SIPOC METODA OPTIMIZACIJE KLINIČKOG PROCESA U AKUŠERSTVU

PREGLEDNI RAD

REVIEW ARTICLE

SIPOC METHOD OF OPTIMIZING THE CLINICAL PROCESS IN OBSTETRICS

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SAŽETAK

Brzina pružanja usluga pacijentima direktno utiče na uspeh zdravstvenih organizacija. U tom pogledu, implementacija savremenih koncepata u zdravstvenim organizacijama predstavlja sinonim za uspeh.

Predmet istraživanja: Predmet istraživanja ovog rada je mogućnost primene *SIPOC* metode na klinički proces u akušerstvu. Preciznije, primena navedene metode značila bi brže odvijanje aktivnosti u okviru kliničkog procesa (pregestacijsko savetovanje, antenatalna zdravstvena nega trudnica, porođaji, nadzor porodilja u periodu puerperijuma). Kroz aktivnosti navedenog kliničkog procesa nastoje se zadovoljiti zdravstvene potrebe trudnica i porodilja. Primena *SIPOC* metode nije toliko aktuelna u kliničkim procesima, posebno kliničkom procesu u akušerstvu, te stoga ovaj rad otvara jedno novo istraživačko područje.

Cilj: Cilj ovog rada jeste da ukaže na aktuelnost *SIPOC* metode, kao jednog od alata u okviru *Lean* metodologije, koji se može koristiti za unapređenje kliničkog procesa u akušerstvu.

Materijali i metode: U radu su korišćenje sledeće metode: metoda analize, induktivno – deduktivna metoda, metoda sinteze, metoda deskripcije i metoda dokazivanja. Takođe je korišćena analiza slučaja, kod primene *SIPOC* matrice u ginekološko-akušerskoj ambulanti.

Rezultati: Rezultati istraživanja su pokazali da implementacija savremenih metoda ima pozitivan uticaj na poboljšanje efikasnosti pružanja zdravstvenih usluga. *SIPOC* metoda je uticala na poboljšanje efikasnosti kliničkog procesa u akušerstvu. Na osnovu pregleda literature i dobijenih rezultata, utvrđeno je da ne postoji formalizovan koncept sa instrukcijama o implementaciji metoda poboljšanja kliničkih procesa.

Ključne reči: metode, zdravstvene usluge, akušerstvo

ABSTRACT

The promptness of providing services to patients directly affects the success of healthcare organizations. In this regard, the implementation of contemporary concepts in healthcare organizations is synonymous with success.

Subject of research: The subject being researched in this paper is the possibility of applying the SIPOC method to the clinical process in obstetrics. A more precise application of the abovementioned method would mean a prompter implementation of activities within the clinical process (pregestational counseling, antenatal care of expectant mothers, deliveries, supervision of women during puerperium). Through the activities of the abovementioned clinical process, an effort is made to meet the health needs of expectant and new mothers. The application of the SIPOC method is not sufficiently present in clinical processes, especially the clinical process in obstetrics, and therefore this paper opens a new research area.

Aim: The aim of this paper is to indicate the relevance of the SIPOC method as one of the tools within the Lean methodology, which can be used to improve the clinical process in obstetrics.

Materials and methods: The following materials and methods were applied in this study: the method of analysis, the inductive – deductive method, the method of synthesis, the method of description, the method of proof. Case analysis was also used in the application of the SIPOC matrix at a gynecology and obstetrics outpatient clinic.

Results: The results of the research showed that there was a positive impact on improving the efficiency of the provision of health services, through the implementation of modern methods. The SIPOC method affected the improvement of the efficiency of the clinical process in obstetrics. The review of the literature and the obtained results revealed that there is no formalized concept with instructions on the implementation of clinical process improvement methods.

Keywords: methods, health services, obstetrics

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UVOD

Tematika implementacije savremenih modela na nivou tercijarne zdravstvene zaštite posebno je aktuelna. *SIPOC* metoda (engl. *suppliers, inputs, process, outputs, customers – SIPOC*) našla je primenu u upravljanju različitim organizacijama [1,2], a izazov je da se ona primeni i u organizacijama zdravstvene zaštite. Primena u oblasti ginekologije i akušerstva bi se zasnivala na dosadašnjim činjenicama o svrsi i načinima implementacije [3], te obogatila saznanjima stečenim iz lokalnog iskustva [4], što može biti posebno značajno za unapređenje performansi zdravstvenih ustanova tokom javnozdravstvenih kriza, kao što je pandemija KOVID-19 oboljenja [5].

Povećanje potreba za što bržim, jeftinijim i kvalitetnijim uslugama zdravstvenog sektora, a u uslovima ograničenih resursa, pred tercijarnu zdravstvenu zaštitu postavlja nužnost traženja i primene novih modela i alata usmerenih ka poboljšanju funkcionisanja sistema. Zbog toga smatramo da dato istraživačko područje ima opravdanost i predstavlja izazov za istraživače. Imajući u vidu korisnike usluga kliničkog procesa u akušerstvu (trudnice i porodilje), posebno je značajno unapređenje efikasnosti kroz implementaciju savremenih modela. Klinički proces u akušerstvu obuhvata sledeće aktivnosti: pregestacijsko savetovanje, antenatalnu zdravstvenu negu trudnica (ultrazvučna dijagnostika, fizikalni pregled, praćenje hematoloških i biohemijskih analiza kod trudnica), porođaje, nadzor porodilja u periodu puerperijuma. Za klinički proces sa takvim nizom aktivnosti, smatramo da je primena savremenih modela unapređenja neophodna.

U nastavku rada biće predstavljena optimizacija kliničkog procesa u akušerstvu primenom *SIPOC* metoda. Sama implementacija podrazumeva sledeće korake: definisanje isporučilaca usluge (lekari i ostalo osoblje), ulaza (trudnice, porodilje sa svojim kliničkim slikama), procesa (pregledi, terapije), izlaza (zdravstveno stanje trudnica i porodilja).

MATERIJALI I METODE

Prilikom izrade rada, podaci su prikupljani iz najnovijih relevantnih naučnih članaka i knjiga, te su analizirani zdravstveni sistemi koji su primenjivali savremene koncepte optimizacije kliničkih procesa.

Metode korišćene u ovom radu su iz grupe analitičkih i sintetičkih.

Metoda analize je korišćena u svrhu analize dostupne literature koja se bavi datim predmetom istraživanja, te u svrhu analize dobijenih rezultata istraživanja.

Induktivna metoda je korišćena kao postupak logičkog zaključivanja, na osnovu analize problema istraživanja i rezultata istraživanja.

INTRODUCTION

The issue of implementing contemporary models at the tertiary level of healthcare is currently a particularly relevant topic. The SIPOC method (suppliers, inputs, process, outputs, customers) has found its application in the management of different organizations [1,2], and the challenge is implementing this method in healthcare organizations. Its implementation in the gynecology and obstetrics field would be based on the data available so far regarding the purpose and the manner of implementation [3], and would further be enhanced by the knowledge obtained from local experience [4], which can be especially significant for improving the performance of healthcare institutions during public health crises, such as the COVID-19 pandemic [5].

The increase in the demand for the promptest, least costly services of the best possible quality in the healthcare sector, with limited resources, places before tertiary healthcare the necessity of finding and applying new models and tools aimed at improving the functioning of the system. This is why we feel that the research area in question has merit and is a challenge for researchers. Bearing in mind the service users in the clinical process in obstetrics (expectant and new mothers), the improvement of efficiency through the implementation of contemporary models is especially important. The clinical process in obstetrics encompasses the following activities: pregestational counseling, antenatal care of expectant mothers (ultrasound diagnostics, physical examination, monitoring hematological and biochemical test results in expectant mothers), deliveries, supervision of women during puerperium. We feel that, for a clinical process involving such a set of activities, the application of contemporary improvement models is necessary.

The paper will further present the optimization of the clinical process in obstetrics through the application of the SIPOC method. The implementation of the method itself, includes the following steps: defining the service suppliers (doctors and other medical staff), the inputs (expectant and new mothers with their clinical presentations), the processes (examinations, therapies), the outputs (health status of expectant and new mothers).

MATERIALS AND METHODS

As a part of this study, data were collected from the latest relevant research articles and books, and healthcare systems implementing the contemporary concepts of optimizing clinical processes were analyzed.

The methods employed in this study belong to the analytical and the synthetic group.

The method of analysis was applied in analyzing available literature dealing with the subject of this study, as well as for analyzing the results obtained in the research.

Deduktivna metoda je korišćena kod donošenja zaključaka o tome da li je postignut cilj istraživanja i donošenja opštih zaključaka do kojih se došlo tokom istraživanja.

Metoda sinteze je korišćena kako bi se svi elementi povezali u integralnu celinu i došlo do generalnog zaključka rada.

Deskriptivna metoda je korišćena kod opisa procesa.

PREGLED RANIJIH ISTRAŽIVANJA

U samom pregledu istraživanja, navešćemo najznačajnija istraživanja u okviru *Lean* metodologije, sa fokusom na *SIPOC* metodu. Smatramo to značajnijim, jer je *SIPOC* samo jedna od metoda u okviru navedene metodologije. *Lean* predstavlja čitav jedan koncept, a *SIPOC* je samo metoda koja je posledica primene *Lean* metodologije. Drugi razlog je taj što se kroz *Lean* metodologiju i njene efekte može jasno ukazati na neophodnost implementacije savremenih modela u zdravstvenim organizacijama.

Istraživanje Diksona i saradnika [6], o upotrebi *Lean* metodologije na odeljenjima hitne pomoći četiri državne bolnice u Masačusetsu, Vusteru, Orlandu i Ajova Sitiju, pokazalo je da se, uz pomoć primene *Lean* metodologije, smanjilo čekanje pacijenata. Smanjeno čekanje je direktno uticalo na povećanje zadovoljstva pacijenata.

Istraživanje, koje je sprovela Zoi Radnor [7], pokazalo je da je primenom ove metodologije u bolnici *Scotland Cancer Treatment Center,* smanjeno čekanje pacijenta na preglede, te da je unapređen protok pacijenta kroz sistem pružanja usluge za 48%.

Na osnovu pregleda literature koja se bavi predmetom istraživanja rada, formulisana je hipoteza istraživanja: primenom *SIPOC* metode može se pozitivno uticati na efikasnost kliničkog procesa u akušerstvu.

Kako bi se postigao cilj istraživanja i dokazala postavljena hipoteza, biće prikazana matrica implementacije *SIPOC* metode u kliničkom procesu u akušerstvu.

Mogućnosti primene savremenih modela u zdravstvu

Brojni su izazovi sa kojima se susreću zdravstvene institucije prilikom implementacije savremenih modela. Postoji mnogo nejasnoća kada je u pitanju utvrđivanje vrednosti u zdravstvu. Specifičnost kod određivanja vrednosti u zdravstvu je ta što pacijenti ne mogu u potpunosti da razumeju obim dobijene usluge, kao ni trošak koji prati pruženu uslugu. Najveći izazov primene savremenih modela u zdravstvu jeste da se pronađe način da se poboljša usluga koja se pruža pacijentima.

Implementacija savremenih modela nije jednostavan zadatak ali može dovesti do toga da zdravstvene

The inductive method was used as the process for logical deduction, based on the analysis of the research problem and research results.

The deductive method was applied in reaching conclusions on whether the aim of the study had been achieved and in reaching general conclusions resulting from the research.

The method of synthesis was used in order to connect all elements into an integral whole and for the purpose of reaching a general conclusion of the study.

The descriptive method was used in describing processes.

REVIEW OF EARLIER RESEARCH

In the review of previous studies, we will describe the most important research within the Lean methodology, with a focus on the SIPOC method. We believe this to be important, as SIPOC is merely one of the methods within the Lean methodology. Lean represents an entire concept, while SIPOC is just a method stemming from the implementation of the Lean methodology. Another reason is that, through Lean methodology and its effects, it is possible to clearly point out the necessity of implementing contemporary models in healthcare organizations.

A study by Dickson et al. [6], on the implementation of the Lean methodology at the emergency departments of four public hospitals in Massachusetts, Worchester, Orlando, and Iowa City, showed that, with the help of the Lean methodology, the patients' waiting time was reduced. The decreased waiting time directly affected the increase in the satisfaction of the patients.

A study by Zoe Radnor [7] showed that the implementation of this methodology at the Scotland Cancer Treatment Center resulted in a reduction of the time patients waited for examinations, as well as in the improvement of patient flow through the system of service provision by 48%.

Based on the review of the literature dealing with the research topic of the present study, a research hypothesis was formulated: the application of the SIPOC method can positively affect the efficiency of the clinical process in obstetrics.

In order to achieve the research goal and prove the proposed hypothesis, the matrix of implementing the SIPOC method in the clinical process in obstetrics will be presented.

Opportunities for implementing contemporary models in healthcare

There are many challenges which healthcare institutions face when implementing contemporary models. There are many unclear issues when it comes to determining values in healthcare. A particularity of deter-

organizacije unaprede svoje poslovanje i rezultate, smanje troškove, te povećaju zadovoljstvo pacijenata. Očekivana poboljšanja koja nastaju implementacijom modela su: za pacijente, za zdravstvene radnike, za zdravstvene ustanove. Iako sama implementacija nije jednostavna, dobiti prikazane u nastavku ukazuju na neophodnost implementacije datih modela.

Za pacijente [8]:

- Smanjenje dužine boravka u ustanovi
- Povećanje zadovoljstva
- Smanjenje vremena čekanja
- Povećanje kvaliteta usluge
- Smanjenje broja grešaka
- Poboljšanje protoka informacija
- Za zdravstvene radnike [9]:
- Eliminisanje rasipanja
- Smanjenje količine prekovremenog rada
- Smanjenje obima posla
- Povećanje zadovoljstva
- Mirnije i organizovanije radno okruženje

Za zdravstvene ustanove [10]:

- Smanjenje inventara
- Povećanje broja pregleda pacijenata
- Smanjenje troškova
- Poboljšanje protoka informacija

Mogućnosti primene *SIPOC* metode u kliničkom procesu u akušerstvu

Primena *SIPOC* modela u kliničkom procesu u akušerstvu omogućava da se unapredi kvalitet usluga koje ovaj proces obuhvata, te da se što efikasnije zadovolje potrebe trudnica i porodilja. Uspešnost primene *SIPOC* metode u datom kliničkom procesu zavisi od podrške uprave/rukovodilaca u svim aktivnostima koje su prikazane u matrici u nastavku. Implementacija *SIPOC* metode u navedenom kliničkom procesu može se zasnivati na Amblerovom stavu. Prema navedenom autoru, neophodno je identifikovati nosioce elemenata modela, polazeći od njegovog determinisanog konstrukta, koji obuhvata pet delova [11], a to su:

(a) isporučioci
(b) ulazi
(c) proces
(d) izlazi
(e) korisnici.

Ključne pripremne aktivnosti, pre definisanja delova modela jesu:

1. Misija
2. Granice procesa
3. Rezultati

Misija: Proces praćenja trudnica kroz ključne aktivnosti kliničkog procesa, sve do zbrinjavanja porodilja,

mining value in healthcare lies in the fact that patients cannot completely comprehend the entire scope of the service provided, nor the expenditure of the said service. The greatest challenge of implementing contemporary models in healthcare is finding a way to improve service for patients.

The implementation of contemporary models is not a simple task, but it can help healthcare organizations improve their operation and results, reduce costs, as well as increase patient satisfaction. The expected improvements resulting from the implementation of the model are intended for: patients, healthcare workers, healthcare institutions. Although the implementation itself is not simple, the benefits that will be presented in the following paragraphs indicate the necessity of implementing these models.

For patients [8]:

- Decrease in the time spent in hospital
- Increase in satisfaction
- Decrease in waiting time
- Improvement of service quality
- Decrease in the number of errors
- Improvement of information flow
- For healthcare workers [9]:
- Elimination of waste
- Decrease of overtime
- Decrease of the workload
- Increase in satisfaction
- A more peaceful and better organized work environment

For healthcare institutions [10]:

- Decrease in equipment
- Increase in the number of examined patients
- Decrease in costs
- Improvement of information flow

Opportunities for implementing the SIPOC method in the clinical process in obstetrics

The implementation of the SIPOC model in the clinical process in obstetrics makes it possible to improve the quality of the services that this process includes, as well as to meet the needs of expectant and new mothers in the most efficient manner. The success of SIPOC method implementation in the given clinical process depends on the support provided by the management in all the activities shown in the matrix presented further in this text. The implementation of the SIPOC method in the said clinical process may be based on Ambler's approach. According to the said author, it is necessary to identify the main elements of the model, on the basis of his predetermined construct, which includes the following five components [11]:

kroz učešće stručnog osoblja klinika za ginekologiju i akušerstvo.

Granice procesa: Ovaj proces počinje prijavljivanjem trudnice, a završava se otpustom porodilje.

Rezultati: Tim koji je uključen u procenu procesa će snimiti procese, sačiniti kartu procesa i kartu toka vrednosti, primenom *SIPOC* modela. Konačni rezultati primene savremenih alata trebalo bi da budu: smanjenje komplikacija kod trudnica, te smanjenje boravka porodilja u bolnici – od porođaja do otpusta.

S obzirom da klinički proces u akušerstvu pripada ginekologiji i akušerstvu, populaciju istraživanja su činili sledeći ispitanici: doktori medicine – specijalisti, specijalizanti, više medicinske sestre, medicinske sestre, te administrativno osoblje Klinike za ginekologiju i porodiljstvo. Ovako predložena matrica može da bude primenjiva na bilo koju kliniku za ginekologiju i porodiljstvo sa ključnim akterima: trudnice i porodilje.

Uspešnost implementacije SIPOC metode zavisi od razumevanja procesa.

Prvi korak u implementaciji ovog modela odnosi se na utvrđivanje misije procesa koji se želi unaprediti. Nakon toga se definišu elementi *SIPOC* dijagrama. Pri utvrđivanju aktivnosti za unapređenje procesa, svrsishodno je primeniti holistički pristup poboljšanja zadovoljstva uslugom na duži vremenski period. To zavisi od ljudskih resursa zdravstvenih organizacija i njihovog zadovoljstva.

(a) suppliers
(b) inputs
(c) process
(d) outputs
(e) customers.

The key preparatory activities, before defining the elements of the model, are as follows:

1. Mission
2. Limits of the process
3. Results

Mission: The process of monitoring expectant mothers throughout the key activities of the process leading to and including care for new mothers, through the participation of the medical staff of the gynecology and obstetrics departments of clinics/hospitals.

Limits of the process: This process begins with registering the expectant mother's pregnancy and ends with the new mother's discharge from hospital.

Results: The team involved in process assessment will record the processes, as well as map out the processes and the value flow, by implementing the SIPOC model. The final results of implementing contemporary tools should be, as follows: reduced complications in expectant mothers as well as reduced time in hospital for new mothers – from delivery to discharge.

As the clinical process in obstetrics is a part of gynecology and obstetrics, the following subjects made

Tabela 1. *SIPOC* matrica za klinički proces u akušerstvu

Table 1. SIPOC matrix for the clinical process in obstetrics

Podsistem / *Subsystem*	**Isporučilac (I) / *Supplier (S)***	**Ulaz (U) / *Input (I)***	**Proces (P) / *Process (P)***	**Izlaz (I) / *Output (O)***	**Korisnik (K) / *Customer (C)***
Sprovođenje programa za trudnice i porodilje / *Implementation of programs for expectant and new mothers*	Lekari i ostalo medicinsko osoblje / *Doctors and other medical personnel*	Informacije o zdravstvenom stanju trudnice / *Information on the health status of the expectant mother* Program vođenja trudnoće: 1. pregestacijsko savetovanje pacijentkinja 2. ultrazvučna dijagnostika 3. fizikalni pregled / *Regular pregnancy follow-up program* *1. pregestation counseling of patients* *2. ultrasound diagnostics* *3. physical examination*	Redovni kontrolni pregledi / *Regular medical follow-up examinations* Nadzor porodilja u periodu puerperijuma / *Supervision of women during puerperium*	Uspešno završena trudnoća / *Successfully completed pregnancy* Porođaj / *Parturition*	Trudnice / *Expectant mother*
Upravljanje / *Management*	Uprave kliničkih centara Rukovodioci u kliničkim disciplinama / *Management of clinical centers/ Heads of clinical disciplines*	Zakoni/statuti / *Laws/statutes*	Pravilnici, procedure / *Rules, procedures*	Efikasna organizacija / *Efficient organization*	Trudnice i porodilje / *Expectant mothers/ new mothers*

Izvor: Izrada autora, prema Amblerovom stavu i konstruktu SIPOC matrice, sa njenim gradivnim komponentama, primenjena na analizirani klinički proces. Za svaku komponentu SIPOC matrice navedeni su elementi i aktivnosti kliničkog procesa. /
Source: Compiled by the authors of this paper in accordance with Ambler's approach and the construct of the SIPOC matrix, with its structural components, and applied to the analyzed clinical process. The elements and activities of the clinical process have been presented for each SIPOC component.

Primeri smanjivanja rasipanja u zdravstvu i pozitivnog uticaja na efikasnost procesa u akušerstvu

Prema teoriji, klasifikovano je osam vidova gubitaka u procesima: aktivnosti koji ne povećavaju vrednost, hiperprodukcija, inventar, čekanje, nedostaci, suvišna kretanja, nepotrebni transport i nedovoljno korišćenje kapaciteta ljudskih resursa [12].

U cilju utvrđivanja stepena rasipanja resursa u procesu, neophodno je izmeriti različite aspekte u procesima [13]. U našoj studiji, merenja su izvršena po različitim grupama aktivnosti.

U prijemnoj ambulanti Klinike za ginekologiju i porodiljstvo snimljena su vremena odvijanja aktivnosti. Vreme trajanja aktivnosti variralo je i obuhvatalo je različite intervale, što se može videti u Tabeli 2.

Iz Tabele 2 se vidi veliki raspon u trajanju aktivnosti. Evidentna su čekanja (zastoji) u aktivnostima, koja su nastala kao rezultat neravnomernog trajanja aktivnosti. Ostali uzroci mogu da budu nepredviđeni ulasci pacijenata, kao i druge aktivnosti lekara, uslovljene hitnim i nepredviđenim slučajevima.

Na osnovu sprovedenih analiza i primenom metode posmatranja, postala su evidentna odstupanja između predviđenog vremena trajanja aktivnosti i stvarnog vremena trajanja zdravstvene usluge, što se direktno reflektovalo na vreme čekanja usluge. Nakon primene *SIPOC* metode, povećana je efikasnost procesa pružanja usluga.

Neki od predloga za dalja istraživanja su [14,15]:

1. Unapređenje metodologija za merenje performansi sistema u zdravstvenim ustanovama
2. Razrada simulacionih modela prilagođenih konkretnoj zdravstvenoj ustanovi

up the tested population: medical doctors – specialists, residents, nurse practitioners, nurses, and administrative staff of the Clinic of Gynecology and Obstetrics. The proposed matrix may be applicable at any gynecology and obstetrics clinic, with the following key participants: expectant and new mothers.

The success of the implementation of the SIPOC method depends on the understanding of the process. The first step in the implementation of this model relates to determining the mission of the process that we are aiming to improve. After this, the elements of the SIPOC diagram are defined. When determining the activities for improving the process it is useful to apply the holistic approach of increasing satisfaction with the service, in the long-term. This depends on the human resources of healthcare organizations and their satisfaction.

Examples of reducing wastefulness in healthcare and of positive impact on efficiency in obstetrics

According to theory, eight forms of waste in processes have been defined and classified: activities that do not increase value, hyperproduction, equipment, waiting, deficiencies, excess movement, unnecessary transport, and insufficient use of human resources capacities [12].

For the purpose of determining the degree of resource waste in the process, it is necessary to measure the different aspects within the processes [13]. In this study, measurements were made by different activity groups.

At the admitting unit of the Clinic of Gynecology and Obstetrics, the duration of performing activities was recorded. The duration (time) of the activities var-

Tabela 2. Vreme trajanja aktivnosti u kliničkom procesu

Table 2. Duration of activities in the clinical process

Redni br. / *No.*	Opis aktivnosti u okviru procesa / *Description of activities within the process*	Vreme / *Time* (min.)								Najbolje vreme / *Best time* (min.)
		1	2	3	4	5	6	7	8	
1.	Unos podataka u protokol / *Data entry into the protocol*	0:52	1:25	0:39	0:43	0:53	0:48	0:50	0:46	0:39
	Čekanje / *Waiting*	52	85	39	43	53	48	50	46	39
2.	Prozivanje pacijenta / *Calling out the patient's name*	107	10	40	344	11	54	84	37	10
	Čekanje / *Waiting*	133	51	86	35	25	128	20	254	20
3.	Obavljanje pregleda / *Performing the examination*	11:24	11:28	17:55	13:25	9:57	10:58	10:12	12:37	9:57
	Čekanje / *Waiting*	2	1	8	8	5	4	6	7	1
4.	Konsultacije i uputstva za dalje lečenje / *Consultations and instructions on further treatment*	11:28	11:31	18:07	13:35	10:04	11:05	10:20	12:46	10:04
	Čekanje / *Waiting*	2	1	8	8	5	4	6	7	1

Izvor: Izrada autora, istraživanje urađeno tehnikom posmatranja aktivnosti u prijemnoj ambulanti. /
Source: Compiled by the authors of this paper; research performed by observing activities at the admitting unit.

Tabela 3. Vreme trajanja aktivnosti nakon poboljšanja

Table 3. Duration of activities after improvement

Redni br. / *No.*	Opis aktivnosti u okviru procesa / *Description of activities within the process*	Vreme / *Time* (min.)								Najbolje vreme / *Best time* (min.)
		1	2	3	4	5	6	7	8	
1.	Unos podataka u protokol / *Data entry into the protocol*	1:23	1:56	1:54	1:43	1:46	2:09	1:42	1:57	1:23
	Čekanje / *Waiting*	28	54	53	42	48	55	31	53	28
2.	Prozivanje pacijenta/ *Calling out the patient's name*	3:58	4:52	4:43	4:48	4:44	5:22	4:53	5:17	3:58
	Čekanje / *Waiting*	10	15	10	14	18	15	20	23	10
3.	Obavljanje pregleda / *Duration of the examination*	4:02	4:56	4:46	4:50	4:47	5:24	4:56	5:19	4:02
	Čekanje / *Waiting*	0	0	0	0	0	0	0	0	0
4.	Konsultacije i uputstva za dalje lečenje / *Consultations and instructions on further treatment*	11:28	11:31	18:07	13:35	10:04	11:05	10:20	12:46	10:04
	Čekanje / *Waiting*	2	1	8	8	5	4	6	7	1

Izvor: Izrada autora, istraživanje izvršeno tehnikom posmatranja u prijemnoj ambulanti nakon poboljšanja, odnosno uvođenja sistema koji su bazirani na poboljšanju pružanja usluge pacijentima /
Source:Compiled by the authors of this paper, research performed by observing activities at the admitting unit after improvement, i.e., after the implementation of systems based on patient service improvement.

3. Identifikacija različitih problema koji utiču na vreme pružanja zdravstvene usluge
4. Identifikacija uticaja savremene opreme koja bi skratila vreme pružanja usluge
5. Identifikacija modernog informacionog sistema koji će omogućiti lakši i efikasniji rad lekarima i medicinskom osoblju.

ZAKLJUČAK

U sistemu zdravstva, primena savremenih koncepata, kao što je *SIPOC* metoda, veoma je važna iz aspekta pravovremene realizacije svih zahteva koje definiše krajnji korisnik (pacijent). Kroz istraživanje je napravljen pregled izvora koji obrađuju predmetnu oblast. Na tom osnovu napravljen je okvir za poboljšanje kliničkog procesa. Takođe su prepoznati različiti pristupi rangiranja procesa, koje treba poboljšati.

U ovom istraživanju pošlo se od pretpostavke da je, da bi se klinički proces unapredio, neophodno smanjiti greške na minimum i unaprediti pružanje usluga pacijentima kroz smanjeno čekanje. To potvrđuje osnovnu postavku metode – racionalizaciju kliničkog procesa.

Uspešnost zdravstvenih organizacija je u direktnoj korelaciji sa kvalitetom resursa kojima se usluga realizuje [16,17]. U tom smislu je neophodno koristiti alate koji omogućavaju kontrolu utroška resursa. Jedna od takvih korektivnih metoda je i *SIPOC* metoda. U konkretnom analiziranom kliničkom procesu, evidentni su zastoji i čekanja u pružanju zdravstvenih usluga, zbog čega primena *SIPOC* modela ima potpunu opravdanost. Testiranjem predloženog modela, vidi se poboljšanje, odnosno skraćivanje vremena čekanja u ied within a different range of intervals, as presented in Table 2.

Table 2 shows a wide range in the duration of the activities. Waiting, i.e., hold-ups in the activities, resulting from the uneven duration of the activities, are evident. Other causes may stem from unscheduled patients entering the doctor's office or from other activities that the doctor may become involved in as the result of emergencies or unexpected cases.

As a result of the analyses performed and the application of the method of observation, the discrepancies between the time planned for the activities and the actual time that it took for a health service to be provided became evident. This directly reflected on the waiting time. After the implementation of the SIPOC method, the efficiency of the process of service delivery was increased.

The following are some of the proposals for future research [14,15]:

1. Improving methodologies for measuring the performance of systems in healthcare institutions
2. Developing simulation models adapted to a specific healthcare institution
3. Identifying different problems that influence the time necessary to provide a health service
4. Identifying the impact of modern equipment that would shorten the time necessary for providing the health service
5. Identifying a modern information system which would enable an easier and more efficient work process for the doctors and medical personnel.

pružanju zdravstvene usluge. Uz navedeno, predlaže se primena opreme koja će unaprediti i ažurnije pružiti adekvatne informacije, te pomoći osoblju u zdravstvu da brže pruža usluge.

Buduća istraživanja trebalo bi da se usmere na ocenu efekata implementacije *SIPOC* metode u kliničkom procesu. Prema našem istraživanju [18], da se bi se postigao potpuni efekat implementacije *SIPOC* metode, neophodno je integrisati aktivnosti i procese. Integracija aktivnosti i procesa obezbeđuje jasan prikaz ulaza, procesa i rezultata.

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CONCLUSION

In the healthcare system, the implementation of contemporary concepts, such as the SIPOC method, is very important, from the aspect of timely execution of all the demands defined by the end user (patient). This study offers a review of sources dealing with this particular subject matter, which was the basis for creating a framework for improving the clinical process. Also, different approaches to ranking the processes that need to be improved, were recognized.

In this study, the initial premise was that, in order to improve the clinical process, it is necessary to minimize errors and improve service delivery through decreased waiting time. This confirms the basic premise of the method – the rationalization of the clinical process.

The success of healthcare organizations is in direct correlation with the quality of the resources used to provide services [16,17]. To that effect, it is necessary to use tools that enable the control of resource expenditure. Such a corrective method is the SIPOC method. In the particular clinical process analyzed, hold-ups and waiting are evident in the process of health service delivery, which is why the implementation of the SIPOC method is completely justified. Testing of the proposed model shows improvement, i.e., a decrease in the time that the patient spends waiting for a health service. In addition to the above stated, the application of equipment that would improve and more promptly provide necessary information, as well as help medical personnel provide prompter service, is also proposed.

Future research should focus on assessing the effects of implementing the SIPOC method in the clinical process. According to our study [18], in order to achieve the full effect of SIPOC method implementation, it is necessary to integrate activities and processes. The integration of activities and processes provides a clear outline of inputs, processes, and results.

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