



INTERNATIONAL ACADEMY OF SCIENCE AND ARTS  
IN BOSNIA AND HERZEGOVINA (IASABIH)  
INTERNACIONALNA AKADEMIJA NAUKA I UMJETNOSTI  
U BOSNI I HERCEGOVINI (IANUBIH)

International Scientific Symposium

## WHAT HAVE WE LEARNED ABOUT THE CONSEQUENCES OF THE COVID-19 PANDEMIC



22. i 23. oktobar/listopad 2021.

Hotel Salis, Tuzla

# BOOK OF ABSTRACTS

Tuzla 2021



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INTERNATIONAL SCIENTIFIC SYMPOSIUM

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CONSEQUENCES OF THE COVID-19 PANDEMIC?**

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Tuzla, 2021.

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## **INTERNACIONAL SCIENTIFIC SIMPOSIUM**

### **WHAT HAVE WE LEARNED ABOUT THE CONSEQUENCES OF THE COVID-19 PANDEMIC?**

Tuzla, October 22 - 23 2021

#### **Publisher:**

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Osman Sinanović, Mevludin Hasanović, Izet Pajević

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Mevludin Hasanović, Muhammed Hasanović

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## **WELCOME NOTE**

**Dear colleagues,**

It is my great honor and pleasure to invite you to an international symposium, a hybrid type, organized by the International Academy of Sciences and Arts in Bosnia and Herzegovina (Department of Medical Sciences) in cooperation with the University Clinical Center Tuzla and the Association of Psychiatrists of Tuzla Canton, planned for October 22-23, 2021 in the hotel "Salis" Tuzla, entitled "What have we learned about the consequences of the COVID-19 pandemic?"

The aim of the symposium is to exchange previous experiences and new scientific and practical knowledge gained during the confrontation with the COVID 19 pandemic through lectures and discussions on selected topics, of the prominent experts from various medical, social and theological fields. The online call with the program will be forwarded to over 3000 e-mail addresses of doctors and other relevant experts from BiH and beyond. Thus, the Symposium could be an incentive for new efforts and achievements in our daily work for the benefit of our citizens and the community as a whole in these complex and difficult circumstances.

Given that this is a pioneering gathering of this caliber in Bosnia and Herzegovina, and that for the first time we bring together in one place the work of experts from different disciplines on these complex and still insufficiently known issues, we expect that participants will have the opportunity to learn and expand their knowledge about contemporary problems related to the COVID 19 pandemic and to incorporate this knowledge into everyday practices, clinical work and the work of relevant social institutions of our communities.

Convinced that you will join and participate in this important event, I look forward to your participation and pleasant company in Tuzla and online, to encourage these efforts to improve the overall knowledge and standards of care for the overall health of our population.

Welcome live and online!

Prof.dr.med.sc. Osman Sinanovic, s.r.  
Leader of class for medical sciences IANUBiH.

## **ORGANIZERS**

INTERNACIONALNA AKADEMIJA NAUKA I UMJETNOSTI  
U BOSNI I HERCEGOVINI/  
ACADEMIA SCIENTARUM ET ARTIUM INTERNATIONALIS  
IN BOSNIA ET HERCEGOVINA

MEDICAL SCIENCES CLASS

## **IN COOPERATION WITH**

UniverClinical Center Tuzla  
Association of Tuzla Canton Psychiatrists

## **AUSPICE**

Government of Tuzla Canton, Ministry for Health of Tuzla Canton  
Medical Chamber of Tuzla Canton

## **SCIENTIFIC COMMITTEE**

Academician Asim Kurjak,  
Academician Osman Sinanović,  
Academician Miro Jakovljević,  
Prof. dr.sc. Šefik Hasukić

## **ORGANIZING COMMITTEE**

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Academician Miro Jakovljević,  
Prof. dr.sc. Izet Pajević,  
Prof. dr.sc. Mevludin Hasanović,  
Ahmed Pajević,  
Emina Sinanović,  
Muhammed Hasanović

# INTERNATIONAL SIMPOSIUM

## What have we learned about the consequences of the COVID-19 pandemic?

### PROGRAM

**Friday 22.10.2021.**

14:00-14:30

#### **Opening of the symposium**

Academic Asim KURJAK/Academic Osman SINANOVIĆ

**Moderator: Osman Sinanović**

14:30-15:00

Asim KURJAK, Zagreb/Sarajevo

Is the COVID-19 pandemic the end of happy globalization – what was the scientific response?

15:00-15:30

Afzal JAVED, London

Mental health challenges during COVID-19 pandemic

15:30-16:00

Ognjen GAJIĆ, Rochester

International cooperation in the treatment of critically ill patients during the COVID19 pandemic

**16:00 – 16:20**

**Coffee break**

16:20-16:40

Senka MESIHOVIĆ-DINAREVIĆ, Sarajevo

Postcovid-19 in children – evaluation of immunological and coronary artery status

16:40-17:00

Milan STANOJEVIĆ, Zagreb  
Mother and newborn during the COVID-19 pandemic: Between Scilla and Charybdis

17:00-17:20

Slobodan APOSTOLSKI, Slađana KNEŽEVIĆ-APOSTOLSKI, Beograd  
COVID-19 and Myasthenia gravis

**Subota/Saturday 23.10.2021.**

**Moderatori: Osman Sinanović & Izet Pajević**

8:30-8:50

Semira GALIJAŠEVIĆ, Sarajevo  
Role of Oxidative Stress in SARS-CoV-2 Infection: possible mechanism

8:50-9:10

Jasmina SMAJIĆ, Tuzla  
COVID-19: Respiratory disorders

9:10-9:30

Petar KES, Zagreb  
COVID-19: Nephrological disorders

9:30-9:50

Šefik HASUKIĆ, Tuzla  
The laparoscopic surgery: technique, ergonomic and specifics in the time of COVID-19 pandemics

9:50-10:10

Emir FAZLIBEGOVIĆ, Mostar  
COVID-19: Cardiac disorders

**10:10-10:30**

**Coffee break**

**Moderators Osman Sinanović & Miro Jakovljević**

10:30-10:50

Milenko BEVANDA, Mostar  
COVID-19 and gastrointestinal tract

10:50-11:10

Vanja BAŠIĆ KES, Zagreb  
COVID-19: Neurological disorders

11:10-11:30

Osman SINANOVIĆ, Tuzla/Sarajevo  
Association of sense of smell and taste disorders with SARS-CoV-2 infection

11:30-11:50

Zlatko TRKANJEC, Zagreb  
COVID-19 and Parkinson's disease

**11:50-12:50**

**AMICUS: Satelitski simpozij/Satellite symposium  
(Izet PAJEVIĆ/Mevludin HASANOVIĆ)**

12:50-13:10

Sead SELJUBAC, Tuzla  
COVID-19 pandemic: temptation or punishment – an Islamic perspective

13:10-13:30

Mijo NIKIĆ, Zagreb  
The COVID-19 pandemic – a call to conversation and return to Goad: a view from the perspective of the Catholic theology

13:30-13:50

Srđan RADMANOVIĆ, Bijeljina  
The COVID-19 pandemic - pastoral challenges for the Orthodox Church

**13:50-14:50**

**Ručak**



**Moderators: Osman Sinanović & Mevludin Hasanović**

14:50-15:10

Mirsad MUFTIĆ, Sarajevo  
Rehabilitation during the COVID-19 pandemic

**15:10-15:30**

**BOSNALIJEK: Satellite symposium  
(Mevludin HASANOVIĆ)**

15:30-15:50

Miroslava JAŠOVIĆ-GAŠIĆ, Tijana CVETIĆ, Beograd  
Exploration of previous knowledge about the consequences of patients with COVID-19 infection on mental health

15:50-16:10

Academic Miro JAKOVLJEVIĆ, Zagreb  
Promotion of the public mental health and fight against the COVID-19 pandemic and infodemic

16:10-16:30

Mevludin HASANOVIĆ, Izet PAJEVIĆ, Tuzla  
Health consequences for healthcare employees during the COVID-19 pandemic

16:30-17:00

**Presentation of book:**

Vlado Jukić, Miro Jakovljević: Norman Sartorius – razgovori, misli, djela. Medicinska naklada, Zagreb, 2021.

(Osman SINANOVIĆ, Afzal JAVED, Miro JAKOVLJEVIĆ, Norman SARTORIUS)

17:00

**End of the symposium**

# BOOK OF ABSTRACTS

INVITED LECTURERS



### **Academician ASIM KURJAK**

Professor of obstetrics and gynecology at Medical School Universities of Zagreb (Croatia) and Sarajevo (Bosnia and Herzegovina). Professor Emeritus at University *Sarajevo School of Science and Technology*. President of International Academy of Perinatal Medicine. President of International Academy of Science and Art in Bosnia and Herzegovina.

#### **PUBLICATIONS:**

Papers: published 1.151 papers; his papers have been cited more than 14.000 times, with h-index 64 (data from Google Scholar).

Books (written or edited): 123 (in English, Croatian, Italian, Japanese, German, Spanish, Portugese and Polish)

**AWARDS, HONORS AND ACHIEVEMENTS:** National Prize for Young Scientists (1971); Croatian national award "Ruđer Bošković" for scientific work (1985); "Josip Juraj Strossmayer" Prize of Academy of Science and Arts of the Republic of Croatia for the scientific book (1990); The Prize of Academy of Science and Art of the Republic of Croatia for the achievements in medical science (1994); Prize "Europski krug" given by European Movement - Croatia (1996), Prize "William Liley" for the best scientific paper from fetal diagnostics and therapy (1998); "Maternity Prize" given by European Association of Perinatal Medicine (2000), and Presidential decoration "The Order of the Croatian Starr with the Effigy of Rudjer Boskovic" (2001); "Pavao Culumovic" Prize of Croatian Medical Association (2003), Erich Saling Perinatal Prize (2011), Lifetime Achievement Award from International Academy of Perinatal Medicine (2015).

He is a regular member of European Academy of Sciences and Art, International Academy for Human Reproduction, Italian Academy of Science and Art of Reggio Puglia, Academy of Medical Sciences of Catalonia; honorary member of American Institute of Ultrasound in Medicine and Biology; foreign member of Russian Academy of Medical Sciences; Regular Fellow of Russian Academy of Science; member of Academy of Science and Art of Bosnia and Herzegovina.

Presently, he is Past President of World Association of Perinatal Medicine; coordinator of Educational Committee of World Association of Perinatal Medicine; President of International Academy of Perinatal Medicine and Fellow of World Academy of Art and Science; founder and director of Ian Donald Inter-University School of Medical Ultrasound.

Editor-in-chief of Donald School Journal of Ultrasound in Obstetrics and Gynecology. He has been awarded doctor honoris causa from University of Banja Luka, Bosnia and Herzegovina; Autonomous University of Barcelona, Spain; Semmelweis University in Budapest, Hungary; University of Athens, Greece; Carol Davila University of Medicine, Bucharest, Romania; University of The Republic, Montevideo, Uruguay; Siberian State University, Tomsk, Russia; University of Buenos Aires, Argentina; Ott Scientific Research University of Obstetrics and Gynecology, St Petersburg; Pirogov Russian National Research Medical University, Moscow and Center for Obstetrics, Gynecology and Perinatology, Moscow; University of Tirana, Albania; University of Khartoum, Sudan.

He is honorary member of 15 international societies. Member of Editorial board or editor in chief of several international journals.

## **IS THE COVID-19 PANDEMIC THE END OF HAPPY GLOBALIZATION – WHAT WAS THE SCIENTIFIC RESPONSE?**

**Academician Asim KURJAK**

Medical School University of Zagreb, Croatia

University Sarajevo School of Science and Technology, Sarajevo, Bosnia and Herzegovina

### **SUMMARY**

The coronavirus pandemic exposes the weaknesses of globalization and serves as a warning on the constants of the natural law on the survival of any nation or human community: only a well-organized modern state is capable of protecting its citizens, and this presumes the acceptance of the roles of borders, control and the authority principle while the economic and healthcare sovereignty requires the necessity of the principle of self-sufficiency in the areas of agriculture, nutrition and the necessary production of medication and primary products for the needs of the populace.

Taking into account everything we have learned about the SARS-CoV-2 virus so far it comes as a surprise that there hasn't been a more intense scientific debate on whether the blind lockdown model, implemented by most national governments, was truly an appropriate response to the challenges posed by the pandemic. Today, when we know more about the transmission modes of SARS-CoV-2 (primary mode is by respiratory droplets) as well as how dangerous it truly is (much less than previously thought), it is time to reassess the first radical epidemiological reactions. This needs to be done not to accuse someone of mistakes, but in order to plan future action.

It is clear that in the beginning numerous countries opted for radical epidemiological measures because we didn't have enough information about the COVID-19 pandemic but now the time has come to ask the questions about the weirdly mingled responsibility of politicians and epidemiologists who persist in scaring the populace with threats of the virus without considering the general consequences. Individuals who bravely provoke the world scientific community by insisting on a discussion based on data and not assumptions are actually very rare.



**Dr. Afzal JAVED**

**MBBS, MCPS, D.PSYCH (LONDON), BOARD CERT.PSYCH (UK),  
F.R.C.Psych. (UK), M.PHIL (Edinburgh), FRCP (Ireland)**

Dr. Afzal Javed is a Consultant Psychiatrist & Honorary Professor, Institute of Applied Health Research, University of Birmingham & Honorary Associate Clinical Professor at Warwick Medical School, University of Warwick UK. He is also chairman of Pakistan Psychiatric Research Centre & a Board member of Fountain House Lahore.

He graduated from King Edward Medical College Lahore, Pakistan and received higher specialised training in Psychiatry in Pakistan & UK.

He has served the Royal College of Psychiatrists UK as Deputy & Associate Registrar & Chairman of West Midlands Division of the College.

His role in international psychiatry is highlighted by his current position at World Psychiatric Association (WPA) as President from October 2020 to October 2023.

He has also been the Past Presidents of Asian Federation of Psychiatrists Associations (AFPA) from 2017-19 & World Association for Psychosocial Rehabilitation (WAPR) from 2012-15.

His areas of special interest are Social and Transcultural Psychiatry, Psychosocial Rehabilitation and Psychiatric Research. His academic skills have been invaluable when publishing more than 145 scientific papers and being author of six books/monographs on different topics of psychiatry.

# **MENTAL HEALTH CHALLENGES DURING COVID 19 PANDEMIC**

**Afzal JAVED**

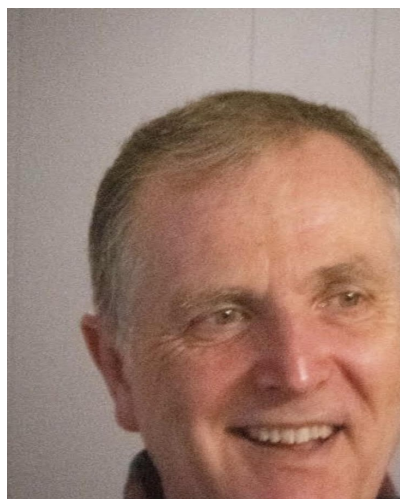
President World Psychiatric Association  
Institute of Applied Health Research, University of Birmingham, UK  
Pakistan Psychiatric Research Centre, Fountain House, Lahore, Pakistan

## **SUMMARY**

21<sup>st</sup> century is witnessing rapid global changes along with a major shift in current thinking about shifting priorities in health & social care. Adding to its high infectivity and fatality rates, the Covid 19 is leading to consequential universal health impacts by causing fear, economic burden, and financial losses. Similarly, corona-phobia as well as the actual effects of Covid 19 have generated a plethora of psychiatric manifestations across the different strata of the society that have increased a need to revisit current mental health planning.

The coronavirus (COVID-19) pandemic is having additional impacts on everyone's lives. There is no doubt that COVID- 19, a biomedical disease, has serious physical and tremendous mental health implications due to the rapidly spreading pandemic. In addition to financial impacts, mental well-being is becoming a focus of attention for health professionals, service providers and policy makers dealing with health and social care planning. There may be common reactions to the difficult situation we face but everyone is reacting differently to events and changes in the way that we think, feel and behave.

This paper describes some new challenges that we are facing in mental health. Attention is drawn to the various & emerging interrelated and interdependent predisposing and causative factors for the development of psychological ill-effects of current challenges with the interventions needed to address it.



**Prof. Dr. Ognjen GAJIĆ**

MD, MSc, FCCM, FCCP

Dr. Gajic practices and teaches critical care medicine at Mayo Clinic in Rochester, Minnesota. Dr Gajic has published more than 350 peer-reviewed articles and book chapters related to critical care medicine. He has served as a chair of the Discovery Research Network of the Society of Critical Care Medicine. He pioneered the concepts of improving critical care and outcomes with intelligent ICU environments. Dr Gajic and his group designed and implemented one of the largest international quality improvement project in critical care: CERTAIN (Checklist for Early Recognition and Treatment of Acute Illness & iNjury) [www.icertain.org](http://www.icertain.org)

## **INTERNATIONAL CRITICAL CARE COLABORATION DURING COVID-19 PANDEMICS**

**Ognjen Gajić**

Mayo Clinic, Rochester, Minnesota, USA

### **SUMMARY**

COVID19 pandemics brought an unprecedented number of critically ill patients worldwide. Challenges with hospital strain and misinformation pandemics further compromised patient care and outcomes. The development of large collaborative research registries has highlighted the fact that high-quality supportive care is the most important modifiable outcome determinant of COVID19 critical illness. Mayo Clinic's CERTAIN program (Checklist for Early Recognition and Treatment of Acute Illness and injury) is a virtual education and quality improvement program focused on a standardized approach to the critically ill with the goal to maximize the quality of life and, when appropriate, quality of dying using a compassionate, humane approach to patient care. During the pandemics, CERTAIN has been used to support clinicians in busy ICUs in the USA, and with the support of the WHO office in Sarajevo, has also helped with rapid knowledge sharing with health care workers in the countries of former Yugoslavia.



### **Academician Senka MESIHOVIĆ-DINAREVIĆ**

Born in 1958 in Sarajevo. Graduated on the Faculty of Medicine University of Sarajevo 1982. She worked at the Paediatric Clinic-Clinical University Centre Sarajevo 1982-2016. From 2016 subspecialist of paediatric cardiology, Polyclinic Eurofarm Sarajevo. MSc 1985, specialist paediatrician 1988, subspecialty in Paediatric cardiology: Sarajevo, Belgrade, London. PhD 1991, Professor of Paediatrics from 2006 Medical faculty University of Sarajevo and from 2016 Professor of Paediatrics Medical faculty University of Mostar. Professor at European Centre for peace and Development /EPCD/ University for peace United Nation, since 1994. Member of Association for European Paediatric and Congenital Cardiology /AEPC/, 1995. British Paediatric Cardiology Association /BPCA/. Ordinary member of General Medical Council /GMC/, England, Lecturer Postgraduate studies London: Membership Royal College of Paediatrics /MRCP/ from 1995-2011; Consultant cardiologist Royal College of Paediatrics and Child Health (RCPCH) England since 1997.; from 2003-2016 Director of Paediatric Clinic University Clinical Centre Sarajevo and Head of Paediatric Chair Medical faculty University of Sarajevo; Director of Disciplines for Child Health University Clinical Centre Sarajevo: Paediatric Clinic and Clinic for Paediatric Surgery from 2011, and from 2014-2016, Director of the Discipline for the Women's and Child Health Protection, which includes the Gynaecology and Obstetrics Clinic University Clinical Centre Sarajevo Sarajevo. 2000 FESC /Fellow European Society for Cardiology/, from 2008 Member of Academy of Sciences and Arts of Bosnia and Herzegovina, 2009. Chairman of the Committee of Cardiovascular pathology, Department of medicine Academy of art and science of Bosnia and Herzegovina, Honorary Doctorate of Letters, Cambridge England 2014. 2016. Member of the European Academy of Science and Arts; over 547 papers, 17 books/textbooks.

### **„POSTCOVID 19 IN CHILDREN- EVALUATION OF IMMUNOLOGICAL AND CORONARY ARTERY STATUS**

**Senka MESIHOVIĆ-DINAREVIĆ**

Polyclinic Eurofarm Sarajevo, Bosnia and Herzegovina

#### **SUMMARY**

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) causing COVID-19 has reached pandemic levels since March 2020. Patients with cardiovascular /CV/ risk factors and



established cardiovascular disease /CVD/ represent a vulnerable population when suffering from COVID-19, and have an increased risk of morbidity and mortality. Severe COVID-19 infection is associated with myocardial damage and cardiac arrhythmia. COVID-19 is a new disease with insufficiently known epidemiological characteristics and spectrum of clinical expression in childhood. Current findings indicate that children have a lower incidence of the disease with a predominance of mild forms of the disease but severe clinical forms such as, among others, acute respiratory distress syndrome and multisystem inflammatory syndrome may occur. The aim of this study was to evaluate the knowledge on SARS-CoV-2, epidemiology, transmission, the associated clinical presentation including immunological and cardiovascular status in postCovid children in Sarajevo. The group of 70 children /previously healthy or with no pre-existing heart disease/ from Sarajevo with positive postcovid history, formed this study. In the group of 70 children /40 boys/ there were: infants /under 1 years of age/:10, 1-5 years: 20; 6-10:12; 11-15:21; 16 -18 years: 7; forming five groups. They were referred by a local pediatrician or by concerned parents due to the child's symptoms, for cardiovascular assessment by pediatric cardiologist. Patients were evaluated in Policlinic Eurofarm in Sarajevo, during the period of October 2020 till April 2021. Following the history and epidemiological data, establishing the 1<sup>st</sup> day of disease or contact, a detailed cardiovascular examination has been performed included parameters of body weight, height, oxygen saturation, pulse, blood pressure, 12 leads electrocardiogram /ECG/, values of polymerase chain reaction (PCR) or serological test on corona: immunoglobulin G /IgG/ and immunoglobulin M /IgM/ and echocardiography which provided data on the morphology and hemodynamic of the heart with special attention for myocardium, ejection fraction of left ventricle, morphohaemodynamics of coronary blood vessels and possible myocardial infarction. Symptoms differ depending on age group, younger children had no or mild symptoms in comparison to the older group of children. The majority of children /64.3 %/ were asymptomatic, except two boys age 14 years, with palpitation on exertion, shortness of breath, including ECG changes: denivelation of ST segment in lead II, V5 and V6, lower oxygen saturation /91% and 94%, elevated CPKMB: 38 and 45 /normal range up to 25/ with enlarged in one patient diameter of left coronary artery /LCA/up to 3.8mm, no aneurysm, no skin changes, with normal EF of LV. They were on a short period /10-15days/ on treatment with nonsteroids including low doses of Aspirin, vitamins /C and D/, rest, and no sports activities. After treatment and regime of no activities, they were fully recovered, free of symptoms, normal oxygen saturation and normal values of CPKMB and FBC, the diameter of LCA was within a normal range according to age and bodyweight of the patient. In all pts FBC including platelets and white blood count were within normal range, as well as urine, D dimer, CRP, LDH, liver enzymes, CPK, CPKMB except above mention. ECG was normal in relation to patients age except in 8 patients /intermittent palpitations on exertion/ who has had PR interval short 0.120-0.140ms, with no delta wave, with heart rate within the normal range according to age, so 24hrs ECG Holter was performed without any significant arrhythmias, incomplete right branch block /IRBB/ has been documented in 12%, monofocal ventricular ectopic extrasystoly /VES/ in 15%. Mean IgG showed a statistical significance when compared between age groups I and II / < 5/ and older groups: III, IV, V / > 5/. (p <0.05; p=0.043). PCR test was negative in 9/70 children, although they had symptoms, clinical data on Covid 19 infection, and positive laboratory findings. Echocardiogram was normal in all patients with a normal ejection fraction of LV. No pericardial effusion, vegetation's or thrombus was detected. Mean diameter of coronary arteries right /RCA/ and left /LCA/ ranged 1.98 mm to LCA 2.09 mm. Z score calculation for coronary arteries including body weight, height, and gender of every patient, was within normal

values for RCA and LCA. Practitioners should consider the possibility of COVID-19 in children with atypical symptomatology and positive or suspicious epidemiological survey, paying special attention to immunological and coronary artery status.

**Keywords:** Post-COVID-19, children, immunological and coronary artery status



**Prof. Dr. Milan STANOJEVIĆ**

Head of the Department of Neonatology at the Department of Obstetrics and Gynecology Medical School University of Zagreb, “Sveti Duh” University Hospital, Zagreb, Croatia from 2007 till 2018. Retired in 2018. Actively participating in the teaching for the graduate and postgraduate medical students at the Medical School University of Zagreb (Obstetrics and Gynecology, Basic Course on Ultrasonography in Croatian and English, Fetal and neonatal neurophysiology, fetal behavior). Associate professor at Dubrovnik International University from 2011. Assistant professor of pediatrics at The Faculty of Teacher’s Education University of Zagreb from 2013. Member and from 2007 to 2011 Secretary General of the World Association of Perinatal Medicine (WAPM), vice-president of WAPM from 2011, president elect from 2013, and president of WAPM from 2015 till 2019. Board member of the Fetus as the Patient Society from 2008. From 2008 associate fellow of the International Academy of Perinatal Medicine (IAPM) and from 2014 regular fellow of IAPM. Fellow of the European Academy of Sciences and Arts from 2014. Since 2020, Corresponding Member of the International Academy of Sciences and Arts in Bosnia and Herzegovina. Member of the Board of Croatian Perinatal Association. Involved as a member of the organizing committees, vice – president and member of scientific committees of national and international meetings. Awarded with William Liley Medal by Fetus as a Patient Society in 2011 and „Ladislav Rakovac” Award by Croatian Medical Association in 2008, Global Maternity Prize of International Academy of Perinatal Medicine in 2019. Visiting professor at the Weill Cornell Medical University, New York, USA. Visiting Professor in 2021 at the Medical University of Warsaw, Poland. Honorary professor of the Pirogov Russian National Research Medical University, Medical Institute of State University in Surgut, Russia, and Kuban State Medical University, Russia. Published 326 papers (151 journal and 175 conference papers), 44 conference papers without publication as invited speaker, with 3067 citations and H index 25 (Scopus). Wrote 60 chapters in the books and edited 7 books. Author of the manual for the implementation of Mother and Baby Friendly Hospital Initiative in Croatia available as online course at <https://agora.unicef.org/c/RPMD+-+Unicef+Hrvatska>. Member of editorial board of two journals and reviewer in ten. Participating in several research scientific projects (follow up of high-risk infants, fetal hypoxia, fetal neurology). National coordinator for education at the UNICEF Office for Croatia involved already twenty-two years

in the project “Baby Friendly Hospital Initiative”. Still lecturing at Medical School University of Zagreb and Techer’s Faculty University of Zagreb.

## **MOTHER AND NEWBORN DURING THE COVID-19 PANDEMIC: BETWEEN SCILLA AND CHARYBDIS**

**Milan STANOJEVIĆ**

Department of Obstetrics and Gynecology Medical School University of Zagreb, Sveti Duh Clinical Hospital, Zagreb, Croatia

### **SUMMARY**

The first guidelines of many societies and organizations such as the World Health Organization, the European Center for Disease Prevention and Control, the Royal College of Obstetrics and Gynecology (RCOG), the Center for Disease Control, The International Federation of Gynecology and Obstetrics (FIGO), the American Academy of Pediatrics, World Association of Perinatal Medicine (WAPM), many national professional societies on the treatment of pregnant women, mothers and newborns are based on some recommendations on experiences with previous coronavirus epidemics caused by other viruses from the same group.

Among the first were Chinese recommendations that came almost immediately after the outbreak of the Wuhan epidemic and then the pandemic.

All recommendations were "developmental" as the introduction of the virus and knowledge of epidemiology, pathogenesis, progression, and course of the disease in different groups of people, including pregnant women, mothers, and newborns, progressed.

The recommendations that caused the most controversy are accompaniment at birth, skin-to-skin contact, breastfeeding and feeding the newborn, rooming-in, vertical transmission of SARS-CoV-2, vaccination of pregnant and breastfeeding women.

Recommendations for overcoming Covid-19 infection in pregnancy should be evidence-based and should enable the best possible outcome for mothers, newborns, and families worldwide.

In addition to saving lives, these guidelines should be effective and aimed at achieving a favorable outcome by respecting the basic principle of ethics in medicine: "do no harm".

During the COVID-19 pandemic, tens of thousands of children will lose their parents or grandparents at an age when they cannot assess the meaning of the loss or remember it later, and the loss of loved ones will affect their future lives in countless immeasurable ways.

In maternal and child health, the pandemic has brought numerous misconceptions that are inconsistent with the natural laws governing the mother-child relationship, which will certainly leave unforeseeable consequences, including those relating to the mental and overall health of future and present generations. Therefore, it could be said that medicine (along with politics) in its recommendations regarding the protection of maternal and child health during the COVID-19 pandemic was and still is between Scylla and Charybdis.



**Prof. Dr. Slobodan APOSTOLSKI**

Was born in 1950 in Belgrade, Serbia. He graduated from the Faculty of Medicine in 1974. Since 1976, he has been employed at the Institute of Neurology, Clinical Center of Serbia, and since 1983, at the School of Medicine as well. He achieved his PhD degree in neurology in 1981 ("Correlation of Clinical, electrophysiological, immunological and histopathological parameters in Myasthenia Gravis"). He has been Head of the Unit for Neuromuscular diseases at the Institute of Neurology (1987 -2007), an Assistant of the Chairman of the Institute of Neurology and had a position of a Full Professor of Neurology at the School of Medicine (1999-2009). During two years (2000- 2002) he had the position of a Dean of the School of Medicine. He chaired the professorship of neurology at the School of Medicine (2004-2009). He completed the most important part of his advanced training and postdoctoral fellowship in neuroimmunology in USA, at the Mayo Clinic in Rochester and at the Columbia University in New York.

Prof. Apostolski was a member of the majority of national and international neurological associations (Managing Board of the Danube Symposium, World Federation of Neurology – The member of the Executive committee of the Education committee of the WFN, Scientific board of the European School of Neuroimmunology (ESNI), Muscle and Neuromuscular subcommittee of the ENS, and Scientific committee of the EFNS) and currently is a member of the EAN, a member of the EAN Scientific Panels Neuropathies and EAN Scientific Panel Muscle&NMJ disorders.

He is the author or co-author of 450 papers, four books, several EFNS guidelines papers, manuals, and editor of an important monographs.

His greatest scientific contributions include his research of immunopathogenesis of myasthenia gravis, identification of the new peripheral nerve antigens and their importance in immuno-mediated neuropathies, as well as studies in the field of neuro-AIDS. He has improved clinical practice in treatment of myasthenia gravis and immunomediated neuropathies. Currently, his field of interest includes immunotherapy of immune mediated neuromuscular diseases.

He runs Outpatient neurological Clinic in Belgrade, Serbia and has the position of Visiting professor at several universities in former republics of Yugoslavia.



### **Dr. Slađana KNEŽEVIĆ-APOSTOLSKI**

Born on January 23, 1974 in Sremska Mitrovica. In 1999 she graduated from the Medical Faculty of the University of Belgrade. 2001 - 2006 Specialization in neurology at the Institute of Neurology of the Clinical Center of Serbia (interruptions of the internship due to injury and maternity leave). 1999/2000. She enrolled in postgraduate classes in immunology at the Medical Faculty of the University of Belgrade, attended 4 semesters of postgraduate classes and completed experimental work at the Faculty of Pharmacy of the University "Cyril and Methodius" in Skopje. 2008 She passed the specialist exam in neurology at the Medical Faculty of the University of Belgrade with an excellent grade.

01.04.2009.-31.05.2010 Specialist neurologist in the Specialist Practice for Neurology "Apostolski" in Belgrade.

01.06.2010 - 01.04.2012. Specialist neurologist in the office - Clinic for Neurology of the Military Medical Academy in Belgrade.

From 01.04.2012. Specialist neurologist in the Specialist Practice for Neurology "Apostolski" in Belgrade.

Under the guidance of Dr. Sanja Pavlović, a subspecialist in clinical electromyoneurography, she completed her education and practical training in clinical electromyography, confirmed by a certificate for clinical electromyography.

1. Completed several continuous educations at the Faculty of Medicine in Belgrade:

Molecular genetics in pediatric neurology and psychiatry

2. Neuromuscular transmission damage syndrome

3. Vascular dementias

4. Characteristics, preparation and use of immunoglobulins for intravenous administration.

5. Sleep and sleep disturbance.

6. EFNS Regional Teaching course

7. Neuropathy-modern approach in classification, diagnosis and therapy.

Published eight papers in journals cited in cc from the field of neuromuscular diseases.

### **COVID-19 AND MYASTHENIA GRAVIS**

**Slobodan APOSTOLSKI, Slađana KNEŽEVIĆ-APOSTOLSKI**

## SUMMARY

**Objective:** To investigate the effect and consequences of SARS-CoV-2 infection on patients with myasthenia gravis (MG).

**Background:** MG may be precipitated and complicated with respiratory failure by infection. It has been reported that the mortality rate significantly increased in patients with myasthenic crisis and SARS-CoV-2 infection.

**Methods:** We followed 172 patients with myasthenia gravis at the Outpatient Neurological Clinic between January, 2020 – August, 2021 and performed retrospective analysis of the clinical course in 30 patients infected with SARS-CoV-2.

**Results:** Thirty out of 172 patients (17.5%) with MG had COVID-19. Half of them, 15 women, with a mean age of 40.6 years, and 15 men, with a mean age of 55 years, were included. The median disease duration was 6 years. Twenty patients presented generalized MG (10 patients IIB and the other 10 IIA MGFA score) and the other ten patients had ocular MG (MGFA I). Twenty-seven patients had antibodies to AChR, and three patients with ocular MG were double-seronegative. Comorbidities included hypertension (7 patients), hypothyreosis (3), diabetes mellitus (1), seropositive Rheumatoid arthritis (1), Sjogren (1), Parkinsonism (1), and anemia (1). Sixteen patients were previously thymectomized, two of them had thymoma (B1, AB type). At the time of infection 11 patients were using prednisone (20-40mg), 4 patients azathioprine (100-150mg), 8 patients combination of prednisone and azathioprine, one patient cyclosporine and prednisone, one patient metotrexate and prednisone, and 5 patients had no immunosuppression. Asymptomatic COVID-19 had six patients (3 MG IIA and 3 MG I), all of them with continuous immunosuppression with prednisone. Mild COVID-19 with fever, cough, and myalgia had 16 patients, five of them with anosmia. Seven patients had pneumonia and needed hospitalization with an oxygen nasal cannula without mechanical ventilation. All of them had steroid treatment and did not have deterioration of MG. One patient who had MG IIB, thymoma and diabetes mellitus developed an MG crisis and required intubation. He was treated in an intensive care unit for 10 days with antibiotics, corticosteroids. Intravenous immunoglobulin, and Ivermectin and recovered to the MGFA score IIB. Four patients who had postcovid syndrome presented with bradycardia, tachycardia, chronic fatigue, and residual anosmia.

**Conclusion:** A study with MG and COVID-19 patients requiring hospitalization revealed an intensive care unit admission rate of only 3.3%, with no mortality. Moderate clinical presentation with a hospitalization rate of 23.3%, and asymptomatic and mild COVID-19 in 22 patients (73.3%) may be explained by continuous immunosuppression before and during infection with no deterioration of MG.





**Prof. Dr. Semira GALIJAŠEVIĆ**

Prof Dr. Semira Galjašević currently serves as the Dean of the Faculty of Medicine at the University of Science and Technology in Sarajevo where she is also a full-time Professor while being an Executive Committee member for the Association of Medical Schools of Europe, Berlin, Germany. She completed her undergraduate studies at The University of Sarajevo of Natural sciences and obtained her Ph.D. at Wayne State University, School of Science in Michigan. She continued research as a Research Associate at the Ob/gyn Department, School of Medicine at Wayne State University.

Later, she becomes an Associate Professor at the Faculty of Natural Sciences at the University of Sarajevo, Visiting professor at the University of Natural resources and Life sciences at the Biochemistry Division in Vienna Austria, and also Visiting Scientist at the Medical University of Graz, Austria. She continuously mentors master and doctoral studies students at Sarajevo School of Science and Technology, University of Banja Luka, University of Sarajevo and mentored required practice for Sorbonne Université student.

Her research has been supported by two grants from American Heart Association, USA and National heart, lung, and blood institute, USA and a number of local grants.

Dr. Galjasevic has organized and chaired multiple scientific conferences, and actively participated in conferences about medical education and science. She published more than sixty papers and conference abstracts, works as scientific editor for PLOSOne Journal.

Her research focus on pro-inflammatory enzyme myeloperoxidase, that plays a role in immune surveillance and host defense mechanisms. Increased MPO activity and production of free radical species has been linked to a number of pathologies with compelling evidence in initiation and progression of inflammatory events. Recent research efforts are focused towards deciphering enzyme mechanistic pathways and connection with oxidative stress and design of effective MPO inhibitors that could subdue inflammatory actions of MPO and subsequent development of different pathologies. The second part of research is focused on heme biochemistry under the conditions of oxidative stress.



# THE ROLE OF OXIDATIVE STRESS IN SARS-COV-2: POSSIBLE MECHANISM

**Semira GALIJAŠEVIĆ**

Faculty of Medicine at the University of Science and Technology in Sarajevo, Bosnia and Herzegovina

## SUMMARY

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) has emerged as a major challenge for medical science. A great effort has been made to understand its epidemiology, its clinical evolution and molecular mechanism of this viral infection. Number of studies published in a last year gave either hypothesis or scientific data on pathogenesis and the host response mechanisms in the progress of the disease. First steps in the invasion of the cells by virus have been detected early in pandemic. Receptor binding domain (RBD) of the SARS-CoV-2 spike proteins attaches itself to and gains entry to the cell. But, new variants of SARS-CoV-2 are having mutations in the S1 subunit of the spike protein that stentings the RBDs ability to bind to ACE2 much stronger. One inside the cell, mechanism is not quite completely clear. There are still many unknowns and competing hypothesis in an attempt to explain exact behavior of the virus. Some of the major unknowns are the number of ACE2 receptors needed to bind each spike protein, number of spikes to gain entry to the cells. So far, 332 interactions between SARS-Co2 and human proteins have been detected.

Several laboratory biomarkers have been identified early on and used to classify patients based on their risk of developing a severe form of COVID-19. Those were lymphocyte count, neutrophil count, neutrophil-lymphocyte ratio, C-reactive protein, erythrocyte sedimentation rate, procalcitonin, IL-6, D-dimer, troponin, creatine kinase, and aspartate aminotransferase. Resent research showed that homocysteine assessment can be a potential predictive biomarker for the severity of COVID-19 infection. In addition, angiotensin II and alamadine have been identified as potential biomarkers. However, in order to develop appropriate therapeutic strategies, exact molecular mechanism that is very complexes needs to be deciphered. Enhanced neutrophil extracellular traps (NETs) formation has been reported in severe cases of COVID-19. Elevated level of cell free DNA, myeloperoxidase-DNA complexes and citrullinated histones have been detected and correlated with inflammatory markers such as CRP and D-dimer. Soon after detection and correlation of NETs with severity of COVID-19, another, more complex mechanism has been proposed.

High production of reactive oxygen species (ROS) and subsequent oxidative stress leading to increased formation of NETs leading to suppression of adaptive immune system appeared to be a main cause of systemic tissue damage and ultimately severity of COVID-19. The latest scientific data implicated association of oxidative stress with changes found in patients with COVID-19, such as the initiation and the amplification of the cytokine storm, coagulopathy, and cell hypoxia. Influx of ROS and a high oxidative stress was implicated as a potential cause of lymphopenia and T cell suppression in COVID-19. High glucose and also hypoxia /reperfusion happening upon ventilation of COVID-19 patients leads toward another increase in ROS, thus promoting further tissue injury. In a structural manner, oxidative stress can cause oxidation of

the cysteine residues on proteins of both the virus and ACE-2 to form disulfide bonds that in turn increase the affinity of the SARS-CoV-2 for ACE-2, thereby amplifying COVID-19 pathogenesis.

The complexity of the SARS-CoV-2 activity on a cellular level, and cascade of events leading towards serious tissue injury that clearly involves oxidative stress demands detailed research and detection of exact mechanistic pathways in order to develop appropriate therapies.



**Prof. dr. Jasmina SMAJIĆ**

Jasmina Smajić, born on December 14, 1972. in Dortmund, Germany. Primary and secondary school ended in Tuzla. Graduated from the Medical Faculty of the University of Tuzla in 2001. Worked as an intern at the Tuzla Health Center, passing the professional exam in November 2002. Since January 2003. an employee of the University Clinical Center Tuzla, at the Clinic for Anesthesiology and Intensive Care. The specialist exam was passed in September 2008, and works as a specialist in anesthesiology with resuscitation. Areas of professional interest are adequate depth of anesthesia, transplant medicine, pain treatment, infection control, polytrauma treatment, intensive care. Received master's degree in "Assessment of the depth of anesthesia" in November 2009 and defended her doctoral dissertation on "Clinical significance of coagulation parameters in the process of systemic inflammatory response in the surgical patients" in February 2014. Associate professor at the Department of Anesthesiology, Resuscitation and Intensive Care. Leads the subjects "Emergency Medicine and" Pain Medicine "at the Medical Faculty of the University of Tuzla, and" Palliative Health Care "at the University" Džemal Bijedić "Mostar. Since 2019 the primarius. From 2016 to 2020 the head of the Intensive Care Unit, after which became the head of the Clinic for Anesthesiology and Resuscitation. The President of the Association of Doctors of Medicine Anesthesiologists-Reanimatologists in the Federation of Bosnia and Herzegovina, a member of the European Association of Anesthesiologists and Intensive Care in which was a member of the Council in the period 2016-2021. As the president of the organizing committee, participated in the organization of several professional and scientific conferences, domestic and international workshops, seminars, symposia and congresses. Participate as an invited lecturer at domestic and international professional and scientific gatherings. The author and co-author of several papers published in indexed journals, professional journals, collections, author of 3 chapters in books, editor of two handbooks. Member of the editorial board in two, peer-reviewed in several journals. Participated as a coordinator or team member in several domestic or international scientific research projects. Member of the commission for taking the specialist exam as well as the defense of the master's thesis and doctoral dissertation.

# COVID-19: RESPIRATORY DISORDERS

**Jasmina SMAJIĆ**

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## SUMMARY

The severe acute respiratory syndrome coronavirus-2 emerged as a serious human pathogen in late 2019, causing the disease coronavirus disease 2019 (COVID-19). The most common clinical presentation of severe COVID-19 is acute respiratory failure consistent with the acute respiratory distress syndrome. Airway, lung parenchymal, pulmonary vascular, and respiratory neuromuscular disorders all feature in COVID-19. Viral pneumonia is the most frequent serious clinical manifestation of COVID-19, prominently featuring fever, cough, dyspnea, hypoxemia, and bilateral infiltrates on chest radiography.<sup>3–6</sup> Dry cough is more common than a productive cough.<sup>6</sup> Dyspnea appears after a median time of 5 to 8 days.<sup>5,6</sup> Severe hypoxemic respiratory failure consistent with the Berlin definition of the acute respiratory distress syndrome (ARDS) occurs in a significant proportion of patients with COVID-19 pneumonia.<sup>7,8</sup> Patients who require mechanical ventilation have a high risk of death. The respiratory tract epithelium is the key entry point for beta-coronaviridae, which includes SARS-CoV-2, MERS-CoV (Middle East respiratory syndrome-related coronavirus), and SARS-CoV, into the human host.<sup>29,30</sup> The airway epithelium acts as a barrier to pathogens and particles, preventing infection and tissue injury by the secretion of mucus and the action of mucociliary clearance while maintaining efficient airflow. Inhaled SARS-CoV-2 particles likely infect different epithelial cell types on their way to the distal lung. After entering and replicating within the nasal mucosa, SARS-CoV-2 travels to the conducting airways, where it triggers an immune and inflammatory response, manifesting in clinical signs and symptoms of COVID-19. Although SARS-CoV-2 infection often begins in the upper airway epithelium, in a subset of patients, the virus infects or injures the alveolar epithelium diffusely, resulting in markedly impaired gas exchange and respiratory failure. SARS-CoV2 infection of endothelial cells, which might occur from luminal or alveolar interstitial side, triggers endothelial release of cytokines, which cause increased capillary permeability, thereby allowing adhesion and extravasation of neutrophils and monocytes into the alveolar interstitial space. Neutrophils, and macrophages secrete a multitude of cytokines, procoagulants, and complement, which promote viral attack and clearance but which induces further vascular injury enhancing the risk for thrombosis. COVID-19 affects all components of the respiratory system, including the neuromuscular breathing apparatus, the conducting airways, the respiratory airways and alveoli, the pulmonary vascular endothelium, and pulmonary blood flow.

**Key words:** SARS-CoV-2, COVID-19, respiratory system



**Prof. Dr. Petar KES**

PETAR KES, full professor - last place of employment: Faculty of Medicine, University of Zagreb, Department of Nephrology, Arterial Hypertension, Dialysis and Transplantation, Clinic for Internal Medicine, University Hospital Center Zagreb. He was born on April 15, 1950 in Osijek, Croatia. Specialist in internal medicine and nephrology. Former head of the Department of Dialysis and Transplantation at KBC Zagreb, consultant-nephrologist and professor of internal medicine and nephrology at the Medical Faculty of the University of Zagreb and visiting professor at the Medical Faculty of the J. J. Strossmayer University in Osijek / Croatia. Professor Petar Kes is a full member of the Croatian Academy of Medical Sciences (since 2000) and a member of the Senate of the Croatian Academy of Medical Sciences (since 2016), the current president (two terms) of the Croatian Society of Nephrology, Dialysis and Transplantation, former governor (two terms) ) European Society of Artificial Organs; former President (2015-2017) of the Balkan Association of Nephrology, Transplantation and Artificial Intelligence (BANTAO) and Member of the Management Board of BANTAO (from 2009 until today); member of the Board of Directors of the Danube Association of Nephrology (DAN) from 2008 until today; Vice President of ISN-GO for Central and Eastern Europe (International Society of Nephrology - Global Reach) since 2012; Member of the Council of the Mediterranean Nephrological Society; Delegate of the Croatian Medical Chamber and the Croatian Society for Nephrology, Dialysis and Transplantation at UEMS; National Representative at KDIGO; Chairman of the ERA-EDTA Activation Committee for Southern Europe and Mediterranean Countries - responsible for coordination and education in nephrology, dialysis and kidney transplantation. He is a member of the Commission for Awarding and Recognition of the Croatian Academy of Medical Sciences; former President of the Dialysis Commission of the Ministry of Health of the Republic of Croatia from 2001 to 2004; National Committee of the Republic of Croatia for Diagnosis, Prevention and Treatment of Patients with Hepatitis; head of the commission headed by the Ministry of Health to solve the problem of severe aluminum poisoning in patients with hemodialysis Sisak, the hepatitis C epidemic at the hemodialysis center in Slavonski Brod and in 2001 head of the commission to solve the "Baxter affair", a tragic event when 23 patients died during hemodialysis. All three problems were successfully resolved in a very short time and without further consequences for dialysis patients. He has been a member of professional associations for many years, such as: Croatian Medical Association,

Croatian Society for Nephrology, Dialysis and Transplantation, European Nephrological Association - European Association for Dialysis and Transplantation (ERA-EDTA), National Kidney Foundation (NKF), International Nephrological Association ), The American Nephrological Association (ASN), the International Association of Artificial Organs (ISAO), the Association of Balkan Cities for Nephrology, Dialysis, Transplantation and Artificial Organs (BANTAO) and the European Association of Artificial Organs (ESAO). He was the president of the 3rd, 4th and 5th Croatian Congress of Nephrology, Dialysis and Transplantation; President of the 12th BANTAO Congress; organizer and leader of about 50 CME courses in nephrology, dialysis and kidney transplantation at the Faculty of Medicine, University of Zagreb; organizer of more than 60 national and international symposia in the field of nephrology, dialysis, plasmapheresis and apheresis, kidney transplantation; co-founder of the Croatian Registry for Kidney Replacement Therapy; co-founder of the Croatian School of Kidney Transplantation at the Inter-University Center in Dubrovnik. Professor Petar Kes has published 640 scientific, professional, review articles and book chapters, 52 manuals in the field of nephrology, dialysis, kidney transplantation and therapeutic apheresis and 4 books. He has been a longtime member of the editorial board of the professional journals Kidney and Blood Pressure Research, BANTAO Journal, Acta Clinica Croatica, Contributions and Acta Medica Croatica (editor-in-chief since 2017). During his many years of professional and scientific activity, he has received several domestic and foreign awards for achievements in nephrology, dialysis and kidney transplantation.

## **ACUTE KIDNEY INJURY IN PATIENTS WITH COVID-19**

**Petar KES**

Academy of Medical Sciences of Croatia  
School of Medicine, University of Zagreb, Zagreb, Croatia

### **SUMMARY**

Acute kidney injury (AKI) is a common finding in patients with coronavirus disease 2019 (COVID-CoV-19), and it is associated with long-term hospital treatment, more frequent admission to intensive care units (ICUs), and higher mortality compared with COVID-CoV-19 patients without kidney disease. Moreover, the mortality rate is directly proportional to the severity of AKI.

The pathophysiology of COVID-19 associated AKI could be related to specific and unspecific mechanisms. COVID-19 – specific mechanisms are direct cellular injury resulting from viral entry through the ACE-2 receptor, which is highly expressed in the kidney, an imbalanced renin-angiotensin-aldosterone system (RAAS), severe respiratory failure, proinflammatory cytokines elicited by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection, coagulopathy, microangiopathy, and collapsing glomerulopathy. Nonspecific mechanisms include hemodynamic alterations, high levels of positive end-expiratory pressure in patients requiring mechanical ventilation, sepsis, hypovolemia, rhabdomyolysis, and administration of nephrotoxic drugs.

Today, we do not know enough about the prevention and management of COVID-19. Treatment of AKI includes general management, pharmacological management of COVID-19,

hemodynamic and volume optimization, renal replacement therapy, and other extracorporeal organ support.

As of now, the long-term prognosis is unknown. However, it may be safe to speculate that prognosis will be associated with the etiology of AKI. Patients with thromboembolic complications and collapsing glomerulopathy may develop a more severe degree of chronic kidney disease compared to those with other types of renal injury (e.g., acute tubule-interstitial nephritis). Early studies suggest that about one-third of patients who survived AKI caused by COVID-19 will remain dialysis-dependent.

**Keywords:** acute respiratory distress syndrome, acute kidney injury, angiotensin-converting enzyme 2 receptor, COVID-19, cytokine release syndrome, extracorporeal organ support, renal replacement therapy, SARS-CoV-2





**Prof. Dr. Šefik HASUKIĆ**

Professor Sefik Hasukic, MD, PhD, has rich professional development and broad spectrum of national and international activities with remarkable achievements and contribution to the development of Surgery, especially in the field of minimally invasive surgery, where he was a pioneer in BiH in the introduction of new laparoscopic surgeries. Professor Hasukić had the following academic degrees, educations and position held: in 1983 he earned M.D. at University of Tuzla, Tuzla, Bosnia-Herzegovina; in 2000 he earned M.A. at University of Tuzla, Tuzla, Bosnia-Herzegovina (thesis title: « The changes in the pulmonary function after laparoscopic and open cholecystectomy»). In 2002 he earned Ph.D. at University of Tuzla, Tuzla, Bosnia-Herzegovina (thesis title: «The changes in hepatic function after laparoscopic and open cholecystectomy»). in 2003 he has been elected as Assistant-professor, Department of Surgery, University Hospital Tuzla, 2006: Vice dean for science and research, in 2008: Associate Professor of Surgery, and in 2014 he has been elected as Professor of Surgery, Medical faculty, University of Tuzla. In 1996 he finished Postgraduate education in laparoscopic surgery, Kreiskrankenhaus Erbach, Germany (Chefaertzte Dr. med. F. Mandel). 2001: EAES-Upper GI Tract Surgery course, Pecz, Hungary.(Prof A.Fingerhut, Prof K. Fucks). In 2011: he became subspecialist in abdominal surgery. Position Held: 2000. UCC Tuzla, Head Deapartment of Laparoscopic surgery, 2005. UCC Tuzla, Head Deapartment „A“ of abdominal surgery, 2010. UCC Tuzla, Head of the Surgical clinic. Prof. Hasukić participated in writing many textbooks, being editor or co-editor of some of them and author of many teaching modules, for postgraduate education in laparoscopic surgery. He is the author of one book in the field of laparoscopic surgery and 3 chapters in other books. He contributed actively to many international laparoscopic surgery conferences and meetings in almost all countries in the region and broader at the European and global level. Prof Hasukić is a member of the following surgical associations: Bosnia and Hercegovina Association of General Surgeons, since 1995; European Association for Endoscopic Surgery (EAES), since 2001. He is author and coauthor of 70 scientific and professional papers published in national and international medical journals and proceedings of national and international conferences, from the narrow scientific field of laparoscopic and abdominal surgery. Prof Hasukić was the leader of several projects in the area of laparoscopic surgery. He was a mentor for the preparation of doctoral dissertations in 15 projects. She is an active leader of the course "Clinical Research-Surgical Disciplines" at the doctoral study of the



Faculty of Medicine in Tuzla. He is currently the Assistant General Director for Teaching and Research at the University Clinical Center Tuzla.

## **THE LAPAROSCOPIC SURGERY: TECHNIQUE, ERGONOMIC AND SPECIFICS IN THE TIME OF COVID-19 PANDEMICS**

**Šefik HASUKIĆ**

Department of Surgery, University Clinical Center Tuzla,  
Faculty of Medicine, University of Tuzla, Tuzla, Bosnia and Herzegovina

### **SUMMARY**

**Background:** Laparoscopic surgery is a very sophisticated surgical method that requires work with special equipment and has many advantages for the patient. The first human laparoscopy was performed by von Jacobeus in 1910 in Sweden, to diagnose ascites and this method was mainly used by gastroenterologists. Since 1980, after the first laparoscopic surgeries, such as laparoscopic appendectomy, cholecystectomy, laparoscopic colon surgery, etc., surgeons have taken a leading role in the application of laparoscopy.

**Objective:** Ergonomic specifics of instruments, equipment, and specific position of the surgeon during the operation are important in laparoscopy. The application of laparoscopic surgery in patients with COVID-19 infection is the topic of this article.

**Methods:** We analyzed all patients operating laparoscopically who were simultaneously infected with the COVID-19 virus.

**Results/Diskussion:** Laparoscopic surgery has numerous advantages compared to open surgery, which has been established in clinical studies: faster recovery of patients, fewer complications, less pain, aesthetic results are better, and the economic effects are on the side of laparoscopy. The application of laparoscopic surgery at the time of COVID-19 infection requires some answers that we do not yet have. Difficult visualization of the operative field, which is otherwise present during laparoscopy, is further complicated by the use of special clothing, visors, and glasses in COVID-positive patients. Also, the insufflation of CO<sub>2</sub> into the abdomen and its losses can potentially cause infection of the surgical personnel. Therefore, the application of laparoscopic surgery in emergency operations in COVID-positive patients is not an advantage over open surgery. Is there a possibility of contamination of the surgical team with gas from the abdomen? Does increased intra-abdominal pressure adversely affect a COVID-19 infected patient? All of this requires the larger clinical trials that await us.

**Conclusion:** Laparoscopic surgery has an advantage over open surgery in standard conditions. In patients infected with COVID-19, the use of laparoscopic surgery is associated with certain aggravating factors that require additional clinical trials.

**Keywords:** Laparoscopic surgery, technique, ergonomics, COVID-19 infection.



**Emir FAZLIBEGOVIĆ, Mostar**

He was born in Mostar, on April 28, 1953, where he completed primary and secondary education; -25.11.1976 graduated from the Faculty of Medicine in Belgrade, and on March 19, 1987. Master's degree in cardiology in Belgrade; graduated from the Military Medical Academy in Belgrade in 1978. -26.03.1987 passed the specialist exam in Internal Medicine in Belgrade; -from 1991-1995 he spent the whole war in Mostar, and then at SKB Mostar until his retirement in 2017. -07.04.2001.- title of PRIMARIUS

-Project Manager UNIVERSITY AREA MOSTAR (from 1987-1992).

-Participated in the project "Health for all until 2000." Institute of Social Medicine UMC Sarajevo.

-Head and director of the BiH Red Cross School until 1992.

-2002 in Berlin he was promoted to Fellow of ESC (FESC), a -2005

- received a degree in European cardiology, Stockholm.

-21.09.2006 he defended his doctoral dissertation at the Medical Faculty in Sarajevo.

-From May 17-19, 2007, organizer and secretary of the 4th Congress of Cardiologists and Angiologists of BiH

-Organizer and active participant Turkish-Bosnian Cardiology Meetings in BiH

-2008 appointed National Coordinator for the development, presentation and promotion of the ESC Guide

-2011 appointed National Coordinator of the European Register of HF for BiH (EORP).

-30.01.2013 accepted as a corresponding member of the Bosnian-Herzegovinian-American Academy of Sciences and Arts in Washington (BHAAAS).

- winner of the gold medal and the Plaque of the Association of Cardiologists of Bosnia and Herzegovina for exceptional contribution to the work of the Association;

-Active organizer and participant of BHAAAS Day in BiH

- President of the Organizing Committee of the 7th Congress of UKuBiH, 2016.

-Assistant Professor at the Health Care Study at the University "Džemal Bijedić" in Mostar.

-Corresponding member of IANUBIH since 2021, and Vice President of the Regional Board of VKBI for Herzegovina.

-An active member of the Red Cross of Yugoslavia and BiH and the winner of the golden sign and recognition of this organization.

-An active member of MDD Merhamet and the head of the MDD Merhamet Polyclinic since 1992 and the winner of the MDD Merhamet Plaque for outstanding contribution to the work of the organization.

-Published over 117 professional papers and 129 as a co-author, and 15 books of monographs and Guides for KVB ESC and 23 books and Guides of ESC as a co-author. He is a participant in 97 conferences of the ESC, WHF, national associations of cardiologists from Turkey, Egypt, Tunisia and BiH.

## **COVID-19: CARDIOLOGICAL DISORDERS**

**Emir FAZLIBEGOVIĆ**

Džemal Bijedić University Mostar, Mostar, Bosnia and Herzegovina

### **SUMMARY**

The COVID-19 infection has spread all over the world and caused a global health and economic crisis, so we will talk about "time before covid" and probably "time after covid". Although the virus most often attacks the respiratory system, respiratory diseases, especially SARS COV2, are the main cause of mortality in patients with COVID-19 infection, followed by damage to the myocardium and complete cardiovascular system, which is a common finding in patients. The association between COVID-19 and acute myocardial infarction (AMI) is interpreted as impaired immunity with enhanced inflammatory response and development of endothelium with procoagulant disorders such as thrombosis and thromboembolism with sequelae on the heart, brain, pulmonary and peripheral arteries. Endothelial dysfunction develops with myocardial damage with the instability of atherosclerotic plaque, its fissure and rupture, and AMI. Comorbid conditions such as hypertension, diabetes, hyperlipidemia, and kidney disease further exacerbate the severity and outcome of the disease. Air pollution also significantly contributes to the clinical picture of the disease and complicates COVID-19 infection with the development of cardiovascular complications of the AMI, with cardiac decompensation, malignant cardiac arrhythmias, myocarditis, and pericarditis that contribute to clinical severity and mortality. There was a lower influx of patients to cardiology departments and coronary units and emergency services during the epidemic wave by 30-48% depending on the region-country in the world, but also an increase in the severity of the clinical picture and higher mortality from cardiovascular disease. The reasons for this phenomenon are mostly unknown. It is assumed that it is a matter of fear, "lockdown", self-isolation, and delay in attending the doctor, which prolongs the time of ischemia and loses the "golden hour" to reperfusion of AMI patients, which is also contributed by anti-epidemic measures with PCI testing and personal protection measures. staff in cat-laboratories which prolong the door-balloon (DB) time and thus more serious heart damage.

Keywords: Covid-19, cardiovascular disorders, Acute myocardial infarction (AMI), comorbidities



**Prof. dr. Milenko BEVANDA**

Milenko Bevanda, full professor, Faculty of Medicine, University of Mostar, internal medicine specialist, subspecialist gastroenterologist and hepatologist, primarius. He was born in 1958 in Mostarski Cern, Čitluk, Bosnia and Herzegovina. He graduated from the Medical Faculty of the University of Sarajevo in 1984, received his master's degree in 2004, and his doctorate in 2006, the title of his dissertation "Effect of hyperthermic chemoimmunotherapy on peritoneal carcinomatosis in mice". He works at the Medical Faculty of the University of Mostar and at the University Clinical Hospital Mostar. He has been the Dean of the Medical Faculty of the University of Mostar since 2013, and is the Head of the Clinical Department of Gastroenterology at the University Clinical Hospital in Mostar and the Head of the Department of Internal Medicine at the Medical Faculty of the University of Mostar. Editor-in-Chief of the scientific journal *Medicina Academica Mostariensia*. Area of scientific interest: liver diseases, inflammatory bowel diseases and colon tumors. He is a member of several expert groups at the level of BiH in the field of gastroenterohepatology. He is the leader of several scientific projects, as well as three Interreg IPA Cross-border Cooperation Projects Croatia-Bosnia and Herzegovina. Montenegro. In several doctorates he was a mentor to doctoral students. He has published a large number of scientific and professional papers, of which over 40 in CC journals. He has reviewed several scientific papers in various journals, as well as several professional books. Co-author and author of five professional books. He distinguished himself in the organization of international congresses and symposia in the field of gastroenterology, hepatology and obesity. He is a visiting professor at the Faculty of Medicine in Split. He has been a collaborating member of the Croatian Academy of Medical Sciences since 2018.

# COVID-19 AND GASTROINTESTINAL COMPLICATIONS

**Milenko BEVANDA**

Sveučilišna klinička bolnica Mostar

## SUMMARY

Coronavirus infection (COVID-19) is an infectious disease caused by the SARS-CoV2 virus. Commonly, it manifests as a disease of the respiratory system, but other organ systems including the gastrointestinal tract may be affected.

Pathophysiologically, SARS-CoV2 binds to ACE 2, which is overexpressed in lung epithelial cells and / or intestines. Binding to ACE 2 results in activation of the receptors of the classical renin-angiotensin-aldosterone system. The AT1-R-ACE / angiotensin II / angiotensin type 1/2 receptor system is involved in the proinflammatory immune response resulting in tissue injury. Excessive cell activation results in the production of cytokines and chemokines causing a cytokine storm. If the storm continues, it causes neutrophilia, monocytopenia, lymphopenia and oxidative stress in the cells. This can lead to intense complications, including ARDS-acute respiratory distress syndrome, liver injury, septic shock, and kidney damage.

In this summary, a review of the association of COVID-19 with *C. Difficile* infection, changes in the intestinal microbiota, and liver disease was made.

12% of patients with COVID-19 have gastrointestinal symptoms, and in 40.5% of all patients SARS-CoV2 can be isolated from stool. The possibility of virus transmission by feco-oral route has also been observed. Patients with COVID-19 have significant changes in the fecal microbiome. Useful commensals are exhausted, and the number of pathogenic bacteria is increasing. Pharmacological treatment of the underlying disease also contributes to these changes. Patients with these changes may develop gastrointestinal symptoms such as nausea, vomiting, discomfort, or abdominal pain and diarrhea. Intestinal dysbiosis persists even after cure from COVID-19 and cessation of respiratory symptoms. These changes can lead to reduced resistance to pathogens such as *C. difficile* and to the development of diarrhea associated with *C. difficile* and colitis. Studies have shown that probiotics are a useful potential prevention strategy for *C. difficile* even though they have not yet entered clinical guidelines.

Changes in the intestinal microbiota in patients with COVID-19 may consequently lead to the development of diseases associated with intestinal dysbiosis even after recovery from COVID-19. It is recommended that stool samples taken from recovered patients be examined at least 35 days after the virus has disappeared from the respiratory tract. It is also recommended to check the composition and activity of the intestinal microbiota to assess its balance. In the case of intestinal dysbiosis, an appropriate modulation method should be introduced. In addition, all faecal samples prepared for faecal microbiota transplantation should be tested for SARS-CoV-2 to ensure protection of the recipient.

RNA sequencing analyzes in healthy liver showed that the level of ACE2 gene expression was highest in cholangiocytes (comparable to alveolar type 2 cells), followed by sinusoidal endothelial cells and hepatocytes. Liver enzymes are elevated in 14–53% of patients with

COVID-19. Liver injury is more common in the more severe form of COVID-19 and can occur as a direct action of the virus, drug-induced, and immune-mediated. High ALT values, low platelets and albumin are associated with higher mortality rates. Patients with advanced chronic liver disease have an increased risk of infection due to immune dysfunction. Patients with cirrhosis, nonalcoholic fatty liver disease and HCC are at risk for more severe disease, while patients with viral hepatitis generally do not have an increased risk of developing more severe forms and consequently have a higher hospitalization rate, admission to ICU and COVID-19-related deaths than general population. The prevalence of NAFLD is between 20 and 33%. Patients with NAFLD have a higher risk of disease progression (45% vs. 7%) and a wider spread of the virus (17.5 days vs. 12.1 days). Younger patients with NAFLD have a twice-increased risk for severe COVID-19 (in patients older than 60 years, the difference was not significant) NAFLD patients may also suffer from diabetes, hypertension, and obesity, which puts them at risk.

Possible pathogenic mechanisms linking cirrhosis to severe lung disease COVID-19 include increased systemic inflammation, immune dysfunction associated with cirrhosis, coagulopathy, and intestinal dysbiosis. Abnormal liver biochemistry values are common in patients with COVID-19. The prognostic significance of these disorders and whether they can be directly attributed to hepatic SARS-CoV-2 infection remain uncertain. Patients with cirrhosis and COVID-19 have a high rate of liver decompensation, acute-chronic liver failure, and death from respiratory failure after severe SARS-CoV-2 infection and should be a priority for vaccination (as are all other vulnerable groups).

Priorities need to be made in the care of patients with chronic liver disease. Elective procedures should be delayed according to local recommendations, non-invasive stratification methods used, follow-ups aimed at early detection of liver cancer should be continued, and any patient with acute decompensation should be tested for SARS-CoV-2.



**Prof. Dr. Vanja BAŠIĆ KES**

VANJA BAŠIĆ KES, MD, PhD, full professor, Faculty of Dentistry, University of Zagreb, specialist in neurology, primaria, born in 1969 in Gospić, graduated in 1993 at the Faculty of Medicine University of Zagreb, received masters degree in 1997, and doctoral degree in 1999 at the Faculty of Medicine in Zagreb, with doctoral dissertation "The Effect of Osteoporotic Protein 1 (Bone Morphogenetic Protein-7) in Ischemic Acute Renal Failure". She serves as the Head of Neurology Desk at the Faculty of Dental Medicine University of Zagreb and works at the Clinical Hospital Center "Sestre milosrdnice" in Zagreb as the Head of Department of Neurology and the Lead of Neuroimmunology and Neuroimmunogenetics and Pain Unit. The area of her interest includes neuroimmunology and neurogenetics, treatment of acute and chronic pain and the treatment of stroke. She is the National Coordinator and the Lead of international scientific project for the treatment of stroke in central and eastern Europe "Safe Implementation of Treatments in Stroke" (SITS-EAST). Under her mentorship, ten diploma and doctoral thesis were acknowledged. She published over 122 scientific and professional papers and has been quoted over 893 times. She is the author of four university textbooks. She is the president of the Croatian Society for Neuroimmunology and Neurogenetics, Croatian Society for Pain Prevention and the Croatian Society for Stroke. She is the regular member of Croatian Academy of Medical Sciences, since 2018.

## **COVID-19 in NEUROLOGY**

### **Vanja BASIC KES**

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## **SUMMARY**

COVID-19 is a disease caused by the virus of severe acute respiratory syndrome 2, and it led to an unprecedented pandemic.

This global public health threat is similar to previous epidemics of severe respiratory syndrome (SARS) and Middle Eastern respiratory syndrome (MERS).

Over the course of almost two years, we have learned and learned many things related to the mode of infection, transmission, symptoms, treatment of the disease, and the importance of vaccination against this vicious disease.

As the COVID-19 pandemic progresses, the number of reports of neurological manifestations of the disease is increasing (thousands of patients have been reported to date). Neurological manifestations of the disease may be due to the direct and indirect effect of SARS-CoV-2 on the nervous system as a neurological complication of the systemic effect of COVID-19, as well as immune-mediated diseases. Furthermore, patients have been described in whom an immune-mediated neurological disease (eg Guillian-Barre syndrome / GBS) or acute disseminated encephalomyelitis (ADEM) has developed after overcoming SARS-CoV-2 infection (SARS-CoV-2 can enter the nervous system through the blood-brain barrier (CMB), infected leukocytes or retrograde transport along cranial or peripheral nerves. The innate immune response to viral infection and consequent inflammation can damage nerve tissue, as in the case of acute encephalopathy syndrome caused by influenza. Pathologically adaptive immune responses include damage caused by cytotoxic T cells and antibodies directed to host tissue in the central or peripheral nervous system. The latter can be caused by molecular mimicry between the pathogen and the host epitope, or tissue damage can result in a failure of tolerance to its own antigens. Infection with SARS-Cov-2 can cause damage to blood vessels by direct infection or immune-mediated vasculitis. Furthermore, the virus can activate vascular endothelium with consequent inflammation associated with inappropriate lymphocyte and macrophage overactivity and thrombotic microangiopathy.

**Keywords:** COVID-19, Neurology





### **Academician OSMAN SINANOVIĆ**

Osman Sinanović, MD, PhD was born in Duboštica/Lukavac on 27.2.1952, Bosnia and Herzegovina.

He has been Head of Department of Psychiatry, University Clinical Center Tuzla from 1993 to 2001; Head of Department of Neurology, University Clinical Center Tuzla from 2001 to 2003, 2013 to 2017; Deputy Director for Science, Research and Education, University Clinical Center Tuzla from 2003 to 2007; Head of Postgraduate Course for Master Degree, Medical School, University of Tuzla, 1994 – 2001, 2004-2008; Head of PhD Study of Faculty of Education and Rehabilitation University of Tuzla from 2013 to 2018.

**Education:** He graduated at the Faculty of Medicine of Belgrade University in 1978; at the University of Tuzla he obtained MrSc (1983) and PhD at the University of Zagreb (1989). Specialist examination of neuropsychiatry passed in 1984 in the Medical Faculty University of Belgrade. He completed education in several cities of ex Yugoslavia, in shorter and longer terms (Belgrade, Zagreb, Ljubljana), as well as abroad (Germany, USA, Japan).

**Present position:** Professor emeritus of neuropsychiatry (neurology and psychiatry) at School of Medicine University of Tuzla and Sarajevo Medical School University Sarajevo School of Science and Technology.

Prof. Sinanović is full member and Vice president of Medical Academy of Science of Bosnia and Herzegovina, member of Research Group for Neurology and Psychiatry of Academy of Science and Arts of Bosnia and Herzegovina; Head of Department of Medical Sciences of International Academy of Science and Arts in Bosnia and Herzegovina; Honorary member of Croatian Academy of Medical Science; Member of Board of Directors of Multiple Sclerosis Academy (Inter University Center Dubrovnik); Member of Board of Trustees of the International Pula Neuropsychiatric Congresses.

**Publication:** As author and co-author prof Osman Sinanović published several hundreds different publications, most of them in peer reviewed indexed medical journals. His papers have been cited more than 2000 times in Google Scholar bases; a large number of invited lectures at domestic and international meetings; He is author or co-author of 49 books and monographs; MSC thesis supervisor of 35 and PhD thesis supervisor of 17 candidates;

# **ASSOCIATION OF SENSE OF SMELL AND TASTE DISORDERS WITH SARS-CoV-2 INFECTION**

**Osman SINANOVIĆ**

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Hercegovina

## **SUMMARY**

Infection with the new coronavirus (SARS-CoV-2) was first registered in December 2019 in China, and then later spread rapidly to the rest of the world. On December 31, 2019, the World Health Organization (WHO) informed the public for the first time about causes of pneumonia of unknown origin, in the city of Wuhan (Hubei Province, China), in people who were epidemiologically linked to a seafood and wet animal wholesale local market in Wuhan. Coronavirus disease, called COVID-19 (Coronavirus disease 2019), after China quickly spread to most countries in the world, and the WHO on March 11, 2020, and declared a pandemic with this virus. So we have been in a pandemic for more than 19 months. After the first knowledge about the consequences of infection with the SARS-CoV-2 virus, it turned out that it attacks not only the lungs but also other organs (multiorgan disease) and that many infected people cannot survive the infection. Not just the elderly. Unfortunately, we have recently been confronted with new mutations of this virus that have been registered in our region as well. Furthermore, there are significant consequences for the body even after the infection is „overcome“and it is concluded that we are no longer positive for the virus.

In case of infection with the SARS-CoV-2 virus, the most common are respiratory symptoms, from mild, flu-like, to severe pneumonia, and a significant number of patients experience septic shock and multiple organ failure. The most common extrapulmonary manifestations include thromboembolic complications, myocardial dysfunction and arrhythmias, acute coronary syndromes, acute kidney injury, gastrointestinal symptoms, hepatocellular damage, hyperglycemia and ketosis, various neurological disorders, ocular symptoms, and dermatological complications.

Loss of sense of smell (anosmia) associated with viral infection of the upper respiratory tract is not unique to COVID-19. Post-viral olfactory dysfunction (PVOD) has long been recognized as a major cause of clinically significant olfactory loss, cumulatively about 40% of the total incidence of olfactory dysfunction. At the beginning of the pandemic, anosmia and loss of sense of taste (ageusia) were not considered important symptoms for COVID-19, although olfactory diffusion after SARS-CoV infection had been previously reported in severe acute respiratory syndrome (SARS) in 2002. The first statement mentioning anosmia and ageusia and the first about neurological symptoms in patients with COVID-19 is a statement from Wuhan, Mao et al. (2020), who stated that in 214 patients analyzed, 5.1% had hyposmia and 5.6% had hypogeusia.

These disorders are more common in the elderly and somewhat more common in women, but are not uncommon in the young and children. They usually last for a short time, less than a month, but a significant number of infected people have a disorder that lasts for months.

For now, it is more or less possible only to speculate the mechanism of anosmia formation in SARS-CoV-2 patients. Some understanding of pathogenesis can be gained from other viral infections, including coronaviruses. Anosmia can generally be divided into a conductive and sensorineural olfactory loss. Conductive loss occurs when we have impaired airflow through the nose and this disorder is usually reversible after nasal obstruction recovers. Sensorineural olfactory loss involves olfactory epithelial dysfunction and may be permanent or functional recovery may take longer. Several possible mechanisms that may be in the background of SARS-CoV-2 anosmia, and lead to isolated anosmia or in combination with other symptoms, have been considered. According to one theory, the virus binds to ACE receptors in the nasal epithelium and causes degeneration of the nasal mucosa, as well as subsequent inflammation and damage to the nerve receptors responsible for the olfactory. The second hypothesis, currently the most widely accepted, suggests a direct effect of the virus on the central nervous system. Namely, the initial viral attack can be accompanied by damage to synaptic plasticity.

Based on the natural clinical course of the sense of smell disorder, the treatment strategy can be focused on the one that targets the acute phase and the one that targets the chronic phase. Probably the best form of intervention is to prevent the initial entry of SARS-CoV-2, which is relevant to COVID-19. For the inflammatory virus, local or systemic corticosteroids may be useful in the acute phase of olfactory dysfunction. The main characteristic of synaptic plasticity is the possibility of synaptic modification induced by activity or learning, which may partly explain why olfactory training is an effective therapy for this disorder.

**Keywords:** SARS-CoV-2 – COVID-19 – Anosmia – Ageusia



**Prof. Dr. Zlatko TRKANJEC**

Prof. Zlatko Trkanjec graduated in 1982 from School of Medicine, University of Zagreb, specialization in neurology was carried out in the OB Varaždin and in Sestre milosrdnice University Hospital. In 1991 he attained Master of science degree, and in 1999 he attained Ph.D. degree at School of Medicine, University of Zagreb. In 2008 he was elected as scientific advisor, and since 2014 he is full time professor as permanent tenure at the Department of Neurology, School of Dental Medicine, University of Zagreb.

Since 1986 he was working as a doctor in the Hospital for lung diseases and tuberculosis Klenovnik and from 1996 as a neurologist at the University Department of Neurology, University Hospital Center "Sestre Milosrdnice" in Zagreb.

He has published more than 300 papers in national and international journals, numerous book chapters and books, and was a mentor of several graduation theses. He has more than 400 citations.

He has participated in several scientific projects, and since 2007 he leads scientific project of the Ministry of Science, Education and Sports of the Republic of Croatia: The role of vascular risk factors in the pathogenesis of Alzheimer's disease.

He participated in the organization of numerous scientific and professional meetings, symposia, conferences and congresses. He is a member of numerous national and international professional and scientific associations. He is one of the editors of the journal Acta Clinica Croatica. For his work he received several awards.

# COVID-19 AND PARKINSON'S DISEASE – CASE REPORTS

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## SUMMARY

**Introduction:** Compared with controls, patients with Parkinson's disease (PD) during the SARS-CoV2 virus epidemic had significantly increased levels of stress, depression, and anxiety and reduced quality of life, and a significant decline in physical activity during locking. PB patients have outcomes of COVID-19 infection that do not differ significantly from patients without PB of similar age and with similar comorbidities.

Motor and non-motor symptoms worsen during lockdown due to the COVID-19 epidemic in PB patients not infected with the SARS-CoV2 virus. PB patients with COVID-19 often had new or worsening of existing motor and non-motor symptoms, requiring changes in medication in one-third of cases. The most significant motor problems were urinary problems and fatigue. So far, 3 cases of PD associated with COVID-19 have been described in the literature:

**Case vignettes:** A 58-year-old man with hypertension and hyperlipoproteinemia was admitted to a hospital in Madrid due to dry cough, fever, nausea, and shortness of breath - positive for SARS-CoV-2, bilateral infiltrates in the lungs. He was placed 10 days on a respirator. On the 34th day of illness he was removed from the respirator and developed hyposmia, generalized myoclonus, fluctuating and transient changes in consciousness, opsoclonus, bradykinesia, postural tremor, resting tremor and asymmetric hypokinetic-rigid syndrome, saccades, hypomimia, and reduced blinking and positive glabellar sign. DATSCAN confirmed an asymmetric decrease in the function of dopaminergic structures in both putamens. Significant improvement in tremor, stiffness, and bradykinesia was noted on discharge without any specific treatment.

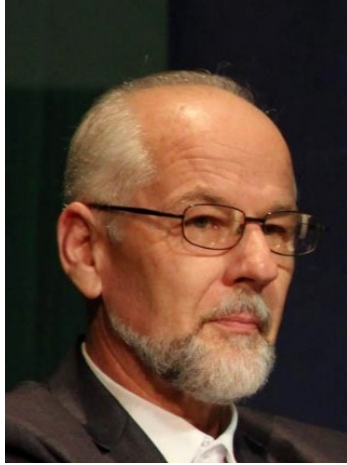
A 45-year-old Jew of Ashkenazi descent with hypertension and asthma was hospitalized at a hospital in Ashdod, Israel due to a dry cough, loss of smell, and muscle aches. He complained of fatigue, shortness of breath, and chest pain without fever, and was positive for SARS-CoV-2. He was treated for 3 days mainly with salbutamol inhalations. After discharge, he spent 3 weeks in isolation and noticed changes in handwriting (micrography) and tremor of his right arm. 2 months later he was admitted to the neurological department of a hospital in Jerusalem with hypomimia, hypophonia, rigidity, bradykinesia, gait with reduced synkinesia. PET scan showed reduced FFDOP intake in both putamens, more pronounced on the left. He was treated with pramipexole 1x0.375 mg and symptoms improved rapidly. Due to the worsening of the tremor 3 months later biperidine 2 mg was introduced and after a week 4 mg daily, which led to a reduction in tremor.

A 35-year-old previously healthy woman in Brazil was diagnosed with a mild COVID-19 infection due to fever, cough, sneezing, rhinorrhea, diarrhea, myalgia, anosmia, and hypogeusia. On day 10, she recovered from respiratory symptoms but developed paresthesia and difficult moving of the right arm. On day 11 she couldn't move her right arm, developed hypophony, generalized rigor, and slowness of movement with gait instability. Day 25 hypomimia, eyelid retraction, saccades, bradykinesia, walking with small steps and reduced synkinesia, anteroflexia, mild hyposmia. After 4 days of 3x200/50 mg levodopa/benserazide therapy, there was a significant improvement in facial expression, dysarthria, and bradykinesia. DATSCAN: decreased function of the dopaminergic system in the left putamen.

**Conclusions:** The SARS-CoV2 virus causes most of the damage by affecting the respiratory system. The incidence of neurological symptoms in patients with COVID-19 is as high as 85%. Low levels of SARS-CoV2 RNA have been demonstrated in 36% of the brains of 27 people who died from COVID-19.

The SARS-CoV-2 virus enters cells via the ACE2 protein. ACE2 proteins are bound to the cell membrane and are found in numerous organs, endothelial cells of arteries and veins, smooth muscle cells in arteries, neurons, and glial cells in the cerebral cortex, striatum, hypothalamus, and the brainstem. Dopamine neurons in the mesencephalon have high levels of ACE2 receptors. The SARS-CoV-2 infection could induce cytotoxic aggregation of proteins, including  $\alpha$ -synuclein, which could function as an antiviral factor within neurons, as shown by increased  $\alpha$ -synuclein expression after acute West Nile virus infection. Rodents infected with H5N1 influenza show CNS microglia activation and abnormal phosphorylation of  $\alpha$ -synuclein causing loss of dopaminergic neurons in the pars compacta of the nigra substance. Accumulation of  $\alpha$ -synuclein after SARS-CoV-2 infection can lead to changes in  $\alpha$ -synuclein and accelerate neurodegeneration. Thus, the virus could initiate and/or accelerate neurodegeneration. COVID-19 is a new disease, and PB is known to develop slowly over years and decades, so any suggestion that the SARS-CoV-2 virus causes PB can only be a guess as to what may happen in the future. There are probably some links between the SARS-CoV-2 virus and PB, but so far there is no evidence that this virus could in the future contribute to the increased incidence of PD

**Keywords:** COVID-19, Parkinson disease,



**Dr. Sead SELJUBAC**

Dr. Sead Seljubac was born on April 27, 1958, in Gornja Tuzla, Tuzla Municipality. He finished primary school there, and then Gazi Husrev-bey Madrasah in Sarajevo in 1997. The Faculty of Islamic Studies in Sarajevo was established in the same year and he became a part-time student there. He graduated in 1987. He completed his Master's degree at the Faculty of Islamic studies in Sarajevo in 2001 as well as his PhD degree in 2008 in the field of tafsir (Qur'anic Exegesis).

He worked as:

- A teacher counselor in Gazi Husrev-bey Madrasah in Sarajevo (1980-1981);
- An imam and a clerk for religious and educational affairs at the Board of Islamic Community Gornja Tuzla (1982-1993);
- A secretary, teacher and a deputy principal of Behram-bey Madrasah in Tuzla (1993-2012);
- A deputy Tuzla Mufti for religious and educational affairs (2013-2020).

Hundreds of his professional and other papers have been published in Preporod, Zemzem, Islamska misao, Hikmet, Novi muallim, Glasnik Islamske zajednice/Herald of the Islamic Community in Bosnia and Herzegovina, Takvim, Anali Gazi Husrev-begove biblioteke/Annals of the Gazi Husrev-bey Library, etc.

He has translated and published the following books:

- *Aqidatu 'l-muslim (Belief of a Muslim)* written by Mohammed al-Ghazali;
- *Tarbiyatuna ar-ruhiyya, (Our spiritual growth)* written by Sa'id Hawwa;
- *Hizbu al-anwari al-haqaiqi an-nuriyya, (Ligths of nurani truths)*, a collection of prayers of well-known scholars;
- And he has contributed to the translation of a great translation project of Abu Hamid al-Ghazali's capital work *Ihya'u 'ulumi 'd-din* (Revival of Religious Sciences).

He has authored and published three books:

- *Following the path of the good and grateful (Stazama dobrih i zahvalnih)*
- *Allamak al-Bosnawi i Qadi al-Bajdawi*
- *Under the Aegis of Faith (U okrilju vjere)*



He has written dozens of book reviews for various genres of books. He has participated in numerous conferences in Bosnia and Herzegovina and abroad. His basic professional interest is in the field of Qur'anic Exegesis.

## COVID-19 PANDEMICS: A TEST OR PUNISHMENT - ISLAMIC PERSPECTIVE

Sead SELJUBAC

In this paper, we will attempt to present the Islamic perspective on contagious diseases (or disease in general), define a necessary filter that helps to overcome the crisis caused by this kind of problem in a way that is the least painful for a person's (or persons') inner world and to point out possible active steps towards prevention of similar challenges in the future.

### Perspective

A believer believes that the Almighty Creator of all worlds has not left those worlds without His control and governing, and believes that they have not been cast adrift and left to chance. He ordered the worlds in the way that He „*blew in him of His spirit*“ (15:29; 38:72). A man functions as a blend of body and soul, likewise, all the other worlds and creatures manifest their liveliness in different ways. However, even non-living creatures have their 'life'. It is woven into the laws of physical worlds, which enable them to be, to exist. Of course, Allah the Exalted has not 'imprisoned' His powers by His own laws. **He does what He wants** (3:40), as the Qur'an claims.

While all the mentioned elements are in harmony, the world is ruled by order and peace, people are healthy, animals are satisfied and plants are happy. Every single deviation from the 'God-given' function results in malfunctioning and disorder, which leads to a chain reaction and causes bigger or smaller consequences. It can be called a mess, or, depending on the circumstances, a disaster, a disease, state of war, or restlessness... When a man starts treating the world in a wrong way, either unconsciously or intentionally, is a sign of rebellion against God, and that is when we get global warming, world, regional or local wars, natural disasters, or simply failing to isolate or 'close down the region where there is an outbreak of pandemics. The Holy Qur'an says: **Corruption has appeared throughout the land and sea by [reason of] what the hands of people have earned so He may let them taste part of [the consequence of] what they have done that perhaps they will return [to righteousness].** (30:41)

It is unreasonable to reject our own change and expect God to change His laws. That will not happen. Our state will change for the better only when we are ready to change ourselves in a positive sense. Therefore, looking from the Islamic perspective, the most appropriate phrase which we can use to name this trouble that we are living is God's sign. The sign which we need to read and learn from. For change. To be better than we are. Towards Him and towards the world.



### Necessary filter

What could be an effective filter which helps to overcome the crisis caused by external problems such as COVID-19 in the least painful way for our internal world? That should be the Ayyubi approach to disease and Rumi's attitude towards death.

The hardships that God's prophet Ayyub, s.a.w.s., had to go through came in the form of disease, loss of material wealth, and children. But, he was patient. He did not complain to God. He had been a wealthy man for years, healthy, well-off, and strong. His gratefulness was put to the test. He managed to successfully overcome the crisis. He did not regret losing things in life, nor did he complain of his hardships. Here is a model. We need to patiently accept life's challenges and bear with them. We should never lose sight of the truth that God can change the situation whenever He wants, with His direct intervention and in spite of regular laws. For example, he can change someone's mental health for the better by changing his perception of sickness with strong faith and patience, which can eventually lead to better physical endurance and help reduce pain.

Fear of death, as an anxiety cause, is a special topic. We are now remembering Rumi's attitude towards death. Jalaluddin Rumi, who is world-famous for his deep sensibility and love for God, defines the moment of dying as the Meeting time or the moment when the lover meets the Beloved, and he presents it as the moment of exceptional joy. What an encouraging approach and an efficient way of reducing the intensity of death anxiety, which caused so many problems in the COVID-19 pandemics among those who cannot successfully deal with the reality of death. Therefore, with the help of Ayyubi's patience in the days of sickness and Rumi's attitude towards death, it can be easier to respond to challenges. Today's challenges as well as other future challenges.

### Possible active steps towards prevention of similar challenges in the future

What are Islamic principles related to prevention in case of a contagious disease outbreak?

According to some historians, God's prophet Muhammad, s.a.w.s., came back from the battle of Tabouk and, in relation to the plague epidemic which spread in Syria at the time, he told his companions: „*When you hear about an outbreak of plague in a land, do not go there. If plague breaks out in a country where you are staying, do not leave that place by any chance*”. The followers of the beloved prophet did what he instructed them to do in this situation. This makes it mandatory for us to quarantine as a way of prevention. The final decision is on experts and decision-makers. That is our way and our duty. Human, civic and religious duty.

The next principle in Islam is our duty to save and protect our health, as well as to look for a cure for the existing diseases. The Prophet Muhammad, s.a.w.s., invited people to take care of their health emphasizing that God has given a cure for every disease, and he also invited Muslims to keep looking for the cure. That is why the Grand Mufti in one of his sermons (August 2021), inviting people to get vaccinated, pointed out the following: “The first revealed verses in the Qur'an were: **Read in the name of your God who created.** (96:1). He who doubts the knowledge given to people also denies God's Revelations. Leave your doubts without proves aside, because that is a sin“.

And the third principle is the principle of respecting people of knowledge. The Qur'an orders us to ask those who know **if we do not know** (21:7). Experts deserve respect because that way we pay respect to knowledge and science in general. That is our duty as believers. On the other

hand, the medical profession has an obligation to justify that respect in the most appropriate way, by putting the maximum effort into finding the best cure for this as well as any other disease. And God *has given a cure for every disease*.

That is why we should walk the way we have chosen. Optimistically. The way of positive changes. The wise Rumi said: “That is your way, and only yours. Others can walk with you, but no one can walk instead of you”

**Keywords:** COVID-19, Islamic perspective



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Dr.sc. Mijo Nikić, a priest and a Jesuit, was born on February 18, 1953 in Gornji Zovik, Bosnia and Herzegovina (BH). He completed his studies of philosophy and theology at the Philosophical-Theological Institute of the Society of Jesus in Zagreb in 1980, when he was ordained a priest. He holds a master's degree in depth psychology from the Pontifical Gregorian University in Rome (1991). In 2002, he defended his doctoral dissertation at the Catholic Faculty of Theology, University of Zagreb. Since 1992, he has been teaching psychology, psychology of religion and history of religions at the Faculty of Philosophy and Religious studies. He teaches eschatology, Mariology and the sacraments of reconciliation and anointing of the sick, and theological anthropology at the Philosophical and Theological Institute of the Society of Jesus in Zagreb (study of theology). He has published several articles in various journals. He participates in domestic and international symposia. Holds spiritual exercises for priests and nuns and psychological-spiritual seminars for managers on the role of spirituality in stress management. The president of the Bishop Joseph Lang Foundation, that cares for the elderly, the infirm and the poor. He was a member of the International Pontifical Theological Commission for the Study of the Phenomenon of Medjugorje. He is an associate member of the International Academy of Sciences and Arts of Bosnia and Herzegovina.

## **COVID-19 VIRUS PANDEMIC - CALL TO CONVERSION AND RETURN TO GOD: A VIEW FROM THE PERSPECTIVE OF CATHOLIC THEOLOGY**

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### **SUMMARY**

The whole world has been in a crisis situation for a long time. Fear reigned on a global scale. The corona virus identified as COVID-19, sneaks in unnoticed all around us. It does not act selectively, but equally attacks old and young, good and evil, believers and unbelievers. In such a

situation, many feel frightened and ask: where is God in the corona virus pandemic? One interprets this virus pandemic that has struck us as God's punishment for sins committed; others as a consequence of sins committed by their ancestors; the third accepts suffering as an inevitable destiny.

According to the teachings and beliefs of the Catholic Church, God wants only the good of man, moreover, he wants only what is best for man and his eternal salvation. Therefore, when a man in the gifted freedom turns away from God, God still remains faithful to his promises. God never forgets man, but calls him to conversion in internal and external stimuli in ways known only to him.

Therefore, we view this pandemic, like all other adversities in our lives, in the light of a faith that calls us to true conversion and challenges us to grow more and more as people and as believers who put God first in their lives and who believe that , to those who love God, God Himself turn everything to good.

The first words of Jesus according to Mark's Gospel read: "The time is fulfilled, and the kingdom of God is at hand. Repent and believe the gospel (Mark 1:15). To convert means: to come to oneself and return to one's God. To come to oneself means to become aware of the meaning of one's existence in this world, to discover the right path that leads to eternal life. And to return to God means to put God first in our lives and to believe in his love in Christ Jesus, and to open ourselves completely to the Holy Spirit.

God calls us 365 times in the Bible: "Do not be afraid! I am with you! " That truth is what we need most now!



**Mr. sc. Srđan RADMANOVIĆ**

Srđan Radmanović was born on 4 March, 1986, in Teslić. He finished Petar II Petrović Njegoš Elementary School in 2000 as a holder of the Vukova Diploma (Certificate of Excellence).

In 2004, he graduates from St. John Chrysostom High School in Kragujevac with honors and enrolls in academic studies of the first cycle at the Orthodox Faculty of Theology of the University of Belgrade.

He completed basic academic studies in 2009. After basic academic studies, he continues his education in Geneva (Chambésy) at the Institute of Orthodox Theology of the Ecumenical Patriarchate. At the same time, he attends lectures at the Protestant Faculty in Geneva and at the Catholic Faculty in Freiburg. He defended his thesis in September 2011.

He continues his further theological education at the National University of Athens, where he resides from 2011-2013. Since 2014, he has been a Ph.D. student with granted inactive status, at the Faculty of Theology of the University of Belgrade. During the study, his subjects of research are sociological and shepherding topics, with a special focus on eclectic law and inter-religious relations.

He's currently serving as a parish priest. Since 2015, he has been a member of the Missionary Activities Committee of the Eparchy of Zvornik and Tuzla. He is the coordinator of the Youth Camp of St Sava and an active member of the Inter-Religious Co-operation Committee in Bijeljina. He's married and a father of two. He speaks English, French, and Greek.

## **COVID 19 PANDEMIC – SHEPHERD CHALLENGES FOR ORTHODOX CHURCH**

**Srdan RADMANOVIĆ**

Orthodox Faculty of Theology of the University of Belgrade, Belgrade, Serbia  
Orthodox church Bijeljina

More than a year and a half after the beginning of the Covid 19 pandemic, we became aware that it is no longer just a health medical problem. But it is also becoming the subject of research in different scientific disciplines and a challenge for all spheres of society.

The consequences of the pandemic are also present in the sphere of religious life, both of the individuals and the religious community to which they belong to. One of the main theological fundamentals is that a human being is a dialogical being that consists of several different entities that form its identity and value system, which produce reactions and behavior patterns. The formation of one's identity is influenced by different factors. During the pandemic, it became apparent that the availability of information through the media and the influence of social networks play a decisive role. All this enters into the church being of each individual and responds to the challenges set in accordance with personal sensibility.

The Serbian Orthodox Church has also faced certain challenges, particularly ones of a pastorals nature. The reactions of the Church demonstrated a high level of both individual and collective social responsibility while striving to remain faithful to its fundamental beliefs. This is supported by the decisions of the highest Church governing authorities, as well as individual Episcopals, who called to respect of all recommended measures that had been adopted by the Crisis Committee, i.e. that the whole Church life had to conform to the measures of the state of emergency.

Those measures and recommendations adopted by the Church provoked reactions within the Church community itself. Due to the varying scope of restrictions imposed, and the inability to achieve full sacramental life, the Church and its members faced certain pastoral challenges. Different reactions followed. They ranged from full acceptance of all measures to the absolute rejection of any measures as something that does not resonate with the confession of the Orthodox Church. The authenticity of religion and the authority of Church institutions were called into question. And, in some sense, the identity crisis was emphasized.

The above favored the creation of free space for the activation of fundamentalist individuals and groups within the Church. Simultaneously, non-theological and para theological attitudes came to the forefront in an extraordinary way. Due to these reactions, the Church was in a situation where the depersonalization of a man occurred within the Church itself. As a result, we had a situation where certain individuals and groups lost their sense of sacramental collective responsibility for the world and the individuals.

Besides these challenges, a very difficult shepherd challenge was put before the Church. That was the actualization of possible segregation within the societies themselves, segregation between those who have been vaccinated and those who have not. Issues of positive discrimination and protection of public health, in this case, became a pastoral challenge for the Church, as the guardian of the individual's integrity, particularly for its members, as a certain obstacle to maintaining a complete sacramental life and thus achieving identity.

Despite all these pastoral challenges, the Church has continued to contribute during this crisis. Besides the fact that its extremely strong social impact has been proved, alongside its ability to contribute to respecting the recommended measures, the contribution of the Serbian Orthodox Church is also reflected in making all its resources available. Therefore, it is important to stress once again that the Church continues to have its extremely strong social role, which is not diminished by the existence of these pastoral challenges.

It seems that the necessity of a more active dialogue between the Church and other socially important factors will be of great importance in the upcoming post-Covid period, no matter when it starts. The consequences of the pandemic are partly known to us. In this sense, we must say that, despite the evident pastoral challenges, the Church will continue to carry out its mission of salvation by emphasizing the dialogue nature of man, as the only possible postulate in finding solutions to all the challenges posed before all of us during the pandemic.



**Prof. Dr. Mirsad MUFTIĆ**

Prof. Dr. Mirsad Muftić is enrolling in postgraduate studies at the Medical Faculty of the University of Sarajevo - Department of Experimental Medicine at the final study of the Medical Faculty in Sarajevo. In 2005 he presented his Master's thesis on "Cervical Hospital Syndrome - a comparative assessment of IC and the polarized world". In 2010, he defended his doctoral dissertation entitled "Comparative study estimates bone density values through quantitative ultrasound diagnostics (quz) in relation to osteodensitometry (dxa)". From 2000 to 2005 he worked as an assistant at the Faculty of Medicine - University of Sarajevo, on the subject "Physical Medicine and Rehabilitation". From 2005 to 2009 he worked as a senior assistant at the Faculty of Medicine - University of Sarajevo, in the subject "Physical Medicine and Rehabilitation".

In 2010 he was elected assistant professor at the Faculty of Health Studies, University of Sarajevo. From 2010 to 2015, he worked as the Head of the Department at the Faculty of Health Studies, University of Sarajevo - Department of Physiotherapy. 2015 - 2018 works as an associate professor at the Faculty of Health Studies, University of Sarajevo - Department of Physiotherapy. In 2018, he will be elected a full professor at the Faculty of Health Studies, University of Sarajevo - Department of Physiotherapy. In the period 2018 - 2019 he works as a full professor at the Faculty: Faculty of Health Studies, University of Sarajevo, Faculty of Education - University of Sarajevo, Faculty of Medicine SSST Sarajevo and University "L.Ružička" Vukovar Croatia. In 2001, he received the title of Primarius, and in 2014 he passed the subspecialist exam in the field of rheumatology. From 1988 - 1989 employed at the Military Hospital Sarajevo, from 1990 - 1991 Medical Seu Frontiers Holand, 1991 - 1992 Republic Institute for Health Protection of BiH, 1992 - 1994 Clinical Center of the University of Sarajevo, 1994 - 1997 MHS practice, 1997 - 2015 JU DZ Sarajevo - CBR, 2015 - 2019 MHS practice. Professor Muftić is the President of the Association for Physical Medicine and Rehabilitation of FBiH, a member of ESPMR, ISPMR, ISPO and the Paralympic Committee of BiH. Prof. Muftić



has written 20 monographs and books, University textbook in the field of Rheumatology, 86 papers published in professional indexed journals and collections of papers. he was a mentor for 21 master's theses and a mentor for 5 doctorates, a review for 4 books.

## **POST – COVID 19 SYNDROM – REHABILITATION**

**Mirsad MUFTIĆ**

Faculty of Medicine, University of Sarajevo, Sarajevo

### **SUMMARY**

**COVID-19** is a respiratory infection that is primarily transmitted by droplets. The main route of transmission is close contact with a person who has the virus, especially during coughing, sneezing, and medical interventions on the respiratory tract, such as intubation, tracheobronchial aspiration, and mechanical ventilation. SARS-CoV-2 molecules have been isolated from the blood, saliva, tears, conjunctival fluid, and stool of patients so that there is a possibility of transmitting the infection in these ways as well. In the case of SARS-CoV-2 virus infection, the most common respiratory symptoms range from mild flu-like to severe pneumonia, and in some patients septic shock and multiple organ failure occur. The most common extrapulmonary manifestations include thromboembolic complications, acute coronary syndromes, acute kidney damage, neurological and dermatological complications. Based on the relapsing/remitting nature of post-COVID symptoms, the following integrative classification has been proposed:

1. Potentially related symptoms of infection (4-5 weeks of COVID-19),
2. Acute post-COVID symptoms (weeks 5 to 12, after the acute phase),
3. Prolonged fasting COVID symptoms (weeks 12 to 24)
4. Persistent post-COVID symptoms (lasting more than 24 weeks)

Assessment of motor performance is performed based on 2 tests: Barthel Index 0-100 (<70 severe impairment of motor performance) and Short Physical Performance Battery (SPPB 0-12) in which we test balance, stroke at a length of 4 meters and 5x sit-to-stand. Evaluation of results is reflected through the degree of disability 1-2 severe disability, 3-8 moderate disability, and 9-12 normal condition.

Rehabilitation of post-covid patients takes place according to an individual plan depending on the severity of the clinical picture of the patient's sex and age, comorbidity, and complications present. The rehabilitation team consists of a doctor specializing in physical medicine and rehabilitation, physiotherapist, pulmonologist, psychologist, and health professionals from other fields, depending on the clinical picture of patients



**Prof. Dr. Miroslava JAŠOVIĆ-GAŠIĆ,**

**Qualifications -Education:**

Born in Belgrade in 1946. Graduated II Belgrade Gymnasium "Ivo Lola Ribar", 1960-1964 and on Faculty of Medicine, University of Belgrade 1964/65 – 1970.

Demonstrator at the Institute of Pathology at the University of Belgrade School of Medicine 1969 - 1970

Postgraduate teaching in psychotherapy of the Faculty of Medicine, University of Belgrade 1974-1976

Specialization in Neuropsychiatry 1974 - 1977 (Specialist exam with excellent success 25.03.1977.)

Lecturer at the Higher Medical School for the subject Medical Psychology with Psychopathology 1979.

Doctoral dissertation from the authority of psychiatry (psychosomatics-psychodermatology) 1980.

Assistant in the Department of Psychiatry 1981, Assistant Professor 1988, Associate Professor, 1993, Full Professor since 1994.

**Professional career:**

Full Professor in the Department of Psychiatry, University of Belgrade, 1994 (retired October 10, 2011)

Head of the Department for Psychotic Disorders, Institute for Psychiatry, Clinical Center of Serbia, (KCS) 1993-2011.

Director of the Institute for Psychiatry (later Clinic) of KCS Belgrade, 2005-2011.

Head of the Department of Psychiatry of the Faculty of Medicine, University of Belgrade 2005-2011.

Editor-in-chief of Engrami magazine, 2008-2014.

President of the Association of Psychiatrists of Serbia (UPS) 2007-2010.

President of CENP-a (Central-European Neuropsychopharmacology Association) 2010.

The Full Member, SMA Academy of Medical Sciences since 2016 (elected extraordinary member 2010)

Member of the Editorial Board and reviewer of Psychiatria Danubina Guest-ed., Psychiatria Danubina 2009 (vol 21). Member of the Editorial Board of Psychiatry Today

**Other professional activities and memberships:**

He has been an active member of the Psychiatric Section of the SMA since 1977,

Secretary of the Psychiatric Section of the SMA and Member of the Commission for Intersectional Activity of the SMA

President of the Psychiatric Section of the SMA in two terms

Honorary member of the Presidency of the Psychiatric Section of the SMA

Member of the Chair of the SMA Clinical Pharmacology Section

Member of the Ethics Committee of the SMA re-elected in the new term of office 2019

Vice President of the Court of Honor of the Medical Chamber of Belgrade (re-elected in 2014 for a period of 5 years)

Member of the Ethics Committee of the Clinical Center of Serbia until 2011.

Member of EPA European Psychiatric Association

Member of the APA- American Psychiatric Association

Member of the Executive Board of CENP (Central-European Neuro-psycho-pharmacology Association)

Member of the Medical Faculty Commission of the University of Belgrade for Continuous Education

Head of the Department of Psychiatry for Foreign Students of the Medical Faculty University of Belgrade

President of the Specialist Commission for Psychiatry, Medical Psychology, Children's Psychiatry, Forensic Psychiatry, Addiction Disorders, Member for Clinical Pharmacology and Emergency Medicine

President of the Judicial and Psychiatric Board of the Medical Faculty University of Belgrade (2005-2011)

Winner of the SLD Lifetime Achievement Plaque, 2014. (Among other awards, diplomas, charters)

Publications.

*More than 460 bibliographic units with a total scientific competence ratio of 780. Citation Index: 933, H 15 (Mendeley, Elsevier, January, 2020.)*



**Doc. Dr. Tijana CVETIĆ**

Born on June 3, 1975. Belgrade, Clinical psychologist at the Institute for Psychiatry of the Clinical Centre of Serbia in Belgrade, since 2005.

**Education:**

Elementary school completed in Belgrade, winner of Vuk's diploma

IV Belgrade High School, and Tinora High School, USA

Faculty 1 - BGSU Ohio, USA Psychology 1996.

Faculty of Philosophy 2 - Faculty of Philosophy, Department of Psychology of the University of Nis, 2005.

General internship, from 2005 to 2007, Ministry of Health of the Republic of Serbia

Postgraduate studies of FAPSER University in Belgrade since October 2005

Education from Systemic Family Psychotherapy 2006-2008 (counselor)

International Education GCP (Good Clinical Practice) September 2008

Doctorate of The Faculty of Medicine of the University of Kragujevac –Thesis "Soft Neurological Signs as Marker of Schizophrenia - Analysis of Schizophrenia Patients and Their First-Degree Relatives"- Mentor Prof. Dr Dusica Lecic-Tosevski, regular member of SANU, area of Neuroscience, December 2010.

Specialist in Medical psychology, Specialistic exam in Medical Psychology passed with excellent success, Faculty of Medicine, University of Belgrade 2011.

Assistant Professor at Singidunum University, Belgrade, Faculty of Health and Business Studies, elected in 2016. for the fields: psychology, psychiatry, neurology (Department in Valjevo).

Worked for a year up to 10% on a part-time contract in 2017.

**Else:**

Lecturer in Academic Specialist Studies of the Faculty of Medicine, University of Belgrade

Invited Lecturer to 9 Symposium within Continuous Medical Education (CME) organized by the Academy of Medical Sciences of SLD, participating with workshops and methodological depictions of scale in the field of depression, bipolar affective disorder, schizophrenia psychiatric teraporesistance, forensic psychiatry, liaison psychiatry,

Lecturer invited to two foreign CENP (Zagreb Croatia and PAEEB Moscow, Russia) and 2 National Congresses of the Association of Psychiatrists of Serbia with international participation)

Mentor in diploma work in psychology

Translator and member of the working group of the PANSS Institute in New York (Positive and negative syndrome scale PANSS, SCI-PANSS, Calgary depression scale).

Member of the team for evaluation of kidney donors and recipients at the Clinic for Nephrology and Urology of CCS

She speaks and writes, fluently English and French.

**Published papers:**

69 Bibliographic units, 29 in its entirety, 9 of which are published in CC or SCI Journals, in Medline publications 16 in National Journals, one work in the Proceedings of the National Congress and 10 works in a statement, 4 from International Congresses and 8 from the Congress of National Importance and one Chapter in the Textbook.

## **EXPLORATION OF PREVIOUS KNOWLEDGE ABOUT THE CONSEQUENCES OF COVID PATIENTS – 19 INFECTIONS, ON MENTAL HEALTH**

**Miroslava JAŠOVIĆ-GAŠIĆ<sup>1</sup>, Tijana CVETIĆ<sup>2</sup>**

<sup>1</sup>Academy of Medical Sciences of SLD, Belgrade, Serbia

<sup>2</sup> Institute for Psychiatry of Clinical Center of Serbia, Belgrade, Serbia

## **SUMMARY**

**Introduction:** There are at least three categories that can be discussed during the Covid 19 pandemic, concerning mental health:

1. The impact of the pandemic on the general human beings and the proposed safeguards, as part of mental health
2. Mental disorders during illness, and the effects of Covid 19 infections on mental health.

3. The impact on people suffering from a mental disorder before the emergence of the pandemic and reaction during pandemic illness.

**Goal and Methodology:** Referring to the above, the goal of our exposure is to analyze the latest knowledge of the impact of Covid – 19 inflections on mental health, (mentioned in point 2). They are mostly targeted by analysis by foreign authors, during and immediately after the Covid-19 disease. It is also a point, that there has been no such research in our country and region at this level. There is a certain limitation of all the studies that we show because they are not based on the type of "face to face", but "online" survey type or by type of doctors' report to health institutions. But, in these conditions, it is a great contribution to the knowledge of this unknown and the scourge called covid -19.

**Results of studies:** In the study on neurological and psychiatric outcomes in 236379 survivors after Covid-19 disease, after 6 months, incidents of 14 neurological and psychiatric disorders— consequences were detected, such as cerebral palsy, parkinsonism, Guillain-Barre syndrome, nerve disorders, nerve roots and plexus, myoneural transmission and muscle disorders,(neurological); encephalitis, dementia, psychotic disorders, mood disorders and anxiety disorders (specter), substance abuse and insomnia,(psychiatric). The impact of the severity of covid-19 disease, which relates to hospitalization, admission to intensive therapeutic units (ITJ), encephalopathy (delirium and related disorders), has been also addressed. Differences in outcomes between cohorts were evaluated and confirmed, repeating the analysis in different scenarios (Taquet M, Geddes JR, Husain M, Luciano S, Harrison PJ. *Lancet Psychiatry*. 2021 Apr. We will be showing, among other things, a study conducted recently in China, methodologically more correct. This study aims to investigate the prevalence and associated risk factors with psychopathological symptoms in patients infected with covid-19 during the second wave in China. The survey was conducted as a cross-sectional study in five isolated wards of designated hospitals in Beijing, China, from July 1 to December 15. 2020. Mini-International Neuropsychiatric Interview (MINI) was conducted to assess psychiatric disorders, and a series of scales were used to measure self-reported psychopathological symptoms and psychosomatic factors. Multivariant regression was used to analyze risk factors associated with psychopathic symptoms. There were 119 participants with infection, the prevalence of generalized symptoms of anxiety (51.3%), depressive symptoms (41.2%) and post-traumatic stress symptoms (PTSD), post-traumatic stress disorder (PTSD) (33.6%) diagnosed. Loneliness - hope, coping and overcoming strategies and a history of mental disorders were common risks or protective factors for several psychopathological symptoms. The impact of covid-19 was observed as a specific risk factor associated with symptoms of anxiety, (Zhang Z, Feng Y, Song R, Yang D, Duan X. *Global Health*. 2021 April).

**Conclusion:** The studies shown provide evidence for significant neurological and psychiatric morbidity in progress, during and 6 months after covid-19 infection, called: post-traumatic syndrome or "late covid". The risks were highest, but not limited to patients who had severe covid-19 clinical features. This information can help plan services and identify research priorities. Matching designs, methodology, including potential cohorts needed to confirm and explain these and other discoveries. Until further research and new, useful knowledge, let us remain optimistic and have confidence in science, health care professionals, and the most important vaccines and vaccinations, as well as respect for epidemiological measures



**Prof. Dr. Miro JAKOVLJEVIĆ**

Miro Jakovljević, MD, PhD, distinguished professor of Psychiatry, University of Zagreb. He was Head of the Department of Psychiatry, Faculty of Medicine, University of Zagreb in University Hospital Centre Zagreb (2007-2015), Head of the Department of Psychiatry, School of Medicine, University of Mostar (2000-2013), and the vice-dean for science of the Mostar School of Medicine, Bosnia and Herzegovina (2007-2013). He published 20 books and more than 200 scientific and professional papers, also having more than 28 chapters in the books of other authors. He is the editor-in-chief of the international journal “Psychiatria Danubina“ and the journal of International Academy of Sciences and Arts in Bosnia and Herzegovina “Science, Art and Religion”. He is a member of the European Academy of Sciences and Arts, regular member and vice-president of the International Academy of Sciences and Arts in Bosnia and Herzegovina; foreign member of the Academy of Sciences and Arts of Bosnia and Herzegovina, full member of the Croatian Academy of Medical Sciences, the president of the Croatian Society for Psychopharmacotherapy and Biological Psychiatry of Croatian Medical Association and the president of the Danubian Psychiatric Association. *The area of scientific and professional interest:* clinical psychopharmacology and creative person-centered narrative psychopharmacotherapy, biological psychiatry, psychotherapy, spiritual psychiatry and transdisciplinary integrative psychiatry, public and global mental health.



# **PROMOTION OF THE PUBLIC MENTAL HEALTH AND FIGHTING AGAINST COVID-19 PANDEMIC AND INFODEMIC**

**Miro JAKOVLJEVIĆ**

School of Medicine, University of Zagreb, Zagreb, Croatia

## **SUMMARY**

The COVID-19 pandemic represents very complex events, complex in its origin, its spread, its effects, and its consequences at multiple levels and fields with a big impact on people's mental health. On the other side, the quality of our individual, collective, and public mental health is very important for successfully fighting against the COVID-19 pandemic and infodemic.

Positive mental health involves the capacity to

1. realize our abilities and cope with adverse life events (resilience and antifragility), live a life with a purpose and meaning, and make a positive contribution to our communities;
2. empathize with others (understand how others think, feel and behave) and mentalize properly (predict actions, intentions, and feelings of others); form positive and creative relationships with others, and feel connected and supported;
3. experience good faith, hope, peace of mind, and solidarity;
4. practicing freedom take responsibility for oneself and for others as appropriate. What we need is resilience, coherence, and science in this time of pandemic, not conspiracy theories, blame games, and panic.

COVID-19 pandemic and infodemic can be effectively overcome only in the spirit of mutual empathy, respect, trust, and public/global cooperation sowing the seeds for humanistic self, compassionate society, and empathic civilization, rather than blaming, scapegoating, and xenophobia. Empathy for difference and opening to diversity is the invisible force that holds society and civilization together. The good news from the latest neuroscience research is that empathy, coherence, and resilience can be taught, learned, and cultivated. Fighting the COVID-19 crisis should be our collective hero's journey to better individual, public, and global mental health, compassionate society, and empathic civilization.

Resilience Key Determinant of the Health, Adaptation (Stress-coping) and Personal Growth

- may involve positive psychological transformation and personal growth
- an indivisible part of mental health and health in general, well-being and quality of life as well as recovery and treatment outcome
- It is very important to note that some resilience factors may contribute to the development of other resilience factors, and, inconsistency with a cascade model, together they contribute to predicting personal recovery

The good news about resilience

- Resilience and reflection instead of brooding rumination can be enhanced through learning
- Psychology: The ability to bounce back from tough times, or even to triumph in the face of adversity; to display tenacity, but not at the expense of reason

- Medicine: the ability of individual patients to recover from injury or illness characteristics of basic anatomy as well as personality which make some people naturally quick healers

#### Brain and Resilience from Perspective of Predictive, Preventive and Person-centered Medicine

- Why some people do not develop a particular disorder although they have the same genome or they are the subject of the same adversities as the people who develop the disorder
- In addition to research of disorder-specific mechanisms it is of great importance to recognize dysfunction-specific resilience mechanisms.
- a collection of protective and salutogenic factors that modulate the relationship between a stressful event, adversity or disease, and positive outcomes.
- about the whole person, it includes a biological, psychological, social, and spiritual dimension of human existence.
- enables individuals and communities to survive and adapt to challenges and adversities
- sometimes also to be better off and to grow and thrive (post-traumatic growth) in addition to overcoming specific adversity.
- may involve positive psychological transformation and personal growth
- an indivisible part of mental health and health in general, well-being and quality of life as well as recovery and treatment outcome

It is very important to note that some resilience factors may contribute to the development of other resilience factors, and, inconsistency with a cascade model, together they contribute to predicting personal recovery





**Prof. Dr. Mevludin HASANOVIĆ**

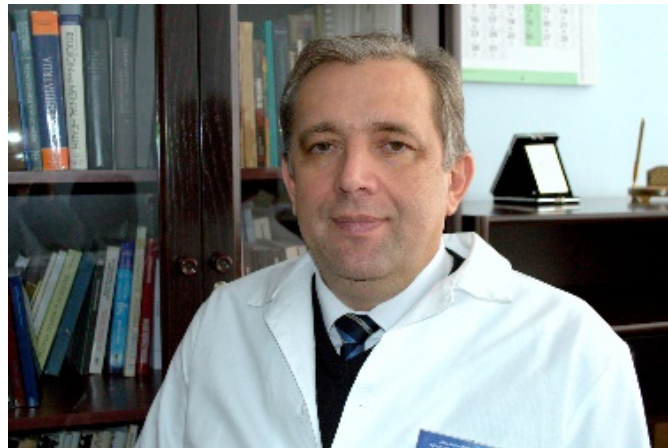
Born in Brčko in 1958. He graduated from the Faculty of Medicine in Sarajevo in 1982 and specialized in neuropsychiatry in Zagreb (Croatia) in 1991. He enrolled in postgraduate studies at the University of Zagreb and finished in Tuzla, where he earned a master's degree and then a doctor of medical sciences (2009), when he was elected assistant professor in Psychiatry with Medical Psychology at the Medical Faculty of the University of Tuzla. He was elected associate professor in the same subject at the Faculty of Medicine, University of Tuzla in 2014.

He is employed at the Clinic for Psychiatry of the University Clinical Center in Tuzla, he is the head of the Department of Social Psychiatry. He is a lecturer at the Faculty of Education and Rehabilitation Sciences, University of Tuzla, and at the Islamic Faculty of Education, University of Zenica.

He has been a primarius since 1994, and a subspecialist in social psychiatry since 2006. Group analyst since 2009, and in 2013 he acquired the title of educator in group analysis. He is an Accredited EMDR Practitioner (2013) and EMDR Consultant (2017). Involved in the teaching process at the Medical Faculty of the University of Tuzla since 1996. He was the president of the Association of Psychiatrists of Tuzla Canton. He is the President of the Association of EMDR Therapists in BiH, the President of the Union of Psychotherapeutic Associations in Bosnia and Herzegovina. He is the Secretary General of the Association of Psychiatrists in Bosnia and Herzegovina, and the Association for Integrative Medicine in Bosnia and Herzegovina. He is the President of the Executive Board of the Foundation "Mental Health for All" Tuzla. He is an elected associate member of the International Academy of Sciences and Arts in Bosnia and Herzegovina.

He has published over 300 professional and scientific papers, his papers have been cited on Google scholarships 1106 times. H-index = 18, I-10 index = 26. He has been awarded with the second prize three times for the best published scientific work at the University Clinical Center

Tuzla in 2005, 2006, and 2012/13. yr. He is a member of the editorial boards of several domestic and international journals. He is married and has five children.



**Prof. Dr. Izet PAJEVIĆ**

Izet Pajević was born and lives in Tuzla, where he completed primary and secondary education. He studied medicine at the Medical Faculties in Tuzla and Sarajevo and graduated in 1985. At the beginning of 1986. He got a job at the Clinic for Psychiatry of the University Clinical Center Tuzla, where he still works today, performing the function of director, ie, head of the Clinic. He completed his specialization in neuropsychiatry in 1993.

During 1995. he attended education at the University of Missouri - Columbia (USA) in the field of psychotraumatology. During 1998-1999. yr. he completed his education in the field of supervisory work (University of Gothenburg). From 2002-2009 yr. he completed training as a group analyst and from 2009 to 2013. and for a group analyst educator (Institute for Group Analysis Zagreb).

He received his master's degree in 1999 and his doctorate in 2003. by doing pioneering scientific research on the impact of religiosity on mental health. In the same year, at the Medical Faculty of the University of Tuzla, he was elected assistant professor, in 2008 associate professor and in 2015 full professor, in the subject "Psychiatry with Medical Psychology". He received the title of primarius in 2003, and has been a certified subspecialist in clinical psychiatry since 2011. The narrower field he deals with in everyday practice and research is clinical and biological psychiatry and psychopharmacotherapy, child and adolescent psychiatry, neuroscience, psychotherapy, psychoanalysis, psychotraumatology, spiritual and integrative medicine, psychology of spirituality and religiosity.

He has published over 200 professional and scientific papers. He is the author of several chapters in books in the professional field that both the editor and the reviewer of several books deal with. He is a member of the World (WPA) and European (EPA) Association of Psychiatrists. He was the president of the Association of Psychiatrists in BH (PABH) in two terms (2010-2012; 2018-2020). President of the Association for Child and Adolescent Psychiatry in BH (PABH) and the

Association of Psychiatrists of Tuzla Canton (UPTK), Vice President of the Association for Integrative Medicine in BH, member of the presidency of the Association of Group Analysts in BH. He is the director of the Foundation "Mental Health for All". Elected member of the International Academy of Sciences and Arts in Bosnia and Herzegovina. He lives in Tuzla, is married, the father of four children

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## **HEALTH CONSEQUENCES OF EMPLOYEES ENGAGED IN HEALTHCARE DURING THE COVID-19 PANDEMIC**

**Mevludin HASANOVIĆ, Izet PAJEVIĆ**

Department of Psychiatry, University Clinical Center Tuzla, Tuzla, Bosnia and Herzegovina  
Medical Faculty, University of Tuzla, Tuzla, Bosnia and Herzegovina

### **SUMMARY**

From December 2019 to 18 October 2021, 4.901.012 people have died due to the COVID-19 pandemic, and health departments confirmed more than 240.805.141 cases worldwide. The first case in Bosnia and Herzegovina (BH) was confirmed on the 5th of March. So, from March 2020 to 18 October 2021, 11.110 people have died due to the COVID-19 pandemic, and health departments confirmed more than 243.914 cases in BH. Up to now, 1,242,203 Anti-COVID vaccine doses were administered, 508,008 persons were fully vaccinated, which means that only 15.39% of the BH population were fully vaccinated.

The lessons learned from previous pandemics are to create enormous pressure on healthcare systems, and in case of inadequate preparation, they can lead to their utter collapse. The healthcare systems globally have been severely strained, as well as in BH too. Effective preparedness for pandemics seeks the engagement of the whole health society, and all assets from the healthcare system must be ready to meet the increasing demands.

The shortages of hospital space availability, personal protective equipment (PPE), treatment supplies, and ventilators from the beginning have been a severe threat to the wellbeing of healthcare workers (HCWs) during this pandemic. When we consider HCWs, namely, the ones dedicated to the testing, diagnosis, treatment, and care of infected patients, or laboratory professionals that directly manipulate biological products containing the virus, we could say that they have a specific risk that bears a higher probability of infection, which necessarily determines the need for specialized protection measures.

HCWs currently comprise the most critical sector of the workforce at the frontlines as well as covering other essential health services. They are at an unusually high risk of exposure to infection, and they are also at high risk of developing mental and behavioral disorders due to the high psychological toll of their intensive work in managing this highly infectious virus.

Its effects could be manifested as stress, depression, anxiety, sleep problems, burnout, and general psychological distress due to excessive workload, inadequate PPE, excessive media

attention, and feeling of insufficient and inadequately supported, and due to insufficient information about the virus, the continuous care of patients with COVID 19, high workload, constant exposure to critical events such as death, fear of being infected and infecting their families and its consequences on their health, and grieving deaths of their colleagues.

Some findings identified the following risk factors for COVID-19-related health impact: working in a high-risk department (COVID-19 Clinics and/or departments), inadequate hand hygiene, suboptimal hand hygiene before and after contact with patients, improper PPE use, close contact with patients ( $\geq 12$  times/day), long daily contact hours ( $\geq 15$  h), and unprotected exposure. The most common symptoms identified amongst HCWs were fever, cough, and weakness. Prolonged PPE usage led to cutaneous manifestations and skin damage with the nasal bridge most commonly affected site. Female HCWs and nurses were disproportionately affected.

The problems of Bosnia and Herzegovina as a developing country were both, the lack of funds for the procurement of personal protective equipment (PPE), and its unavailability on the world market. On the other hand, we were witnessed that “some of the strongest health systems in the world have been surprised by the pandemic”.

To show the consequences of the COVID pandemic in BH, experienced by health workers who worked during the pandemic, we found it impossible to find the exact data because no institution in BH has collected data on this important issue. We addressed some institutions from the cantonal to the state level, but the answer is the same, they do not have particular data on the consequences of the COVID pandemic on HCWs in BH. We received exact data according to the information available to the Federation of BH Medical Chamber that a total of 27 doctors from the Federation of BH (4 women and 23 men) died as a result of the coronavirus infection. In Tuzla Canton 7 (1 + 6), in Sarajevo Canton 12 (1 + 11), Zenica-Doboj Canton 4 (1 + 3). Central Bosnian Canton 2 (m), Herzegovina-Neretva Canton 1 (m), Bosnian-Podrinje Canton 1 (m). There are no exact data on the number of infected doctors and nurses and technicians from COVID-19 in BH.

In the COVID-hospital of the University clinical Center Tuzla, 12 doctors of different specialties were treated (4 died and 8 doctors survived after severe clinical pictures). One pharmacist (MSc) was also successfully treated; and 3 nurses/medical technicians with severe clinical pictures and with respiratory risk, but two nurses / technicians lost their lives to coronae. At the Psychiatric clinic of the University Clinical Center Tuzla, out of 21 doctors, 12 had COVID-19, and out of 39 nurses / technicians, 6 had COVID-19. One psychologist, one special educator and one paramedic also survived COVID-19.

This review highlights the existing burden, borne by health workers at work during the COVID-19 pandemic and its impact on their general and mental health conditions. Regardless of whether there are developed or developing countries, the COVID-19 pandemic has shown that all health systems have failed the test of coping with a high-quality. It also shows differences among the affected subgroups of health workers. This review highlights the importance of the need to

gather high-quality evidence and develop the necessary interventions for the good health and particularly mental health of health workers who are on the front lines in the fight against the COVID-19 pandemic and everything that comes with it and after it. This is a global concern and we don't know when it will stop