POZITIVNI TRENDOVI KRETANJA BROJA MEDICINSKIH SESTARA I TEHNIČARA U CRNOJ GORI: PREGLED PERIODA OD 2014. DO 2023. GODINE

ORIGINALNI RAD

ORIGINAL ARTICLE

POSITIVE TRENDS IN THE NUMBER OF NURSES AND TECHNICIANS IN MONTENEGRO: AN OVERVIEW OF PERIOD BETWEEN 2014–2023

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SAŽETAK

Uvod: Postizanje univerzalne zdravstvene pokrivenosti je veliki izazov za sve zemlje, a napredak u velikoj meri zavisi od resursa kojima one raspolažu i njihove dostupnosti.

Cilj rada je da se sagleda obezbeđenost i dinamika kretanja broja medicinskih sestara i tehničara i njihova struktura u desetogodišnjem periodu 2014-2023. godine, te da se ispita da li je u posmatranom periodu došlo do promene u ujednačenosti distribucije medicinskih sestara i tehničara u odnosu na broj stanovnika po opštinama.

Metode: Izvršena je retrospektivna analiza podataka o medicinskim sestrama i tehničarima zaposlenim u javnim zdravstvenim ustanovama u Crnoj Gori za period 2014-2023. godine, u kojoj su glavne mere ishoda bile: longitudinalni porast broja medicinskih sestara i tehničara; odnos broja medicinskih sestara i tehničara i lekara; struktura medicinskih sestara i tehničara u pogledu pola, starosti, obrazovanja; Gini koeficijent je korišćen kao mera jednakosti raspodele medicinskih sestara i tehničara u odnosu na broj stanovnika po opštinama.

Rezultati: Obezbeđenost medicinskim sestrama i tehničarima se u periodu 2014-2023. povećala (porast stope za 24%) i dostigla vrednost 5,84 na 1000 stanovnika u 2023. godini, dok je odnos medicinskih sestara i tehničara i lekara u sistemu dostigao 2,04 : 1. Medicinske sestre i tehničari su dominantno ženskog pola, starosti 35-44 godina, a udeo zaposlenih muškog pola je u porastu (12,91 u 2014.godini u odnosu na 18,68 u 2023. godini). Petina medicinskih sestara i tehničara stekla je obrazovanje u višoj/visokoj školi. Gini koeficijent jednakosti raspodele medicinskih sestara i tehničara je opao sa 0,195 u 2014. godini na 0,191 u 2023. godini.

Zaključak: U poslednjih deset godina došlo je do značajnih pozitivnih promena u obezbeđenosti i strukturi medicinskih sestara i tehničara, na koje su verovatno imale uticaja mere zdravstvene politike koje su se sprovodile u vreme pandemije.

Ključne reči: medicinske sestre, zdravstvena radna snaga, zdravstvena politika

ABSTRACT

Introduction: Achieving universal health coverage is a major challenge for all countries, and progress largely depends on the resources they possess and their availability.

The aim of the paper is to review the provision and dynamics of the number of nurses/technicians and their structure in the ten-year period 2014-2023, as well as to examine whether there was a change in the equity of their distribution in relation to the number of inhabitants by municipalities.

Methodology: A retrospective analysis of data on nurses and technicians employed in public health institutions in Montenegro for the period 2014-2023 was conducted, focusing on the following outcomes: the longitudinal increase in the number of nurses, the nurse-to-doctor ratio, the distribution of nurses by sex, age, and education, and the Gini coefficient as a measure of inequality in the distribution of nurses relative to the population across municipalities.

Results: The density of nurses increased by 24% between 2014 and 2023, reaching 5.84 per 1,000 inhabitants in 2023, while the nurse-to-doctor ratio in the system reached 2.04 : 1. Nurses are predominantly female, aged 35-44, and the share of male nurses is increasing (12.91 in 2014 compared to 18.68 in 2023). One-fifth of the nurses have completed a college or university education. The Gini coefficient of inequality of distribution of nurses/technicians decreased from 0.195 in 2014. to 0.191 in 2023.

Conclusion: In the last ten years, there have been significant positive changes in the density and structure of nurses and technicians which have probably been influenced by the health policy measures implemented during the COVID-19 pandemic.

Keywords: nurses, health workforce, health policy

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UVOD

Sve zemlje se susreću sa velikim izazovima u postizanju adekvatne obezbeđenosti zdravstvenim kadrovima, posebno medicinskim sestarama i tehničarima, kao važnim i najbrojnijim segmentom zdravstvene radne snage. Međutim, zadovoljavajuća obezbeđenost ljudskim resursima nije garancija da će zdravstveni sistem biti otporan na veliki broj izazova sa kojima se suočava i uspešan sistem na putu postizanja univerzalne zdravstvene pokrivenosti. Samo kada su ljudski resursi raspoređeni tako da obezbeđuju visok nivo pravičnosti i dostupnosti zdravstvene zaštite, te kada su kompetentni i motivisani, mogu da pruže zdravstvenu zaštitu očekivanog kvaliteta i socio-kulturnih standarda [1,2].

Crna Gora je zemlja u kojoj je zdravstveni sistem dominantno zasnovan na kapacitetima u državnom vlasništvu. U novom milenijumu ulagani su napori da se zdravstveni sistem ojača kroz snaženje primarne zdravstvene zaštite, timova izabranih doktora i medicinskih sestara i tehničara u pogledu njihovih kompetencija i uloga [3,4]. U periodu nakon reforme, donešen je plan razvoja zdravstva (od 2015. do 2020. godine), koji je postavio strateške pravce razvoja ljudskih resursa: redovne edukacije, kontinuirano unapređenje znanja i veština, razvijanje kapaciteta za upravljanje ljudskim resursima i mobilnost zdravstvenih radnika [5]. Plan ljudskih resursa u zdravstvu (od 2013. do 2022. godine), predviđao je porast broja angažovanih lekara u sistemu, dok je broj medicinskih sestara i tehničara trebalo da ostane konstantan [6].

Cilj ovog rada je da ispita obezbeđenost i dinamiku kretanja broja medicinskih sestara i tehničara u desetogodišnjem periodu (od 2014. do 2023. godine), njihovu strukturu u pogledu pola, starosti i nivoa obrazovanja, te da sagleda da li je u posmatranom periodu došlo do promene u ujednačenosti geografske distribucije medicinskih sestara/ tehničara u odnosu na broj stanovnika po opštinama.

METODE

Jedinice posmatranja u istraživanju bile su medicinske sestre i tehničari koji rade u državnim zdravstvenim ustanovama na teritoriji Crne Gore, a čiji broj je obuhvatio vanbolničke i bolničke ustanove. Pod medicinskim sestrama i tehničarima se, prema važećem zakonodavstvu u Crnoj Gori, smatraju zdravstveni radnici koji obavljaju poslove opšte zdravstvene nege, kao dela zdravstvene zaštite, i imaju adekvatan nivo obrazovanja iz oblasti zdravstvene zaštite [7,8]. Ukupan broj medicinskih sestara i tehničara nije obuhvatio medicinske sestre ginikološko-akušerskog smera. U medicinske sestre i tehničare ne svrstavaju se rentgen tehničari, fizioterapeutski tehničari i laboratorijski tehničari, radi obezbeđivanja uporedivosti i usklađivanja sa izveštа-

INTRODUCTION

All countries face significant challenges in ensuring an adequate supply of health personnel, particularly nurses and technicians, who form a vital and substantial segment of the health workforce. However, an adequate supply of human resources alone does not guarantee that a health system will be resilient to the numerous challenges it faces or successful in progressing toward universal health coverage. Only when human resources are equitably distributed to ensure widespread access to healthcare, and when they are both competent and motivated, can they deliver care that meets expected quality and socio-cultural standards [1,2].

Montenegro's health system is predominantly built around state-owned facilities. In the new millennium, efforts have focused on strengthening the health system by enhancing primary healthcare and improving the competencies and roles of teams comprising chosen doctors and nurses/technicians [3,4]. Following the reform, the healthcare development plan (2015–2020) was adopted, outlining strategic directions for human resource development. These included regular education, continuous enhancement of knowledge and skills, capacity building for human resource management, and promoting the mobility of healthcare workers [5]. The Human Resources in Healthcare Plan (2013–2022) projected an increase in the number of doctors employed within the system, while maintaining a constant number of nurses and technicians [6].

This study aims to analyze the supply and trends in the number of nurses and technicians over a ten-year period (2014–2023), examining their demographic structure in terms of gender, age, and education level. Additionally, it seeks to determine whether the observed period saw changes in the geographic distribution of nurses and technicians relative to the population size across municipalities.

METHODS

The units of observation in this study were nurses and technicians employed in state health institutions across Montenegro, encompassing both outpatient and hospital settings. According to current legislation in Montenegro, nurses and technicians are healthcare professionals responsible for providing general health care services and are required to have an appropriate level of education in the healthcare field [7,8]. The total number of nurses and technicians excluded those specializing in gynecology and obstetrics. Nurses and technicians do not include radiology technicians, physiotherapy technicians, or laboratory technicians, in order to maintain comparability and alignment with

vanjem u zemljama EU. Prilikom izračunavanja odnosa između broja medicinskih sestara i tehničara i lekara uzet je ukupan broj lekara koji su u navedenom periodu bili angažovani u javnim zdravstvenim ustanovama.

Osim primene deskriptivnih metoda (apsolutni i relativni brojevi) izračunavani su indeksi promene u broju medicinskih sestara i tehničara za period od 2014. do 2023. godine, kao i stope obezbeđenosti medicinskim sestrama i tehničarima na 1000 stanovnika po godinama posmatranog perioda. Na osnovu izračunatih stopa obezbeđenosti medicinskim sestrama i tehničarima i stopa rasta njihovog broja, dobijene su linije trenda koje pokazuju njihovo prosečno kretanje između 2014. i 2023. godine.

Demografske odrednice koje su korišćene bile su pol (muški/ženski) i starost (starosne grupe: do 34 godine, 35-44 godine, 45-54 godine, 55 i više godina). Za potrebe istpitivanja jednakosti raspodele medicinskih sestara i tehničara u odnosu na broj stanovnika po opštinama, koristili smo Gini koeficijent [9-11]. Koristeći kumulativni procenat stanovništva kao apscisu i kumulativni procenat medicinskih sestara kao ordinatu, nacrtali smo Lorencovu krivu distribucije medicinskih sestara i tehničara u odnosu na stanovništvo po opštinama. Gini koeficijent se izračunava iz odnosa površina koju zahvata Lorencova kriva i površine ispod hipotetičke linije apsolutne jednakosti, a kreće se u rasponu od 0 do 1, gde 0 predstavlja savršenu jednakost, dok indeks od 1 predstavlja savršenu nejednakost. Sve operacije rađene su u „Excel" programu softverskog paketa „Microsoft".

Podaci o ljudskim resursima, koje prikuplja i objavljuje Institut za javno zdravlje Crne Gore, korišćeni su u izradi ovog rada. Za izračunavanje stopa korišćeni su podaci o stanovništvu koje objavljuje Uprava za statistiku MONSTAT. Za dobijanje uporednih pokazatelja za zemlje Evropskog regiona i šire, korišćeni su podaci iz međunarodnih baza podataka: OECD Health Statistics 2020, Eurostat Database, baza podataka Svetske zdravstvene organizacije.

REZULTATI

U desetogodišnjem periodu (od 2014. do 2023. godine) došlo je do povećanja broja angažovanih medicinskih sestara i tehničara. Na kraju 2023. godine u zdravstvenim ustanovama radilo je 3602 medicinske sestre i tehničara, što predstavlja povećanje od 23% u odnosu na 2014. godinu. Stopa medicinskih sestara i tehničara na 1000 stanovnika je bila u stalnom porastu u navedenom periodu. Ona se povećala za 24% u odnosu na 2014. godinu i dostigla vrednost od 5,84 na 1000 stanovnika u 2023. godini (Grafikon 1). Broj medicinskih sestara ginekološko-akušerskog smera je bio relativno konstantan, a u 2023. godini je iznosio 250 (Tabela 1).

reporting standards in EU countries. When calculating the ratio between the number of nurses/technicians and doctors, the total number of doctors employed in public health institutions during the specified period was considered.

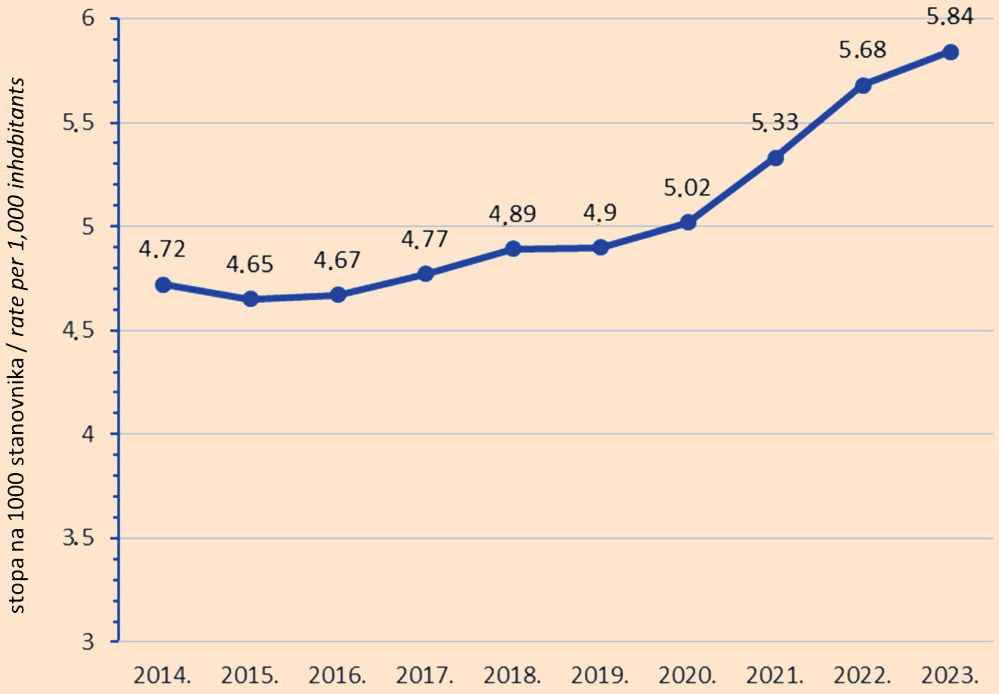
In addition to using descriptive methods (absolute and relative numbers), indices of change in the number of nurses and technicians were calculated for the period from 2014 to 2023. The rate of nurses and technicians per 1,000 inhabitants was also calculated for each year within the observed period. Based on the calculated rates of distribution of nurses/technicians and the growth rate of their numbers, trend lines were generated to illustrate their average movement between 2014 and 2023.

The demographic determinants used were gender (male/female) and age (age groups: up to 34 years, 35-44 years, 45-54 years, and 55 and over). To assess the equality of the distribution of nurses and technicians relative to the population size by municipality, we employed the Gini coefficient [9-11]. Using the cumulative percentage of the population as the abscissa and the cumulative percentage of nurses as the ordinate, we constructed a Lorenz curve to illustrate the distribution of nurses/technicians relative to the population by municipality. The Gini coefficient is calculated based on the ratio of the area under the Lorenz curve to the area beneath the hypothetical line of perfect equality. It ranges from 0 to 1, where 0 indicates perfect equality and 1 signifies perfect inequality. All calculations were performed using the "Excel" program within the "Microsoft" software package.

Data on human resources, collected and published by the Institute for Public Health of Montenegro, were used in the preparation of this study. To calculate the rates, population data published by the Statistical Office of Montenegro (MONSTAT) were used. For comparative indicators across European countries and beyond, data from international databases were utilized, including the OECD Health Statistics 2020, Eurostat Database, and the World Health Organization database.

RESULTS

Over the ten-year period from 2014 to 2023, the number of employed nurses/technicians increased. By the end of 2023, a total of 3,602 nurses and technicians were employed in healthcare institutions, reflecting a 23% increase compared to 2014. The rate of nurses and technicians per 1,000 inhabitants steadily increased throughout the mentioned period. By 2023, it had risen by 24% compared to 2014, reaching a value of 5.84 per 1,000 inhabitants (Graph 1). The number of gynecological-obstetrical nurses remained relatively constant, totaling 250 in 2023 (Table 1).



Grafikon 1. Broj medicinskih sestara/tehničara na 1000 stanovnika u Crnoj Gori u periodu od 2014. do 2023. godine

Graph 1. Number of nurses/technicians per 1,000 inhabitants in Montenegro from 2014 to 2023

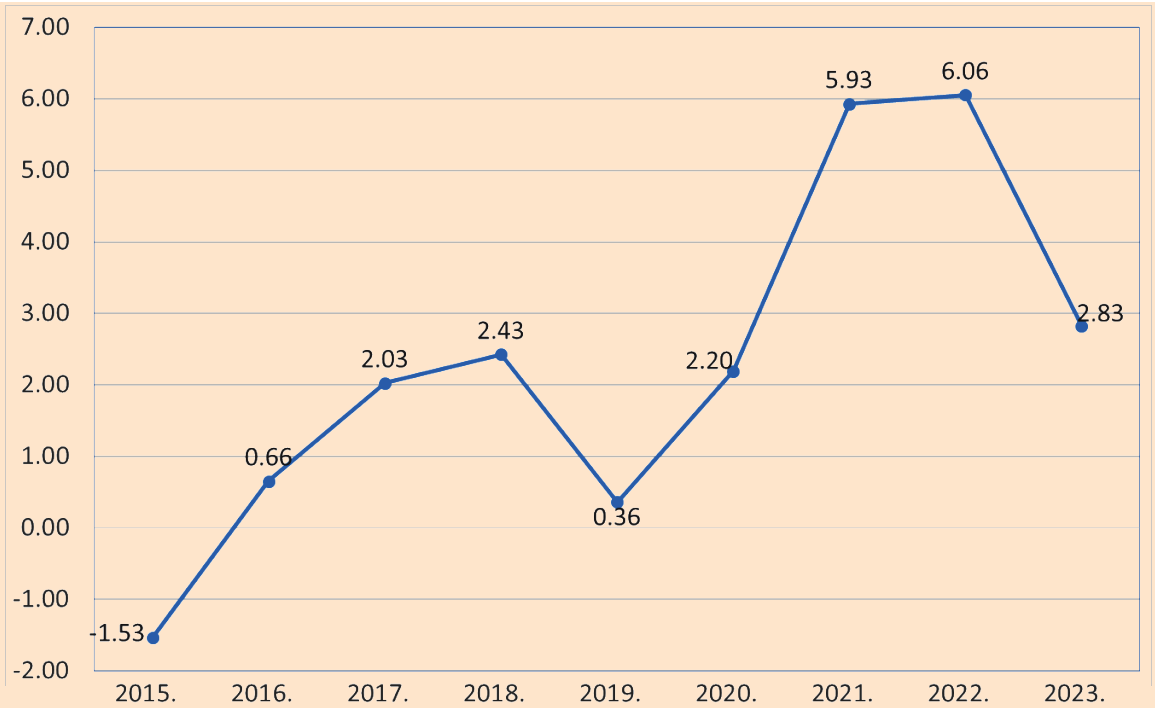
Na osnovu dinamike rasta broja medicinskih sestara i tehničara (prema stopi rasta po godinama posmatranog perioda), koja je prikazana na Grafikonu 2, uočavaju se dva dominantna intervala rasta: inicijalni period rasta (od 2014. do 2018.) i period dinamičnijeg rasta (od 2019. do 2022.). U prvom periodu, stopa ra-

Based on the growth dynamics of the number of nurses/technicians (according to the growth rate by years of the observed period), as shown in Graph 2, two dominant growth intervals can be identified: the initial growth phase (from 2014 to 2018) and a more rapid growth phase (from 2019 to 2022). In the first period, the growth rate of the number of nurses increased by

Tabela 1. Medicinske sestre/tehničari i sestre ginikološko-akušerskog smera u Crnoj Gori u periodu od 2014. do 2023. godine

Table 1. Number of nurses/technicians and gynecology-obstetrics nurses in Montenegro from 2014 to 2023

Godina / *Year*	Medicinske sestre/tehničari (broj) / *Nurses/Technicians (number)*	Medicinske sestre/tehničari (stopa na 1000 stanovnika) / *Nurses/Technicians (rate per 1,000 inhibitants)*	Medicinske sestre gin.-akušerskog smera (broj) / *Gynecology-obstetrics nurses (number)*
2014	2,935	4.72	243
2015	2,890	4.65	246
2016	2,909	4.67	228
2017	2,968	4.77	231
2018	3,040	4.89	243
2019	3,051	4.90	251
2020	3,118	5.02	256
2021	3,303	5.33	261
2022	3,503	5.68	255
2023	3,602	5.84	250



Grafikon 2. Dinamika rasta broja medicinskih sestara/tehničara u periodu od 2014. do 2023. godine

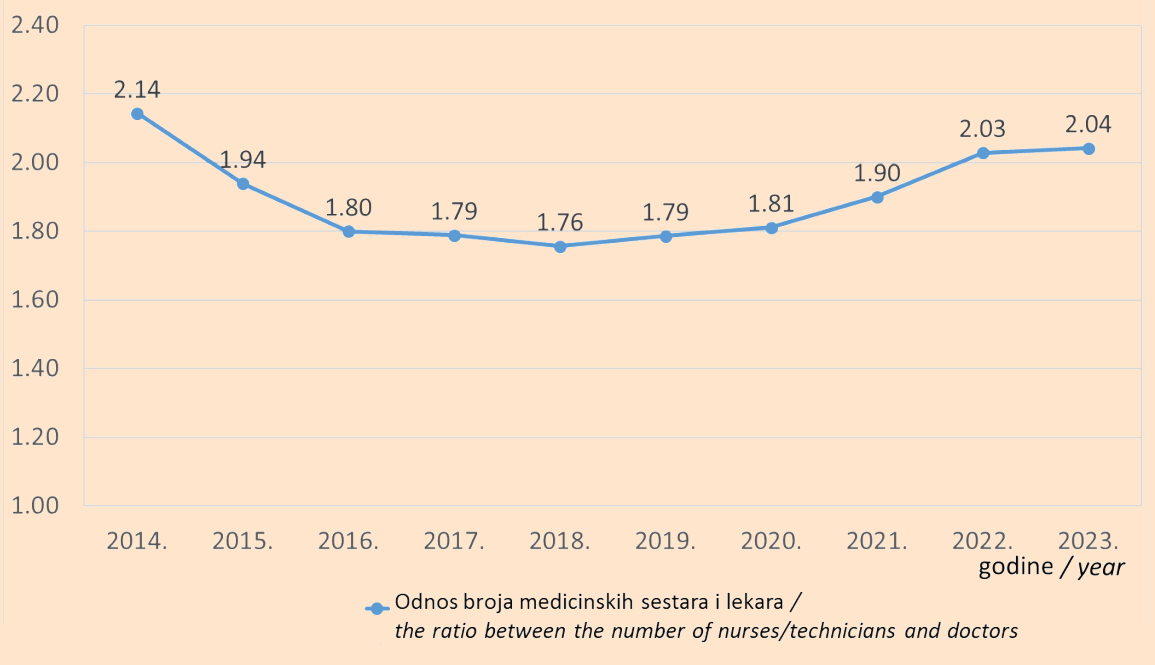
Graph 2. Growth dynamics of the number of nurses/technicians from 2014 to 2023

sta broja medicinskih sestara se povećala za 3,58%, a u drugom periodu nastavila je da raste još brže i ostvarila porast od 14,81% (Grafikon 2). Nakon 2022. godine, broj je rastao sporije, po stopi od 2,83%.

Odnos između broja medicinskih sestara i tehničara i lekara u javnim zdravstvenim ustanovama Crne Gore prikazan je na Grafikonu 3. Nakon 2014. godine

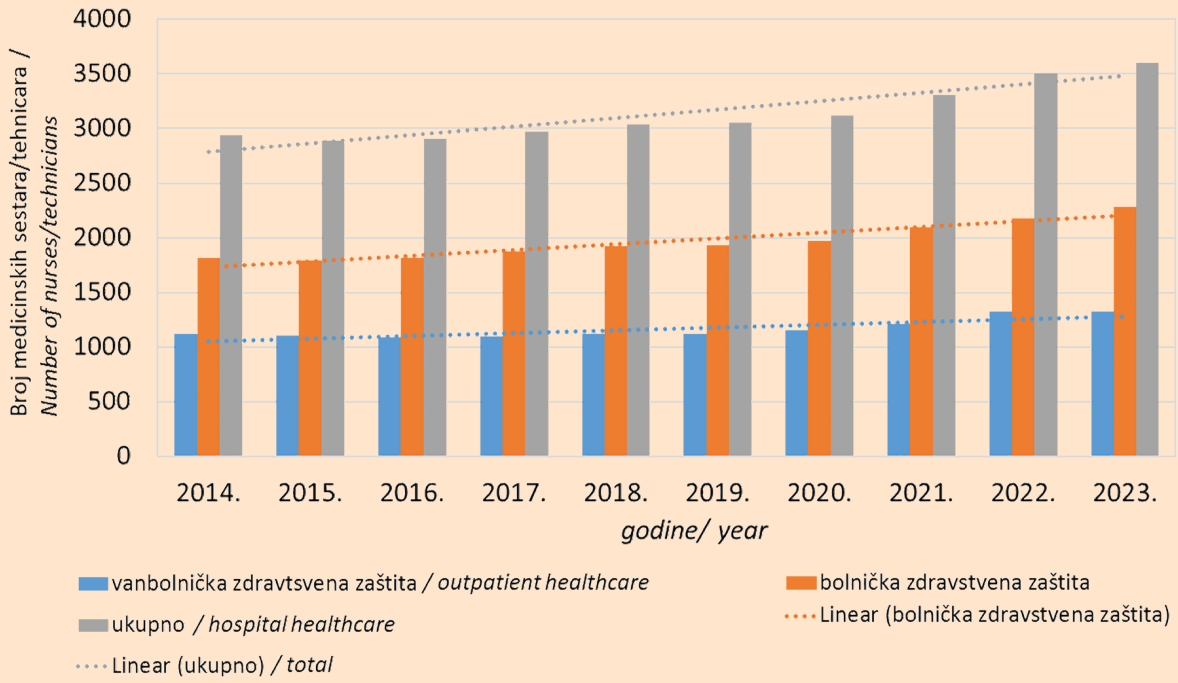
3.58%. In the second period, the growth rate accelerated further, reaching an increase of 14.81% (Graph 2). After 2022, the growth slowed, with a rate of 2.83%.

The ratio between the number of nurses/technicians and doctors in public health institutions in Montenegro is presented in Graph 3. After 2014, when the ratio was 2.14 : 1, it declined until 2018, reaching 1.76 : 1. From



Grafikon 3. Trend odnosa između broja medicinskih sestara/tehničara i lekara u Crnoj Gori u periodu od 2014. do 2023. godine

Graph 3. The trend in the ratio between the number of nurses/technicians and doctors in Montenegro from 2014 to 2023



Grafikon 4. Promene u distribuciji medicinskih sestara/tehničara u bolničkoj zdravstvenoj zaštiti, vanbolničkoj i u ukupnom broju u Crnoj Gori u periodu od 2014. do 2023. godine

Graph 4. Changes in the distribution of nurses/technicians across hospital healthcare, outpatient healthcare, and the total workforce in Montenegro from 2014 to 2023

Tabela 2. Medicinske sestre/tehničari po dobnim grupama i polu u javnim zdravstvenim ustanovama u Crnoj Gori, u 2014., 2019. i 2023. godini

Table 2. Nurses/Technicians by age group and gender in public health institutions in Montenegro: 2014, 2019, and 2023

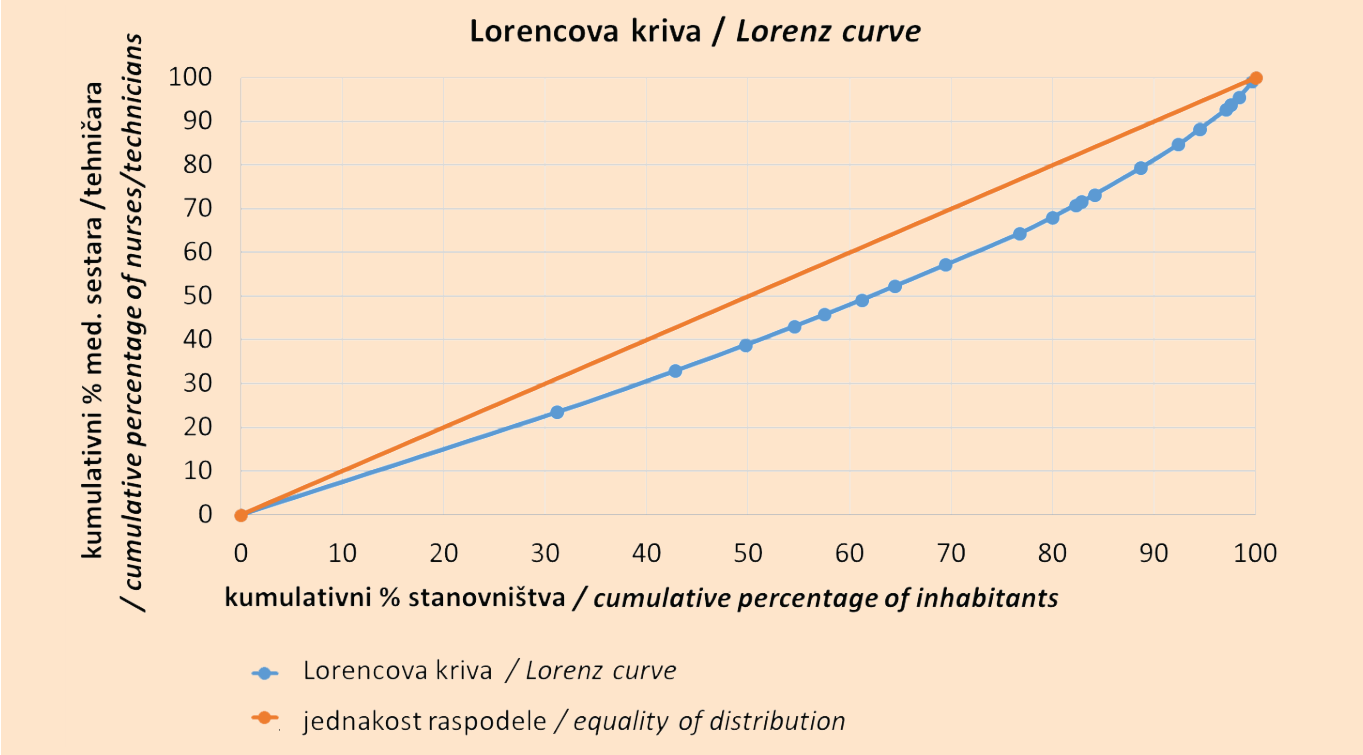
Medicinske sestre/tehničari / *Nurses/Technicians*	2014		2019		2023	
	Broj / *Number*	%	Broj / *Number*	%	Broj / *Number*	%
< 34	737	25.1	876	28.7	1,000	27.8
35–44	721	24.6	729	23.9	1,158	32.1
45–54	1,031	35.1	733	24	610	16.9
55 +	446	15.2	713	23.4	834	23.2
Ukupno / *Total*	2,935	100	3,051	100	3,602	100
Pol / *Gender*						
muški / *Male*	379	12.91	480	15.73	673	18.68
ženski / *Female*	2,556	87.09	2571	84.27	2929	81.32
Ukupno / *Total*	2,935	100	3051	100	3602	100
Nivo obrazovanja / *Education*						
visoka i viša SS / *higher*	229	7.8	411	13.5	771	21.4
srednja SS / *secondary*	2,706	92.2	2,640	86.5	2,832	78.6
Ukupno / *Total*	2,935	100	3,051	100	3,602	100

kada je ovaj odnos iznosio 2,14 : 1, dolazi do pada u periodu do 2018. godine (odnos 1,76 : 1), a zatim do blagog rasta u periodu do 2023. godine kada je dostignuto 2,04 : 1.

U 2023. godini najveći broj zaposlenih medicinskih sestara i tehničara (63,33%) radio je u bolničkoj zdrav-

2018 to 2023, the ratio showed a slight increase, reaching 2.04 : 1 by the end of the period.

In 2023, the majority of employed nurses/technicians (63.33%) worked in hospital healthcare, while 36.67% were employed in outpatient healthcare. This distribution has shifted slightly compared to 2014,



Grafikon 5. Nejednakost raspodele medicinskih sestara/tehničara u zdravstvenim ustanovama u Crnoj Gori u 2023. godini

Graph 5. Inequality in the distribution of nurses/technicians across health institutions in Montenegro in 2023

stvenoj zaštiti, dok je 36,67% radilo u vanbolničkoj. Zastupljenost broja medicinskih sestara i tehničara neznatno se promenila u odnosu na 2014. godinu, kada je navedeni odnos iznosio 61,91% : 38,09% u korist bolničke zdravstvene zaštite (Grafikon 4).

Najveći broj medicinskih sestara i tehničara je u 2023. godini bilo u dobnoj grupi 35-44 godina starosti. Broj medicinskih sestara i tehničara te životne dobi je u periodu od 2014. godine bio u porastu, isto kao i broj medicinskih sestara i tehničara u dobnim grupama do 34 godine starosti i u dobnoj grupi 55 i više godina. Istovremeno, smanjio se broj medicinskih sestara u dobnoj grupi 45-54 godina starosti. Među medicinskim sestrama i tehničarima u javnim zdravstvenim ustanovama dominirale su osobe ženskog pola u svim godinama posmatranog perioda. Udeo zaposlenih muškog pola se povećao sa 12,91 u 2014. godini na 18,68 u 2023. godini (Tabela 2). Udeo medicinskih sestara i tehničara sa visokom/višom školskom spremom se povećao sa 7,8% u 2014. godini na 21,4% u 2023. godini. Taj broj obuhvatio je medicinske sestre i tehničare koji su stekli diplomu četvorogodišnjih, trogodišnjih studija i više škole (dvogodišnje).

Kako bismo ispitali ujednačenost raspodele medicinskih sestara i tehničara u 22 opštine u Crnoj Gori, a u odnosu na broj stanovnika, izračunat je Gini koeficijent za početnu i krajnju godinu posmatranog vremenskog intervala. Gini koeficijent koji se odnosi na nejednakost

when the ratio was 61.91% in favor of hospital healthcare and 38.09% in outpatient care (Graph 4).

In 2023, the largest proportion of nurses/technicians belonged to the 35-44 age group. The number of nurses/technicians in the 35-44 age group has been increasing since 2014, along with the number in the up-to-34 and 55-and-older age groups. At the same time, the number of nurses in the 45-54 age group decreased. In public health institutions, females consistently dominated among nurses/technicians throughout the observed period. However, the proportion of male employees increased from 12.91% in 2014 to 18.68% in 2023 (Table 2). The proportion of nurses/technicians with higher education increased from 7.8% in 2014 to 21.4% in 2023. This category includes nurses/technicians who completed four-year and three-year degree programs, as well as those with a two-year higher education diploma.

To assess the uniformity of the distribution of nurses/technicians across the 22 municipalities in Montenegro relative to the population size, the Gini coefficient was calculated for the start and end years of the observed period. The Gini coefficient, which measures the inequality of this distribution, decreased from 0.195 in 2014 to 0.191 in 2023. The distribution for the final year of the period is visually represented in the graph, using the Lorenz curve.

raspodele medicinskih sestara i tehničara se smanjio sa 0,195 u 2014. godini na 0,191 u 2023. godini. Navedena raspodela za poslednju godinu tog perioda je grafički prikazana na grafikonu prikazom Lorencove krive.

DISKUSIJA

U periodu od 2014. do 2023. godine sumiraju se rezultati reforme zdravstvenog sistema Crne Gore, u kojoj je broj medicinskih sestara i tehničara značajno redukovan. Iako strateška dokumenta nisu predviđala da će broj medicinskih sestara i tehničara rasti, već ostati konstantan, njihov broj je u navedenom periodu konstantno rastao i ukupno se povećao za skoro četvrtinu. Porast broja medicinskih sestara i tehničara u sistemu je bio neophodan kako bi se odgovorilo na porast potražnje uzrokovane globalnim izazovima koji nisu zaobišli Crnu Goru, kao što su demografske promene (starenje stanovništva, nizak natalitet), porast hroničnih nezaraznih bolesti, zdravstvene krize, i drugo.

Uprkos porastu, stopa obezbeđenosti medicinskim sestrama i tehničarima u Crnoj Gori je i dalje relativno niska ako se uporedi sa evropskim zemljama. U većini zemalja EU je u periodu od 2010. do 2020. godine takođe došlo do porasta stope obezbeđenosti medicinskim sestrama, posebno u Finskoj, Irskoj i Nemačkoj, koje imaju i najveće stope obezbeđenosti navedenim kadrom, a prosečno je u zemljama EU stopa iznosila 8 na 1000 stanovnika [12]. Među zemljama regiona Jugoistočne Evrope, slične stope obezbeđenosti medicinskim sestrama i tehničarima onima u Crnoj Gori u 2022. godine prijavile su Srbija i Severna Makedonija [12]. Poznato je da je interpretacija i uporedivost međunarodno prikupljenih podataka o ljudskim resursima u velikoj meri otežana usled razlika među zemljama u pogledu organizacije zdravstvenog sistema i izveštavanja.

Druga značajna odrednica perioda koji smo posmatrali je pandemija izazvana Kovidom 19. Zemlje koje su imale značajno niže stope obezbeđenosti medicinskim sestrama i tehničarima imale su u vreme pandemije izazvane Kovidom 19 veće probleme usled izgaranja postojećeg kadra, lošijeg kvaliteta usluga koje su pružali i veću stopu odliva iz sistema [13]. U Crnoj Gori pandemija je uticala na porast potražnje medinskih sestara i tehničara, na šta ukazuje ubrzanje stope njihovog rasta. U pandemijskim godinama desile su se velike promene na primarnom nivou zdravstvene zaštite u pogledu transformacije modela pružanja usluga i upravljanja, što je verovatno doprinelo tome da potrebe za kadrom budu još veće. Kako bi se sprečile migracije i zadržali zdravstveni radnici u zdravstvenom sistemu, na nacionalnom nivou su implementirane *ad hoc* mere povećanja plata zdravstvenim radnicima, poboljšani uslovi rada (nova oprema, modernizacija pro-

DISCUSSION

Between 2014 and 2023, the outcomes of Montenegro's healthcare system reform were evaluated, revealing a significant reduction in the number of nurses and technicians. Although the strategic documents projected that the number of nurses and technicians would remain constant, their numbers consistently increased during the specified period, ultimately growing by nearly a quarter. The increase in the number of nurses and technicians within the system became essential to address the rising demand driven by global challenges affecting Montenegro. These included demographic shifts such as an aging population and low birth rates, a surge in chronic non-communicable diseases, health crises, and other emerging issues.

Despite the increase, the distribution of nursing workforce in Montenegro remains relatively low compared to European standards. Between 2010 and 2020, most EU countries also experienced an increase in the distribution of nursing workforce, with Finland, Ireland, and Germany leading the way, having the highest ratios. On average, the nurse-to-population ratio in EU countries during this period was 8 per 1,000 inhabitants [12]. In 2022, Serbia and North Macedonia reported the distribution of nursing workforce comparable to that of Montenegro among countries in the Southeast European region [12]. The interpretation and comparability of internationally collected data on healthcare human resources are challenging, largely due to differences in health system organization and reporting practices across countries.

Another key factor during the observed period was the COVID-19 pandemic. Countries with significantly lower density of nursing personnel faced greater challenges, including increased staff burnout, a decline in the quality of services provided, and higher attrition rates within the healthcare system [13]. In Montenegro, the pandemic led to a significant increase in the demand for nurses and technicians, which was reflected in the accelerated growth rate of their numbers. During the pandemic years, significant changes occurred at the primary healthcare level, including transformations in service delivery and management models, which likely contributed to an even greater need for staffing. To prevent migration and retain healthcare workers within the system, the government implemented *ad hoc* measures, including salary increases for health workers, improvements in working conditions (such as new equipment and the modernization of work processes), and educational programs at the state university

cesa rada), i uvedeni edukativni programi na državnom univerzitetu. Porast broja radno angažovanih medicinskih sestara i tehničara uticao je na popravljanje odnosa broja medicinskih sestara i tehničara i lekara, koji je bio u padu nakon reformskih aktivnosti iz prethodnog perioda. Time se ovaj odnos primakao proseku EU iz 2020. godine koji je iznosio nešto više od dve medicinske sestre i tehničara po lekaru [12,14], a bio je veći od proseka u nekim zemljama regiona [15].

Medicinske sestre i tehničari su dominantno zaposleni u bolničkoj zdravstvenoj zaštiti, dok oko trećina medicinskih sestara radi u vanbolničkoj zdravstvenoj zaštiti. Njihova dinamika rasta u desetogodišnjem periodu ukazuje na blagu tendenciju jačanja ponude radne snage medicinskih sestara i tehničara u bolničkoj zdravstvenoj zaštiti. Najveći broj medicinskih sestara i tehničara je srednje životne dobi, što je rezultat zapošljavanja, posebno u pandemijskim godinama. Ipak, najstariji među njima (starosti 55+) čine skoro četvrtinu, što je lošije od proseka zemalja EU [16].

Kao i u velikom broju zemalja regiona i šire, žene su dominanirale u profesiji medicinskih sestara u odnosu na medicinske tehničare, u svim godinama posmatranog perioda. To se posebno odnosi na medicinske sestre ginekološko-akušerskog smera, gde su isključivo zastupljene žene. Ipak, kako je u posmatranoj dekadi potražnja ovih profila u porastu i kako se poboljšavaju uslovi rada, broj angažovanih izvršilaca muškog pola konstantno raste. Posledično, pandemija izazvana Kovidom 19 u Crnoj Gori nije produbila postojeći jaz i nejednakost u zastupljenosti polova, kao što je bio slučaj u drugim zemljama [17].

Obrazovna struktura zaposlenih medicinskih sestara i tehničara se u posmatranoj dekadi promenila, pa sada petina medicinskih sestara i tehničara koji su zaposleni u zdravstvenim ustanovama ima diplomu više ili visoke škole. Tome je doprinela ekspanzija edukativnih programa: osnovnih (Visoka medicinska škola i Primenjena fizioterapija), specijalističkih i master studija (Zdravstvena nega i Fizioterapija) na državnom medicinskom fakultetu, koje mogu upisati medicinske sestre i tehničari sa završenim srednjoškolskim obrazovanjem.

Pitanje jednakosti raspodele medicinskih sestara i tehničara je od posebnog značaja za obezbeđivanje dostupnosti i pristupačnosti zdravstvene zaštite. U Crnoj Gori postoji relativno visok nivo jednakosti distribucije medicinskih sestara i tehničara u odnosu na stanovništvo po opštinama. Tome je verovatno doprinelo već pomenuto povećanje stopa obezbeđenosti. Slična istraživanja (ne)jednakosti raspodele raznih profila zdravstvenih radnika sprovedena su u raznim zemljama. Istraživanje koje je sprovedeno u Kini pokazalo je da je došlo do pogoršanja u ostvarenom nivou jednalevel. The increase in the number of employed nurses and technicians helped improve the nurse-to-doctor ratio, which had been declining following the reform activities of the previous period. As a result, this ratio approached the EU average from 2020, which was slightly over two nurses/technicians per doctor [12,14], and was higher than the average in several countries in the region [15].

Nurses and technicians are predominantly employed in hospital healthcare, with approximately one-third working in outpatient care. The growth trends over the past decade indicate a slight shift toward strengthening the labor supply of nurses and technicians in hospital settings. The majority of nurses and technicians are middle-aged, reflecting the workforce expansion, particularly during the pandemic years. However, nearly a quarter of them are aged 55 and older, which is higher than the average in EU countries and presents a challenge for the workforce sustainability [16].

As in many countries in the region and beyond, women have consistently dominated the nursing profession over medical technicians throughout the observed period. This is particularly true for gynecological-obstetrical nurses, where the profession is exclusively female. However, as the demand for these roles increased over the observed decade and working conditions improved, the number of male nurses and technicians steadily grew. As a result, the COVID-19 pandemic in Montenegro did not exacerbate the existing gender gap or inequality in the profession [17].

The educational structure of employed nurses and technicians has evolved over the past decade, with one-fifth of those working in healthcare institutions now holding a higher or advanced degree. This change was supported by the expansion of educational programs, including basic courses (Medical College and Applied Physiotherapy), as well as specialized and master's studies (Nursing and Physiotherapy) at the state medical faculty. These programs are accessible to nurses and technicians who have completed their high school education.

The issue of equitable distribution of nurses and technicians is crucial for ensuring the availability and accessibility of healthcare. In Montenegro, there is a relatively high level of equality in the distribution of nurses and technicians across municipalities in relation to the population. The previously mentioned increase in the distribution of nursing workforce likely contributed to this trend. Similar studies examining the (in)equality in the distribution of various healthcare worker profiles have been conducted in several countries. Research conducted in China has shown a

kosti raspodele medicinskih sestara, na osnovu opadanja vrednosti Gini koeficijenta [18]. Istraživanja sprovedena u Poljskoj i Mongoliji utvrdila su relativno dobru jednakost distribucije medicinskih sestara u odnosu na populaciju, na osnovu vrednosti Gini koeficijenta u periodu od 2010. do 2017. godine [19,20].

Treba sprovesti dodatna istraživanja kako bi se ispitale zdravstvene potrebe stanovništva, pošto se u Crnoj Gori ne sprovode takva redovna istraživanja. Za proces planiranja, važno bi bilo sprovesti i istraživanja o migracijama medicinskih sestara i tehničara u zemlje regiona i EU, budući da su navedeni podaci oskudni ili ne postoje. Kvalitetni podaci o ljudskim resursima neophodan su preduslov za vođenje politike zasnovane na dokazima, pa je od suštinske važnosti da zdravstvene vlasti prepoznaju značaj uspostavljanja mehanizama koji će obezbediti ažurnu i potpuniju evidenciju.

Ovo istraživanje nije obuhvatilo medicinske sestre i tehničare koji rade u privatnom sektoru, a koji je poslednjih godina u ekspanziji u Crnoj Gori, posebno nakon pandemije izazvane Kovidom 19. Takođe nisu obuhvaćene medicinske sestre i tehničari zaposleni u državnim zatvorima, policiji, vojnim, predškolskim i ustanovama socijalne zaštite. Međutim, ovde treba uzeti u obzir činjenicu da ne mali broj medicinskih sestara koje su zaposlene u državnim zdravstvenim ustanovama, imaju istovremeno dopunski radni angažman u privatnim ustanovama. Medicinske sestre i tehničari koji rade u jedinicama za hitnu medicinsku pomoć u svim opštinama nisu obuhvaćeni prilikom izračunavanja Gini koeficijenta.

ZAKLJUČAK

U proteklom periodu desile su se značajne promene u segmentu zdravstvene radne snage koji čine medicinske sestre i tehničari: došlo je do porasta u ukupnom broju, popravljen je odnos medicinskih sestara u odnosu na lekare, kao i među polovima zastupljenim u profesiji. Došlo je do poboljšanja u domenu obrazovanja medicinskih sestara i tehničara, a smanjene su nejednakosti u njihovoj raspodeli u odnosu na stanovništvo po opštinama. Navedene promene bi mogle da budu u velikoj meri povezane sa odgovorom zemlje na krizu uzrokovanu pandemijom usled Kovida 19. Ipak, stopa obezbeđenosti je u poređenju sa prosekom zemalja EU i dalje relativno niska, kao i udeo sestara sa visokim obrazovanjem, a raspoloživi podaci o ljudskim resusima su ograničeni. Kako bi se mogle donositi adekvatne odluke zasnovane na dokazima, potrebno je raspolagati što potpunijim i ažurnijim podacima o ljudskim resursima na nivou čitavog zdravstvenog sistema.

Sukob interesa: Nije prijavljen.

decline in the level of equality in the distribution of nurses, as evidenced by a decrease in the Gini coefficient [18]. Research conducted in Poland and Mongolia found a relatively high level of equality in the distribution of nurses relative to the population, based on the Gini coefficient, during the period from 2010 to 2017 [19,20].

Additional research is needed to assess the health needs of the population, as such regular studies are not conducted in Montenegro. For effective planning, it is also crucial to investigate the migration patterns of nurses and technicians to regional and EU countries, as data on this topic is either scarce or nonexistent. Quality data on human resources is a critical prerequisite for evidence-based policymaking. Therefore, it is essential for health authorities to recognize the importance of establishing mechanisms that ensure up-to-date and comprehensive records.

This research did not include nurses and technicians working in the private sector, which has been expanding in Montenegro in recent years, particularly after the COVID-19 pandemic. It also excluded those employed in state prisons, the police, military, preschool, and social protection institutions. However, it is important to consider that a significant number of nurses employed in state healthcare institutions also work part-time in private institutions. Additionally, nurses and technicians working in emergency medical aid units across all municipalities are not included in the calculation of the Gini coefficient.

CONCLUSION

In recent years, there have been significant changes in the health workforce segment comprising nurses and technicians: the total number has increased, the nurse-to-doctor ratio has improved, and there has been greater gender representation within the profession. There has been significant progress in the education of nurses and technicians, and inequalities in their distribution across municipalities have been reduced. These changes are largely attributed to the country's response to the crisis caused by the COVID-19 pandemic. However, the density of nursing workforce remains relatively low compared to the EU average, as does the proportion of nurses with higher education, while available data on human resources remains limited. To make informed decisions based on evidence, it is essential to have comprehensive and up-to-date data on human resources across the entire health system.

Conflict of interest: None declared.

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