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TELEMEDICINA U DOBA PANDEMIJE KOVID-19

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SAŽETAK

Telemedicina se široko može definisati kao upotreba telekomunikacionih tehnologija za pružanje medicinskih informacija i usluga. Pandemija Kovid-19 je ponovo stavila u fokus korišćenje digitalnih tehnologija u svakodnevnom radu zdravstvenih radnika, a pre svega lekara. Digitalne tehnologije omogućavaju kontakt lekara sa pacijentom preko sigurne mreže bez ličnog kontakta. Usled Kovid-19 pandemije moramo se prilagoditi novonastaloj situaciji. U Crnoj Gori je tokom 2019. godine, počela sa radom platforma *eZdravlje* koja je nadograđivana tokom 2020. godine. Portal *eZdravlje* pruža informacije i omogućava korišćenje elektronskih servisa u zdravstvenom sistemu Crne Gore. Kovid-19 elektronski servis je razvijen tokom pandemije Kovid-19 i namenjen je osiguranicima testiranim na prisustvo novog koronavirusa, a u svrhu dobijanja povratne informacije o rezultatima testiranja. Na taj način, kroz elektronski model najave pacijenta, izabrani lekari su putem informacionog sistema blagovremeno upozoreni na prisustvo SARS-CoV-2 virusa, pre prijema pacijenta u samu ambulantu, što omogućava dodatne mere opreza, odnosno kvalitetniju preventivu i veći stepen zaštite zdravlja lekara i medicinskog osoblja. Cilj ovog rada je da se ukaže na značaj telemedicine u doba pandemije Kovid-19.

Ključne reči: Telemedicina, Kovid-19, zdravstvena zaštita

Uvod

Koronavirusna bolest (Kovid-19) započela je u gradu Vuhanu u Kini u decembru 2019. godine. Kovid-19 pogodio je mnoge zemlje sveta tako da je do danas preko 32 miliona potvrđenih slučajeva i 993.972 smrtnih ishoda u svetu (1). Istovremeno, na globalnom nivou, oporavljeno je preko 24 miliona pacijenata (1). Crna Gora je registrovala prvi slučaj Kovid-19 17.03.2020. godine i bila je poslednja evropska država u kojoj je registrovana infekcija SARS-CoV-2 virusom. Adekvatne mere Vlade Crne Gore, kao i odgovornost građana, doveli su do toga da je 04.05.2020. godine registrovan poslednji slučaj Kovid-19, a dana 24.05.2020. godine izlečen je i poslednji pacijent, tako da je Crne Gora postala prva evropska zemlja bez korona virusa. Međutim, u oktobru 2020. godine situacija je dijametralno suprotna. Trenutno, na dan 26. septembar 2020., Crna Gora ima 3.630 potvrđnih slučajeva Kovid-19, 155 umrlih i ukupno 6.177 oporavljenih (2).

U ovakvoj epidemiološkoj situaciji, u doba pandemije Kovid-19, kada su preporuke relevantnih medicinskih radnika nošenje maski, fizička distanca i higijena ruku, digitalne tehnologije dobijaju sve veći značaj. U svakodnevnoj komunikaciji upotreba *e-mail*-a, *viber*-a, *zoom*-a i *whatsapp*-a je u ekspanziji. Sa jedne strane, to značajno doprinosi smanjenju epidemiološkog rizika, a sa druge, doprinosi razmeni stručnih znanja i veština. Cilj ovog rada je da se ukaže na značaj telemedicine u doba pandemije Kovid-19.

Telemedicina

Telemedicina je, kao sistem pružanja zdravstvene zaštite, definisana od Svetske zdravstvene organizacije (SZO) i to kao praktična zdravstvena zaštita koja koristi interaktivnu zvučnu i vizuelnu komunikaciju i razmenu podataka (3). Globalno društvo nam putem novih tehnologija omogućava da, pre svega, većinu znanja i modele njihove primene

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TELEMEDICINE IN THE COVID-19 PANDEMIC

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SUMMARY

Telemedicine can be broadly defined as the use of telecommunication technologies to provide medical information and services. The COVID-19 pandemic has once again focused on the use of digital technologies in the daily work of health workers, and above all doctors. Digital technologies enable the doctor to contact the patient via a secure network without personal contact. COVID-19 has forced us to adapt to the new situation. In Montenegro, the *eHealth* platform started operating in 2019, and it was upgraded in 2020. The *eHealth* portal provides information and enables the use of electronic services in the health system of Montenegro. The COVID-19 electronic service was developed during the COVID-19 pandemic, and it was intended for the insured people tested for the presence of a new coronavirus, in order to obtain the feedback on test results. In this way, through the electronic model of patient notification, selected doctors are warned on time about the presence of the SARS-CoV-2 virus through the information system, before admitting the patient to the clinic, which allows additional precautions, that is, the better prevention and greater protection of doctors and medical staff. The aim of this paper is to show the importance of telemedicine during the COVID-19 pandemic.

Key words: Telemedicine, COVID-19, health care

Introduction

The coronavirus disease (COVID-19) appeared in the city of Wuhan, in China in December 2019. Covid-19 has hit a lot of countries, so today there are more than 32 million confirmed cases and 993,972 deaths in the world (1). At the same time, at the global level, more than 24 million patients have recovered (1). Montenegro registered the first case of COVID-19 on March 17th, 2020 and it was the last European country, in which the infection of SARS-CoV-2 virus was registered. Adequate measures of the Government of Montenegro, as well as responsible behavior of its citizens, contributed to the fact that the last case of COVID-19 was registered on the 4th of May, 2020, and the last patient was cured on the 24th of May, 2020, and therefore, Montenegro became the first European country without corona virus. However, in October 2020, this situation is diametrically opposed. Currently, on the 26th of September, Montenegro has 3,630 confirmed cases of COVID-19, 155 deaths and 6,177 recovered people (2).

In such an epidemiological situation, in the COVID-19 pandemic, when relevant medical workers recommend wearing masks, physical distance, and hand hygiene, digital technologies are gaining greater importance. In everyday communication, the use of *e-mail*, *Viber*, *Zoom* and *WhatsApp* is on the rise. On the one hand, it significantly contributes to the reduction of epidemiological risk; while on the other hand, it contributes to the exchange of professional knowledge and skills. The aim of this work is to point to the significance of telemedicine in the COVID-19 pandemic.

Telemedicine

Telemedicine was, as a system of providing health care services, defined by the World Health Organization (WHO) as practical health care, which uses interactive sound and visual communication to exchange data (3). The global society enables us, with the help of these technologies, to find the majority of knowledge and models of its application in one place (4). The level of the application of information

pronađemo na jednom mestu (4). Nivo primene informacionih tehnologija u savremenim zdravstvenim sistemima kontinuirano raste u celom svetu. Iako medicinski informacioni sistemi nisu novina, sa tehnološke tačke gledišta, trend njihove efektivne i masovne upotrebe traje tek poslednjih petnaest godina.

Medicinski informacioni sistem (MIS) značajno unapređuje rad zdravstvenih ustanova kroz povećanje efikasnosti, manji obim rada sa dokumentacijom, vođenjem evidencije o svim segmentima zdravstvene zaštite itd. Međutim, pored osnovne uloge u zdravstvu, pravilno projektovan i implementiran MIS treba da doprinese i značajnom unapređenju edukacije i istraživanja (5).

Zdravstveni informacioni sistem (ZIS) je integrisani komunikacioni računarski sistem za razmenu informacija u procesu zdravstvene zaštite, čiji su korisnici (svi) zdravstveni radnici i (svi) korisnici zdravstvene zaštite (6). Ovim sistemom se obuhvataju sve informacije koje se tiču pitanja zdravlja jedne populacije ili, još bolje, populacije na svetskom nivou (7). Telemedicina pruža mogućnost da se zdravstveni sistem orijentiše na pacijenta i porodicu, tj. da smanji njegovu mobilnost u cilju rasterećenja zdravstvenog sistema, a pacijentu da omogući što bolju i kvalitetniju zdravstvenu zaštitu (8). Pandemije i druge vanredne situacije u javnom zdravstvu obično dovode do rasta potražnje za medicinskom negom, što prevazilazi lokalne mogućnosti.

Telemedicina se, u širem smislu, može definisati kao upotreba telekomunikacionih tehnologija za pružanje medicinskih informacija i usluga. Blagodati telemedicine u ovim situacijama dobro su dokumentovane (9). Telemedicina može podržati kliničku negu, obrazovanje i zdravstvo na daljinu, a njena upotreba dramatično se povećala u poslednjoj deceniji (10). Postoji niz potencijalnih koristi od primene telemedicine i to: olakšan pristup informacijama, poboljšani pristup uslugama i bolja dostupnost nege koja se ranije nije mogla pružiti, unapređeno profesionalno obrazovanje, i smanjenje troškova zdravstvene zaštite.

Prema SZO telemedicina predstavlja pružanje zdravstvene zaštite uz upotrebu informatičke i komunikacijske tehnologije (ICT) za potrebe dijagnostike, terapije, prevencije bolesti i traumatizma, istraživanja i evaluacije, te za potrebe kontinuirane edukacije zdravstvenog osoblja, a sve u interesu unapređenja zdravlja, kako pojedinaca tako i zajednice. *Telehealth*, izraz koji se koristi naizmenično s telemedicinom, definisan je kao pružanje zdravstvene zaštite na daljinu pomoću telekomunikacione tehnologije, a sve u cilju poboljšanja zdravlja pacijenta (11).

Vrste modela telemedicine

Sinhronizovani model telemedicine – telefonska ili audio-video interakcija u stvarnom vremenu, obično s pacijentom, ali je moguće i sa porodicom, pomoću pametnog telefona, tableta ili računara. Ovaj način komunikacije može da se koristiti za prikupljanje podataka od pacijenata obolelih od Kovid-19 kako bi se utvrdilo s kim su bili u kontaktu za vreme dok su bili potencijalno zarazni, kao i za praćenje njihovih kontakata, kako bi ih obavestili o potrebi samoizolacije. Pacijenti sa blagim ili umerenim simptomima Kovid-19 često se mogu izolovati i nadzirati dok su u kućnim uslovima, kako bi se izbegla prenatrpanost zdravstvenih ustanova i kako bi se obezbedili bolnički kreveti za teže slučajeve. Koristeći digitalne tehnologije, kao što su telefoni ili aplikacije, lekari mogu češće da komuniciraju sa pacijentima, kako bi nadzirali njihovo zdravstveno stanje, davali savete i procenili težinu kliničke slike bolesti, radi pužanja adekvatne zdravstvene nege u zdravstvenoj ustanovi. Nakon otpuštanja pacijenata s Kovid-19 iz bolnice, pružaoci zdravstvenih usluga mogu koristiti telemedicinu kako bi pratili zdravstveno stanje pacijenata u samoizolaciji u kućnim uslovima.

Asinhronizovani model telemedicine – komunikacija lekara i pacijenta ne događa se u stvarnom vremenu. Na primer, tehnologija „spremi i prosledi“ omogućava prikupljanje poruka, slika ili podataka u određenom trenutku i njihovo tumačenje ili odgovaranje na njih kasnije. Portali za pacijente mogu olakšati ovu vrstu komunikacije između lekara i pacijenta putem sigurnih poruka.

Praćenje pacijenta na daljinu omogućava direktan prenos lekaru svih kliničkih merenja pacijenta (može ili ne mora biti u stvarnom vremenu) (12).

technologies in contemporary health care systems continually increases in the whole world. Although medical information systems are not a novelty, from the technological point of view, the trend of their effective and mass usage has lasted for fifteen years.

Medical information system (MIS) significantly improves the work of health care institutions through the increase of efficiency, decrease in the scope of work with documentation, keeping evidence about all segments of health care, etc. However, besides the basic role in health care, a properly designed and implemented MIS should contribute to the significant promotion of education and research (5).

The health information system is an integrated communication computer system for the exchange of information in the process of health care, whose users are all health care workers and all users of health care (6). This system is comprised of all information connected with the health of one population or the world's population (7). Telemedicine offers the possibility to focus the health care system on the patient and his family, that is, to reduce the mobility in order to reduce the burden on the health care system, and improve health care quality (8). The pandemics and other emergency situations in public health care usually lead to the growth of demand for medical care, which exceeds the local abilities.

Telemedicine can widely be defined as the use of telecommunication technologies for providing medical information and services. The benefits of telemedicine in these situations are well-documented (9). Telemedicine can support clinical care, online education, and health, and its use has dramatically increased in the last decade (10). There is a range of potential benefits from the use of telemedicine and they are the following: improved access to information, improved access to services, and the increase in care, which could not be provided previously better professional education, and the reduction of costs of health care.

According to the WHO, telemedicine presents providing health care with the help of information and communication technologies for the needs of diagnostics, therapy, prevention of diseases and traumatism, research and evaluation, as well as for the needs of continuous education of medical workers, aimed at promoting the health of individuals, as well as the community. Telehealth, the term which is used alternately with telemedicine, has been defined as providing online health care services with the help of telecommunication technology, aimed at improving the patients' health (11).

Types of telemedicine models

The synchronous model of telemedicine: telephone or audio-visual interaction in real-time, usually with the patient, but possibly with the family, as well with the help of a smartphone, tablet, or computer. This mode of communication can be used for the collection of data from patients with COVID-19, in order to determine their contacts during the time when they were potentially infectious, as well as to observe their contacts in order to inform them about the need for self-isolation. Patients with mild or moderate symptoms of COVID-19 can often be isolated and observed while being at home in order to avoid the overburdening of health care institutions and provide hospital beds for severe cases. By using digital technology, such as telephones and applications, doctors can communicate more frequently with their patients in order to supervise their health condition, give advice or estimate the severity of clinical picture, to provide appropriate health care in the health care institution. After the patients with COVID-19 are discharged from the hospital, providers of health care can use telemedicine to observe the health condition of patients, who are in self-isolation at home.

The asynchronous model of telemedicine: communication between doctors and patients does not unfold in real-time. For example, technology "store-and-forward" makes it possible to collect messages, pictures, and data at some moment and to interpret and respond to them later. Portals for patients can facilitate this kind of communication between doctors and patients with the help of secure messages.

Online observation of patients facilitates the direct transmission of the patient's clinical measurements to his doctor (it can be or does not have to be in real-time) (12).

Telemedicina i Kovid-19

SZO je 11. marta 2020. proglasila pandemiju Kovid-19 uzrokovanu novim koronavirusom (SARS-CoV-2) (13). Pandemija Kovid-19 je ponovo stavila u fokus korišćenje digitalnih tehnologija u svakodnevnom radu zdravstvenih radnika, a pre svega lekara. Iako je telemedicina već napredovala u razvijenim zemljama, verovatno još uvek nije pronašla čvrsto uporište u zemljama s ograničenim resursima. Digitalne tehnologije omogućavaju kontakt lekara sa pacijentom preko sigurne mreže bez ličnog kontakta. Kovid-19 nas je naterao na promene, ili je možda bolje reći da se moramo prilagoditi novonastaloj situaciji (14).

Tokom 2016. godine samo je 11,8% porodičnih lekara i pedijatara u Sjedinjenim Američkim Državama koristilo telemedicinu. Međutim, nakon dva meseca od početka pandemije Kovid-19, samo 9% lekara primarne zdravstvene zaštite koji su radili u ordinaciji nije koristilo telemedicinu (15). Informacione tehnologije su pomagale, ali i dalje pomažu, zdravstvenim radnicima tokom ove pandemije. Lekarima je omogućeno da imaju uvid u zdravstveno stanje pacijenta sa sumnjom na infekciju SARS-CoV-2 virusom pre nego što dođu do lekara i usmere se na dalje lečenje.

Platforma *eZdravlje*

Konsultacije lekara sa pacijentom nisu jedina mogućnost koju pružaju digitalne tehnologije u zdravstvu. U Crnoj Gori je tokom 2019. godine počela sa radom platforma eZdravlje koja je nadograđivana tokom 2020. godine. Portal *eZdravlje* omogućava korišćenje i pruža informacije o elektronskim servisima u zdravstvenom sistemu Crne Gore. Kovid-19-elektronski servis razvijen je u vreme pandemije Kovid-19. Namenjen je osiguranicima testiranim na prisustvo novog koronavirusa, a u svrhu dobijanja povratne informacije o rezultatima testiranja. Zahvaljujući strukturi i apsolutnoj integralnosti zdrvstvenog informacionog sistema, informacije o rezultatima testiranja na novi korona virus su dostupne i izabranim doktorima na primarnom nivou. Na taj način kroz elektronski model najave pacijenta, izabrani lekari putem informacionog sistema su blagovremeno upozoreni na prisustvo virusa, pre prijema pacijenta u samu ambulantu, što omogućava dodatne mere opreza, odnosno kvalitetniju preventivu i veći stepen zaštite zdravlja lekara i medicinskog osoblja (16). Zahvaljujući platformi, izbegnuto je više od pola miliona kontakata između pacijenata i zdravstvenog osoblja od početka epidemije, čime se znatno uticalo na sprečavanje širenja Kovid-19 u Crnoj Gori.

U vremenu pandemje dodatni izazov je kontinuirano pružanje zdravstvene zaštite pacijentima koji nisu inficirani SARS-CoV-2 virusom. Telemedicina se može koristiti kao strategija za održavanje kontinuiteta zdravstvene nege, u meri u kojoj je to moguće, kako bi se izbegle negativne posledice odlaganja preventivne, hronične ili rutinske zdravstvene nege, zbog zabrinutosti za Kovid-19. Korišćenjem telemedicine lekar može odrediti kada je najbolje za pacijenta da dođe na pregled u zdravstvenu ustanovu, a sve u cilju smanjivanja nepotrebnih dolazaka pacijenata u zdravstvene ustanove. Lekari mogu koristiti elektronske recepte i pružati višemesečno izdavanje lekova kako bi se dodatno smanjila potreba za dolaskom pacijenata u ordinaciju. Daljinski pristup, takođe, može osigurati dostupnost zdravstvene zaštite kada dolazak pacijenta nije praktičan zbog zabrinutosti za Kovid-19. Da bi se ublažio stres tokom Kovid-19, stanovništvu treba da se pružaju usluge od strane psihologa.

Ograničenja korišćenja telemedicine

U hitnim slučajevima, u uslovima stanja pacijenta koja zahtevaju klinički pregled, radiološko ili laboratorijsko ispitivanje, ne možemo koristiti telemedicinu, bez obzira da li je pacijent oboleo od Kovid-19 ili ne. Takođe, ograničavajući faktor za korišćenje telemedicine može biti i dostupnost uređaja ili internet veza. Ovo se posebno odnosi na pacijente koji žive u ruralnim predelima. Stanovništvo starije životne dobi je steklo naviku odlaska lekaru u ordinaciju, pa samim tim i na razgovor licem u lice. Ta kulturološka navika, kao i životna dob pacijenata, predstavljaju faktore koji mogu da utiču na manje korišćenje mogućnosti telemedicine.

Zaključak

U doba pandemije Kovid-19 obaveza svih donosilaca politike i odluka je da na najbolji

Telemedicine and Covid-19

The World Health Organization declared the pandemic of COVID-19 caused by the novel coronavirus (SARS-CoV-2) on the 11th March 2020 (13). The COVID-19 pandemic has brought the use of digital technologies into focus in the everyday work of healthcare workers, first of all, doctors. Although telemedicine has already made progress in the developed countries, it has not found its anchor-hold in countries with limited resources. Digital technologies facilitate patient-doctor contact via a secure network without personal contact. COVID-19 has forced us to change, or it is better to say, to adapt to the new situation (14).

During 2016, only 11.8% of family doctors and pediatricians in the United States of America used telemedicine. However, two months after the beginning of the COVID-19 pandemic, only 9% of primary health care doctors, who worked in the medical office, did not use telemedicine (15). Information technologies have helped, and they are still helping the health care workers during this pandemic. Doctors are enabled to have insight into the health condition of patients, who are suspicious of SARS-CoV-2 infection before they come to the doctor and get directed to further treatment.

Platform *eHealth*

Consultations with a doctor are not the only possibility provided by digital technologies in health care. In Montenegro, the platform *eHealth* started working during 2019, and it was updated during 2020. The portal *eHealth* facilitates the usage and provides information about electronic services in the health care system of Montenegro. The COVID-19 electronic system was developed during the COVID-19 pandemic. It is intended for the insured people tested for the presence of the novel coronavirus, with the aim of getting feedback information about the test results. Due to its structure and absolute integrality of the health care information system, information about the test results for the novel coronavirus is available to the chosen doctor at the primary level of health care. Thus, through the electronic patient notification, chosen doctors are via this information system warned about the presence of a virus on time, before they receive patients in the medical office, and therefore, additional precautions can be applied, that is, better quality prevention and a higher level of protection of the health of doctors and medical workers (16). Thanks to this platform, more than half a million contacts between patients and health care workers have been avoided from the beginning of the epidemic, which influenced significantly the prevention of the spread of COVID-19 in Montenegro.

In the time of this pandemic, providing continuous health care to patients, who were not infected with the SARS-CoV-2 virus, presents an additional challenge. Telemedicine can be used as a strategy for maintaining the continuity of health care, to the extent which is possible, in order to avoid the negative consequences of preventive, chronic, or routine health care, which could be postponed due to concerns about COVID-19. By using telemedicine, a doctor can determine when is best for the patient to come to the health care institution, which is aimed at reducing the unnecessary coming to health care institutions. Doctors can use electronic prescriptions and prescribe medicines for several months in order to additionally reduce the patients' need to come to the doctor's office. The online approach can also secure access to health care when coming is not practical for patients due to concerns about COVID-19. In order to alleviate stress during COVID-19, psychologists should provide their services to the population.

Limitations of telemedicine

In urgent cases, when the patient's condition demands clinical examination, telemedicine cannot be used for the radiological or laboratory examination, no matter whether the patient is infected with COVID-19 or not. Also, the limiting factor for the use of telemedicine can be the availability of devices or Internet connection. This especially relates to patients who live in rural areas. The elderly have the habit of going to the doctor's office and talking with their doctor in person. This cultural habit and the patient's age are factors, which can influence the lesser use of telemedicine.

način organizuju pružanje sigurne zdravstvene zaštite. Imajući u vidu preporuke za sprečavanje širenja Kovid-19 (fizička distanca, nošenje maski i higijena ruku), neophodna je implementacija i rutinsko korišćenje telemedicine na svim nivoima zdravstvene zaštite. Međutim, treba imati u vidu da nisu svi zdravstveni radnici spremni da prihvate koncept telemedicine, kao načina komunikacije sa pacijentom na daljinu. Taj negativan stav može biti uzrokovan nedovoljnim poznavanjem digitalnih tehnologija, odnosno manjkom digitalne pismenosti, kao i strahom od moguće zloupotrebe. U skladu sa tim, treba pre svega zakonski regulisati i standardizovati usluge koje se mogu pružati putem telemedicine i na koji način (obavezno ostavljanje zapisa na sigurnoj mreži, radi zaštite samih podataka). Na ovaj način će, pre svega pacijenti, a zatim i medicinsko osoblje, biti sigurni da su usluge pružene putem telemedicine i zakonski valjane. Proaktivna, a ne reaktivna, primena telemedicine, će dugoročno doneti korist i pomoći u svakodnevnim izazovima u zdravstvenim sistemima.

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Conclusion

In the time of the COVID-19 pandemic, the obligation of all policy and decision-makers is to organize secure health care in the best possible way. Having in mind recommendations for the prevention of the spread of COVID-19 (physical distance, wearing masks, hygiene of hands), the implementation and routine usage of telemedicine are necessary at all levels of health care. However, one should have in mind that not all health care workers are ready to accept the concept of telemedicine, as a way of online communication with a patient. This negative approach can be caused by insufficient knowledge of digital technologies, that is, the lack of digital literacy, as well as the fear of possible abuse. In accordance with that, services, which are provided with the help of telemedicine, should be, first of all, legally regulated and standardized and the ways in which it is done should be specified (the written track should necessarily be left on the secure network so that data would be protected). In this way, primarily patients, and then medical personnel as well, will be sure that services provided with the help of telemedicine are legally valid. The proactive and not reactive application of telemedicine will bring long-term benefits and help in the everyday challenges in the health care systems.

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