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DA LI ĆE KOVID-19 PANDEMIJA NEŠTO PROMENITI? – POGLED IZ UGLA MIKROBIOLOŠKE STRUKE

Snežana Delić[1]

[1] Zavod za javno zdravlje Sombor, Srbija

SAŽETAK

Pandemija Kovid-19 je uzdrmala većinu zdravstvenih sistema širom sveta i pokazala da je neophodno uložiti sredstva u savremenu opremu za molekularnu dijagnostiku, kao i obezbediti adekvatan prostor u mikrobiološkim laboratorijama za ovaj vid dijagnostike, po normativima koji su za to predviđeni. Takođe, potrebno je povećati broj specijalista medicinske mikrobiologije, naročito u laboratorijama gde je nedostatak kadra alarmantan. Ulaganje u dijagnostičke grane medicine (gde spada i medicinska mikrobiologija) obezbeđuje optimalnu zdravstvenu zaštitu: brzo postavljanje tačne dijagnoze, primenu adekvatne antimikrobne terapije u kraćem roku, što vodi većoj šansi za izlečenje, smanjenju broja bolničkih dana i broju smrtnih ishoda, a ambulantnim pacijentima obezbeđuje se brže postavljanje dijagnoze i manji broj raznih, nekada nepotrebnih specijalističkih pregleda. U toku pandemije Kovid-19, Sekcija mikrobiologa Srpskog lekarskog društva, kao i Institut za mikrobiologiju i imunologiju Medicinskog fakulteta Univerziteta u Beogradu, stavili su se na raspolaganje Ministarstvu zdravlja Republike Srbije u cilju pružanja stručne pomoći u identifikovanju laboratorijskih kapaciteta i sprovođenju potrebnih stručnih obuka, kako za lekare specijaliste medicinske mikrobiologije, tako i za laboratorijske tehničare. I pored brzog razvoja novih tehnologija i automatizacije u laboratorijskom radu, ipak je teoretski i praktično edukovan specijalista medicinske mikrobiologije stub na kojem počiva savremena, tačna, brza i kvalitetna dijagnostika infektivnih patogena, a naročito onih sa pandemijskim potencijalom.

Ključne reči: Kovid-19, pandemija, mikrobiološka dijagnostika, zarazne bolesti

Uvod

Kovid-19 pandemija uzdrmala je i zdravstvene sisteme razvijenih zemalja, kao što su Francuska (1) i Španija (2), ukazujući time na slabosti njihove koncepcije zdravstvene zaštite, i pored činjice da ove zemlje imaju daleko veće finansijske resurse. Zato je i očekivano da se i u našem zdravstvenom sistemu, gde su finansijski resursi mali i ograničeni, brzo prikažu ključni nedostaci, kao što je nedostatak savremene opreme za brzu i tačnu mikrobiološku dijagnostiku, edukovanog kadra i adekvatnog laboratorijskog prostora.

Decenijsko zanemarivanje sistema javnog zdravlja, gde se u postojećem Zakonu o javnom zdravlju (3), medicinska mikrobiologija (ranije mikrobiologija sa parazitologijom), kao specijalizacija, i ne pominje, pokazalo je da je u ovom trenutku ova specijalizacija važna, kao i specijalizacija iz epidemiologije, kada je u pitanju brz i adekvatan odgovor u dijagnostici infektivnih patogena (3).

Zaposleni zdravstveni radnici i saradnici, koji rade u sistemu javnog zdravlja, čine tek 2% ukupno zaposlenog zdravstvenog kadra u Republici Srbiji (RS) (izvor: Institut za javno zdravlje RS). Oni nisu ugovoreni radnici preko Republičkog fonda za zdravstveno osiguranje (RFZO) i Ministarstva zdravlje (MZ) RS, već se finansiraju sredstvima koja Instituti i Zavodi obezbeđuju ugovorima sa RFZO. To znači da lične dohotke za lekare, specijaliste medicinske mikrobiologije u Zavodima i Institutima za javno zdravlje, ne obezbeđuje RFZO, već se oni finansiraju najvećim delom iz mikrobioloških dijagnostičkih usluga (RFZO), programske aktivnosti iz domena javnog zdravlja (MZ RS) i uslugama za komercijalno tržište.

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WILL THE COVID-19 PANDEMIC CHANGE ANYTHING? – A VIEW FROM THE ANGLE OF EXPERTS IN MICROBIOLOGY

Snezana Delic[1]

[1] Public Health Institute Sombor, Serbia

SUMMARY

The COVID-19 pandemic has shaken the majority of health systems around the world, pointing out that it is necessary to invest in the modern equipment for molecular diagnostics, as well as to provide an adequate space within microbiological laboratories for this form of diagnostics, according to the standards that are required for such procedures. It is also necessary to increase the number of specialists within the field of medical microbiology, especially in those laboratories where the lack of experts is at an alarming level. Investing in the diagnostic branches of medicine (and microbiology, as well) provides the optimal health protection: fast and correct diagnosis, the application of the adequate antimicrobial therapy as soon as possible, resulting in greater chances for curing. Furthermore, this leads to fewer hospital days and fewer deathly outcomes, while for infirmary patients this means a faster diagnostic procedure and a decrease in the number of specialist examinations, which are sometimes unnecessary. During the Covid-19 pandemic, The Section of Microbiologists of the Serbian Medical Society as well as the Institute for Microbiology and Immunology of the Faculty of Medicine of Belgrade University, have made themselves available to the Ministry of Health of The Republic of Serbia for the identification of potential laboratory capacities and for conducting necessary experts training, for doctors specialists and for laboratory technicians, as well. Although new technologies develop fast and the laboratory work becomes automated, in theory and in practice as well, an educated expert in medical microbiology still presents the main pillar that stands up for a precise, modern, quick and high-quality diagnosis of infective pathogens, especially those with pandemic potential.

Key words: COVID-19, pandemic, microbiological diagnostics, infectious diseases

The Covid-19 pandemic has shaken even the health systems of developed countries, such as Spain (1) and Italy (2), pointing out the weak points of their concept of health protection, although these countries have a lot greater financial resources. Therefore, it does not come as a surprise that our health system, in which the resources are scarce and limited, had to tackle problems, such as the lack of modern equipment for fast and precise microbiological diagnostics, educated personnel and an adequate laboratory space.

The system of public health has been neglected for decades. In the existing Law on Public Health (3), medical microbiology (previously microbiology with parasitology) is not even mentioned as specialization. However, it turned out that this specialization is very important, as well as the specialization in epidemiology, for a quick and adequate response in relation to diagnostics of infectious pathogens (3).

Employed health care workers and associates, who work in the public health system, make only 2% of the total health care personnel in The Republic of Serbia, according to The Public Health Institute of The Republic of Serbia. The National Health Insurance Fund does not provide salaries for doctors, specialists of medical microbiology at Public Health Institutes. However, they are financed, for the most part, from the microbiological diagnostic services (The National Health Insurance Fund), the program activities from the public health domain (Ministry of Health, RS), or from the services for the commercial market.

U takvoj konstelaciji, na samim Institutima i Zavodima za javno zdravlje je da obezbede savremenu opremu za dijagnostiku, održavaju i osavremenjuju laboratoriju, finansiraju troškove akreditacije laboratorija, kao i da obezbede kadar za obavljanje dijagnostičkih aktivnosti. Prema podacima Mikrobiološke sekcije Srpskog lekarskog društva (SLD), specijalizacija iz medicinske mikrobiologije je na listi deficitarnih specijalizacija (pored patologije, anesteziologije, radiologije, i dr.), a takođe, prosek starosti trenutno aktivnih zaposlenih specijalista mikrobiologa je veoma visok, što je obeshrabrujući podatak.

Zabrana zapošljavanja u prethodnom periodu, dodatno je otežala ionako tešku situaciju u pogledu odgovarajućeg broja specijalista mikrobiologije, gde imamo slučajeve da u pojedinim zavodima / institutima / bolničkim laboratorijama radi samo jedan specijalista medicinske mikrobiologije. Situacija je još ozbiljnija u mikrobiološkim laboratorijama koje funkcionišu u nekim opštim bolnicama (sekundarnog nivoa zdravstvene zaštite), kao službe pri sektoru laboratorijske dijagnostike. U tercijarnim ustanovama (klinike/instituti), situacija je dosta bolja, jer se na tim nivoima zdavstvene zaštite, prepoznaje značaj brze, tačne i savremene dijagnostike infektivnih bolesti. Opremljenost naših mikrobioloških laboratorija, kako pri zavodima/institutima, tako i pri opštim bolnicama/klinikama je raznolika i zavisi od mnogo faktora: zainteresovanosti menadžmenta, motivisanosti i sposobnosti rukovodilaca laboratorija, učešća u projektima, kao i od finansijskog stanja ustanove.

Treba istaći kao pozitivan primer, projekat MZ RS i Evropske unije i Evropske agencije za rekonstrukciju pod nazivom „Unapređenje laboratorisjkih usluga u Srbiji“, koje je sprovela konsultantska kuća „Eptisa“ (2005-2008), kada su određene referentne laboratorije (RL) za kontrolu zaraznih bolesti, a laboratorije koje su učestvovale u pomenutom projektu dobile su pomoć u laboratorijskoj opremi, edukaciji kadra (26 obuka), kao i posebnoj edukaciji osoblja iz RL u raznim evropskim laboratorijama, za specifične poslove referentnih aktivnosti iz svog domena.

Tokom 2014. godine je MZ RS sprovelo projekat „Pruženje unapređenih usluga na lokalnom nivou“ (DILS projekat), u okviru koga je izvršeno unapređenje rada Nacionalnih RL kroz povećenje njihove vidljivosti i povezanosti. U toku 2018. godine realizovan je zajednički „Projekat bratimljenja“ (MZ RS, Institut za javno zdravlje Srbije „Dr Milan Jovanović Batut“ i Nacionalni Institut za javno zdravlje Italije) pod nazivom „Poboljšanje kvaliteta sistema mikrobiološke dijagnostike u funkciji nadzora zaraznih bolesti u RS”. Izvršena je procena kapaciteta mikrobioloških laboratorija, identifikovani su nedostaci u odnosu na standarde u otkrivanju i potvrdi zaraznih bolesti i izrađene su preporuke za unapređivanje kvaliteta rada (4).

Samim završetkom specijalizacije i polaganjem specijalističkog ispita, ne završava se edukacija jednog medicinskog mikrobiologa. Tek kasnije, posle nekoliko godina rada, kada se sustignu znanje i iskustvo, neophodan je studijski boravak u savremenim, dobro opremljenim laboratorijama u inostranstvu, bar jedne (poželjno više) osoba iz laboratorije, jer će to doneti neprocenjiva iskustva, a kasnije koristi kroz bolju organizaciju i osavremenjivanje postojećih dijagnostičkih procedura. Takođe, neophodno je stalno unapređenje veština pohađanjem specijalizovanih praktičnih kurseva, kao oblika kontinuirane medicinske edukacije (KME), koje organizuje Institut za mikrobiologiju i imunologiju, Medicinskog fakulteta Univerziteta u Beogradu (npr. molekularna dijagnostika: RT-PCR engl. R*eal Time Polimerase Chain Reaction*, praktične radionice iz medicinske mikologije, parazitologije, bakteriologije i virusologije), što se u ovoj pandemijskoj situaciji pokazalo kao veoma važno. Laboratorije koje su od ranije imale uvedenu molekularnu dijagnostiku i posedovale aparate, brže su se uključile u proces detekcije SARS-CoV-2 virusa, RT-PCR metodom. U sklopu projekata Pokrajinskog sekretarijata za zdravstvo Vojvodine, svi Zavodi za javno zdravlje u Vojvodini dobili su RT-PCR aparate u toku 2013. godine (5).

Sticanje znanja iz medicinske mikrobiologije i boravak u savremenim mikrobiološkim laboratorijama je neophodno uvrstiti u plan i program određenih specijalizacija (npr: epidemiologija, infektivne bolesti, anesteziologija i dr.). Takođe, neophodno je dobro

In such a constellation, Public Health Institutes should provide modern equipment for diagnostics on their own, as well as maintain and modernize their laboratories, finance the expenses of laboratory accreditation, and provide personnel who can perform diagnostic activities. According to the data from the Microbiological Section of the Serbian Medical Society, the specialization in medical microbiology is on the list of deficient specializations (beside pathology, anesthesiology, radiology, etc.). Also, the mean age of the currently employed specialists of microbiology is very high, which is a discouraging fact.

The prohibition of employing the new cadre has made a difficult situation even more difficult regarding the appropriate number of specialists of microbiology. There are examples that only one specialist of medical microbiology works in certain institutes, and hospital laboratories. The situation is even more serious in microbiological laboratories in some general hospitals (secondary level of health care), which function within the department of laboratory diagnostics. In tertiary institutions (clinics, institutes), the situation is a lot better, because at this level of health care, the significance of quick, precise and modern diagnostics of infectious diseases is recognized. The state of equipment in our microbiological laboratories and at institutes, general hospitals, clinics is different and it depends on a lot of factors: managers' interest, motivation and skills of managers of laboratories, participation in projects, and the financial state of the institution.

One project should be emphasized as a positive example. It is the project of The Ministry of Health and the European Union, that is, the European Agency for Reconstruction. The project "Strengthening the Services of Public Health Laboratories in Serbia" was conducted by the consulting agency "Eptisa" (2005-2008), when reference laboratories were nominated for the control of infectious diseases, and laboratories-participants in the above-mentioned project were given help related to laboratory equipment, cadre education (26 trainings), as well as special education of cadre from reference laboratories in different European laboratories regarding the specific activities from their field of work.

In 2014, The Ministry of Health of the Republic of Serbia conducted the project "Delivery of Improved Local Services" (DILS project), within which the National reference laboratories improved their work by increasing their visibility and connectivity. In 2018, the mutual project "Twinning light project" (The Ministry of Health, Public Health Institute of Serbia "Dr Milan Jovanovic Batut" and the National Public Health Institute of Italy) under the title "Improving microbiology diagnostic system quality in the function of surveillance of communicable diseases in the Republic of Serbia". The capacity of microbiological laboratories was estimated, weaknesses were identified regarding standards of identifying and confirming infectious diseases and recommendations for improving the quality of work were made (4).

The education of medical microbiologists is not completed when they finish specialization and pass the specialist exam. Later, after a few years of work, when they have knowledge and experience, a study visit is necessary in modern, well-equipped laboratories abroad, of at least one person (desirably more people) from the laboratory, because it will bear priceless experience, and later benefits through better organization and modernization of existing diagnostic procedures. Also, skills should be improved by attending specialized practical courses, as a form of continuous medical education, which is organized by the Institute of Microbiology and Immunology of the Faculty of Medicine, University of Belgrade (for example, molecular diagnostics: RT-PCR – Real-Time Polymerase Chain Reaction), practical workshops from medical mycology, parasitology, bacteriology, virology), which has proved to be very important in this situation of the pandemic. Laboratories, which had introduced molecular diagnostics before and which had equipment, joined faster the process of detecting the SARS-CoV-2 virus with RT-PCR method. All Pubic Health Institutes in Vojvodina got RT-PCR machines in 2013, within projects of the Provincial Secretariat for Health Care of Vojvodina (5).

Acquiring knowledge in the field of medical microbiology and staying in contemporary microbiological laboratories should necessarily

poznavanje i razumevanje dijagnostičkih tehnologija u oblasti mikrobiologije, jer će to umnogome doprineti boljem stručnom razumevanju i saradnji ovih, po prirodi posla, blisko povezanih specijalizacija, a i brži razvoj mikrobioloških dijagnostičkih metoda i tehnologija to diktira. Radna mesta zdravstvenih radnika (specijalista/subspecijalista iz oblasti medicinske mikrobiologije, strukovnih medicinsko laboratorijskih tehnologa, laboratorijskih tehničara), kao i zdravstvenih saradnika (molekularnih biologa), koji neposredno učestvuju u izvođenju dijagnostičkih metoda, nisu bili uniformno klasifikovana kao radna mesta pod rizikom (najpre biološkim, a onda i hemijskim), što se podrazumeva, već je u svakoj zdravstvenoj ustanovi, prema internom Aktu o proceni rizika bilo različito. U realnosti smo svedoci da radna mesta dva medicinska mikrobiologa, koji rade identične poslove, budu različito klasifikovana; jedno radno mesto je pod rizikom, drugo ne. Prvo, metodologija procene nije rađena po „Specijalizovanoj metodologiji za procenu rizika u zdravstvenim ustanovama“ predloženoj od strane MZ RS i Instituta za medicinu rada RS „Dr Dragomir Karajović“(6), a nisu ispunjeni ni potrebni uslovi, da ustanova koja vrši procenu mora da poseduje licencu za obavljanje poslova ispitivanja uslova radne okoline - hemijskih i fizičkih štetnosti (osim jonizujućeg zračenja, mikroklime i osvetljenosti). Ipak, ova pandemija je donela pozitivne promene, te je ovaj problem nedavno rešen izmenama u sklopu najnovijeg akta MZ RS (7).

Neophodno je uložiti sredstva u savremenu opremu za molekularnu dijagnostiku, kao i obezbediti adekvatan prostor u mikrobiološkim laboratorijama za ovaj vid molekularne dijagnostike, po normativima koji su za to predviđeni. Takođe, potrebno je povećati broj specijalista medicinske mikrobiologije, naročito u laboratorijama gde je nedostatak kadra alarmantan. Dobro je poznato da je ulaganje u dijagnostičke grane medicine (gde spada i mikrobiologija), ključni faktor za optimalnu zdravstvenu zaštitu: brzo postavljanje tačne dijagnoze, primenu adekvatne antimikrobne terapije u kratkom vremenskom periodu, a samim tim postoje veće šanse za izlečenje, smanjenje broja bolničkih dana i broja umrlih, a za ambulantne pacijente obezbeđuje se brže postavljanje dijagnoze i manji broj raznih, nekada nepotrebnih specijalističkih pregleda. U toku pandemije Kovid-19, Sekcija mikrobiologa SLD i Institut za mikrobiologiju i imunologiju Medicinskog fakulteta Univerziteta u Beogradu, stavili su sav svoj kadar na raspolaganje MZ RS, dali su stručnu pomoć u identifikaciji laboratorisjkih kapaciteta i sproveli potrebnu stručnu obuku, kako za lekare specijaliste medicinske mikrobiologije, tako i za laboratorijske tehničare.

Na kraju, najvažniji i najbitniji resurs predstavlja osoblje - kompetentan kadar. I pored brzog razvoja novih tehnologija, automatizacije u laboratorijskom radu (koju je i Kovid-19 pandemija dodatno uvela u našu struku, zbog potreba molekularne dijagnostike), ipak je teoretski i praktično edukovan specijalista medicinske mikrobiologije stub na kojem počiva savremena, tačna, brza i kvalitetna dijagnostika infektivnih patogena, a naročito onih sa pandemijskim potencijalom. Zato je opravdano bilo pitanje postavljeno na početku ove pandemije „Da li smo mi to zapostavili laboratorije, a one su ključna karika u lancu borbe protiv virusa?“. Kliničke mikrobiološke laboratorije su vitalna karika u lancu aktivnosti potrebnih da se populacija odbrani od pretećih agenasa, pa i novog koronavirusa (8). Svakako, potrebno je razvijati i druge ciljane strategije za unapređenje pripremljenosti zajednice i države, kao što su promovisanje promena ponašanja i poboljšanje odlučivanja o upravljanju rizicima (8).

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be included into the plan and program of certain specializations (e.g. epidemiology, infectious diseases, anesthesiology, etc.). Also, knowledge and understanding of diagnostic technologies in the field of microbiology are necessary, because this will contribute to better professional understanding and cooperation of these, closely connected specializations. Faster development of microbiological diagnostic methods and technologies dictates it, as well. Positions of health care workers (specialists/subspecialists in the field of medical microbiology, professional medical laboratory technologists, laboratory technicians) and health care associates (molecular biologists), who directly take part in running diagnostic methods, have not been uniformly classified as positions at risk (first of all, biological, and then chemical), but differently in each health care institution, according to the Act on Risk Assessment. In reality, we witness the fact that job positions of two medical microbiologists, who do the same work, are differently classified; one position is at risk, and the other is not. Firstly, the methodology of assessment was not done according to the "Specialized methodology for risk assessment in health care institutions", proposed by the Ministry of Health of The Republic of Serbia and the Serbian Institute of Occupational Health "Dr Dragomir Karajovic" (6), while the necessary conditions were not fulfilled, meaning that the institution, which does the assessment, has to possess the license for examining the conditions of the work environment –chemical and physical harm (beside ionizing radiation, microclimate and lighting). However, this pandemic has brought some positive changes, and this problem has been solved recently within the latest Act of the Ministry of Health of the Republic of Serbia (7).

Resources should be necessarily invested in the modern equipment for molecular diagnostics, and an adequate space should be provided in microbiological laboratories for this kind of molecular diagnostics, according to the set standards. Also, the number of specialists of medical microbiology should be increased, especially in those laboratories where the lack of experts is at an alarming level. It is well-known that investing in diagnostic branches of medicine (and microbiology, as well) is a key factor for optimal health protection: setting the precise diagnosis quickly, administration of adequate antimicrobial therapy as soon as possible, and therefore, chances for curing are bigger, the number of hospital days and deathly outcomes decreases, and for infirmary patients faster diagnosis is secured and a smaller number of sometimes unnecessary examinations, as well. During the Covid-19 pandemic, The Section of Microbiologists of the Serbian Medical Society and the Institute for Microbiology and Immunology of the Medical Faculty of the University of Belgrade, have made their personnel available to the Ministry of Health of The Republic of Serbia; have helped professionally in identifying the laboratory capacities and conducted the education trainings for doctors specialists of medical microbiology, and for laboratory technicians, as well.

In conclusion, the most important resource is the personnel – the competent cadre. Although, the fast development of new technologies and the automation of laboratory work (which has been brought into our field by the Covid-19 pandemic, due to the needs of molecular diagnostics) are important, in theory and practice, an educated specialist of medical microbiology presents the main pillar that stands up for a modern, precise, quick, and high-quality diagnosis of infective pathogens, especially those with the pandemic potential. Therefore, the question, which was posed at the beginning of this pandemic, was justified: "Have we neglected laboratories, which present the key ring in the chain of struggle against this virus?" Clinical microbiological laboratories are a vital ring in the chain of activities necessary to defend the population from the threatening agents, and the novel corona virus, as well (8). Certainly, it is necessary to develop other targeted strategies for the promotion of society and state preparedness, such as promoting the changes of behavior and improving decision making about risk management (8).

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Autor za korespondenciju: dr med. Snežana Delić, načelnik Centra za mikrobiologiju i rukovodilac Referentne laboratorije za meningokok i hemofilus, Zavod za javno zdravlje Sombor, ul.Vojvođanska 47, 25000 Sombor, Srbija; e-mail: mikrobiologija@zzjzsombor.org

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Corresponding author: dr med. Snezana Delic, Head of Center for Microbiology and National Reference Laboratory for Meningococcus and Haemophilus, Public Health Institute Sombor, Vojvodanska 47, 25000 Sombor, Serbia; e-mail: mikrobiologija@zzjzsombor.org