patients.

Clinical manifestations of COVID-19 are wide, ranging from asymptomatic to fatal outcomes. The most common symptoms and their frequency in our research were: fever (82,1%), cough (49,8%), and malaise (32,9%). Some other studies showed a similar frequency of these most common symptoms[15]. Fever is the most common infection symptom but not all patients had it[16,17].

The participants in our research, who had COVID-19, most commonly suffered from these comorbidities: CVD (17,9%) and endocrine diseases (13%). A similar incidence of comorbidities was found in the participants in China[18].

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Pojava zapaljenja pluća kod osoba zaraženih korona virusom u našoj studiji bila je povezana sa godinama starosti ispitanika i povišenim vrednostima CRP. To potvrđuju i druga istraživanja[19,20, 21,22].

Najveći broj ispitanika koji su imali upalu pluća u našoj studiji pripadali su starosnoj grupi od 51 do 60 godina starosti i preko 71 godine. Do tog podatka su došli i drugi istraživači, koji su godine starosti identifikovali kao pokazatelj za visok morbiditet[23,24].

Nivo CRP u plazmi je u pozitivnoj korelaciji sa težinom pneumonije COVID-19. On je važan pokazatelj kliničke evaluacije i ozbiljnosti bolesti, i trebalo bi da se koristi kao ključni pokazatelj za praćenje bolesti[19,25,26].

Vakcinacija naših ispitanika bila je povezana sa godinama starosti i komorbiditetima. Više su se vakcinisale osobe starije životne dobi. Za smanjenje smrtnosti, prednost vakcinacije za starije osobe je najbolja strategija[27,28].

Studija ima neka ograničenja. Radi se o studiji preseka i podaci su na individualnom nivou, a usmereni su na simptomatske pacijente koji su se zbog tegoba javili u Kovid ambulantu na testiranje. Nismo bili u mogućnosti da uzmemo uzorke od većeg broja pacijenata, te su stoga potrebne dalje studije da bi se dobili dodatni podaci.

Zaključak

Najčešće kliničke karakteristike obolelih od COVID-19 u Beogradu (Srbija) bile su povišena telesna temperatura, kašalj, malaksalost. Pneumoniju je imalo 17,4% pacijenata. Najveći broj pacijenata je imao normalan laboratorijski nalaz krvne slike, ali povišene vrednosti CRP (29%). Vakcinisanih nekom od trenutno dostupnih vakcina bilo je 42%, od kojih je bez komorbiditeta bilo 52,9%.

The occurrence of pneumonia in coronavirus-infected persons, in our research, was related to the participant`s age and elevated CRP. It was confirmed in other studies, as well.[19,20, 21,22]

The majority of the participants with pneumonia, in our study, were in the age group 51 to 60 and over 71 years of age. Other researchers came to the same conclusion and age was identified as the risk factor for high morbidity.[23,24]

The CRP plasma levels were in a positive correlation with the severity of COVID-19 pneumonia. It is an important indicator of clinical evaluation and disease severity, and it should be used as a key indicator in the disease follow-up.[19,25,26]

The vaccination status of our patients was related to age and comorbidities. Older people tended to get vaccinated more. Vaccination of older persons is the best strategy to reduce mortality.[27,28]

Our research has some limitations. It is a cross-sectional study and the data are on the individual level, and they are focused on symptomatic patients who due to their symptoms visited the COVID outpatient clinic to get tested. We were unable to include a larger number of patients, therefore new studies are needed to investigate additional data.

Conclusion

The most common features of the COVID-19 infected persons in Belgrade (Serbia) were fever, cough, and malaise. There were 17.4% of patients with pneumonia. The majority of patients had normal CBC but CRP values were elevated in 29% of the participants. There were 42% of vaccinated participants, with one of the available vaccines, and 52,9% were without comorbidities.

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