

VANBOLNIČKI SRČANI ZASTOJ I MERE KARDIOPULMONALNE REANIMACIJE U SLUŽBI ZA HITNU MEDICINSKU POMOĆ PANČEVO – JEDNOGODIŠNJA ANALIZA

ORIGINALNI RAD

ORIGINAL ARTICLE

OUT-OF-HOSPITAL CARDIAC ARREST AND MEASURES OF CARDIOPULMONARY RESUSCITATION IN EMERGENCY MEDICAL SERVICE PANČEVO – ONE-YEAR ANALYSIS

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SAŽETAK

Uvod: Vanbolnički srčani zastoj (VSZ) predstavlja najurgentnije stanje sa kojim se susreću zdravstveni radnici. Primenjene mere kardiopulmonalne reanimacije (KPR) imaju za cilj uspostavljanje ROSC-a (Return of spontaneous circulation). Ciljevi ovog istraživanja su bili određivanje učestalosti VSZ, kao i demografskih karakteristika pacijenata.

Metode: Istraživanje je u vidu retrospektivne studije koja obuhvata period od 01.01.2022.-31.12.2022.godine u Službi za hitnu medicinsku pomoć Pančevo. Podaci su uzeti iz protokola kućnih poseta i poziva, a rezultati su prikazani deskriptivnom statistikom.

Rezultati: U ispitivanom jednogodišnjem periodu VSZ se javio kod 36 pacijenata. U većini su to bili muškarci (69,4%) starijeg uzrasta sa pikom u dobi 70-81 godina. Mesto zadesa je u većini slučajeva prebivalište (72,2%), a svedok laik (77,8%). Mere Basic Life Support-a (BLS) su započete kod 13,9%. Dominantni inicijalni ritam je nešokabilni kod 69,4%, a ROSC je uspostavljen kod 39%. Dispečer je prepoznao da se radi o VSZ u 75 % slučajeva. Etiologija je uglavnom kardiovaskularna kod 44,4% pacijenata. VSZ se najviše javljao tokom popodnevni sati, a najviše slučajeva je bilo u oktobru.

Zaključak: Prebivalište kao najčešće mesto zadesa i mali broj započetih mera BLS-a, kao i deo neprepoznatih VSZ od strane dispečera ukazuju na neophodnost edukacije stanovništva, kao i uvođenja jedinstvenog protokola za dispečere.

Ključne reči: VSZ, KPR, ROSC

ABSTRACT

Introduction: Out-of-hospital cardiac arrest (OHCA) is the most urgent condition that medical professionals are faced with. The applied measures of cardiopulmonary resuscitation (CPR) aim to establish the return of spontaneous circulation (ROSC). This study aimed to determine the frequency of OHCA, as well as the demographic characteristics of patients.

Methods: The research is in the form of a retrospective study in the period from January 1. 2022 - December 31. 2022. in the Emergency Medical Service of Pančevo. The data were taken from protocols of home visits and calls, and descriptive statistics presented the results.

Results: In the one-year period, OHCA occurred in 36 patients. Most were men (69.4%) of older age, with a peak at the age of 70-81 years. The place of occurrence is mostly the residence (72.2%), and the bystander is a layman (77.8%). Basic Life Support (BLS) measures were initiated in 13.9%. The dominant initial rhythm was non-shockable in 69.4%, and ROSC was established in 39%. The dispatcher recognized that 75% of the cases were OHCA. The etiology is mainly cardiovascular in 44.4% of patients. The most frequent occurrences of OHCA were during the afternoon hours, and the highest number of cases occurred in October.

Conclusion: The place of residence, as the most common place where OHCA occurs, and a small number of initiated BLS, as well as a part of the unrecognized OHCA by dispatchers indicate the necessity of educating the population, but also introducing a unique protocol for dispatchers.

Keywords: OHCA, CPR, ROSC

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UVOD

Akutni srčani zastoj (ASZ) je nagli i neočekivani prestanak cirkulacije krvi uzrokovan funkcionalnim prestankom rada srca, koji ima za posledicu gubitak svesti i prestanak disanja [1]. ASZ predstavlja najurgentnije i najdramatičnije stanje sa kojima se medicinski radnici susreću, kako u vanbolničkim, tako i u bolničkim uslovima. Na nesrećenima se primenjuje kardiopulmonalna reanimacija (KPR), koja predstavlja skup hitnih mera i postupaka kod srčanog i respiratornog zastoja sa ciljem ponovnog uspostavljanja cirkulacije i disanja [2]. Redosled i postupak radnji koji se primenjuju u tretmanu ASZ zajednički se nazivaju lanac preživljavanja, koji se sastoji iz 4 karika: rano prepoznavanje i pozivanje u pomoć, rana KPR, rana defibrilacija i rani postreanimacioni tretman. Svaka od ovih karika je podjednako važna za dobijanje pozitivnog ishoda [3]. Vreme je ključan faktor za uspešnost mera KPR. Rana primena mera KPR može utrostručiti preživljavanje kod vanbolničkog srčanog zastoja (VSZ) [4]. Uspešna reanimacija podrazumeva povratak prethodno privremeno izgubljenih životnih funkcija- disanja, svesti i srčanog rada. ROSC (return of spontaneous circulation), kao pozitivan ishod kod reanimiranih pacijenata se ispoljava palpabilnim pulsom, merljivom tenzijom, električnom aktivnosti srca spojivom sa životom ili prisustvom pokreta kod pacijenta [5]. Učestalost, etiologija i smrtnost od VSZ s jedne strane, zatim epidemiološke karakteristike nesrećenih sa druge strane su parametri koji variraju u odnosu na veličinu i karakteristike populacije koja se ispituje. Najčešći uzroci su kardiovaskularne bolesti (KVS), od kojih se posebno izdvajaju aritmije. Ostali uzroci su respiratorne, endokrinološke i metaboličke bolesti, traumatski faktori, intoksikacije, kao i niz drugih spoljašnjih faktora [6]. U EuReCa studiji po podacima iz Srbije u šestomesečnom periodu tokom 2017.godine, na populaciji od 902 970 osoba, rezultati pokazuju da je kod 446 osoba registrovan VSZ [7]. ASZ je jedan od vodećih smrtnih uzroka na globalnom nivou. Istraživanja na teritoriji Evropske unije govore da je srčani zastoj uzrok smrti kod oko 250 000 stanovnika godišnje [8]. VSZ je izazov za medicinske radnike, ali i za laike koji svedoče istom. Započete mere BLS-a (Basic Life Support) od strane očevica pokazuju veću šansu za preživljavanjem [3]. Postoji povezanost između zadesnih elemenata i ishoda VSZ, kao što su prisustvo svedoka, da li je svedok započeo mere reanimacije, kakav je bio inicijalni ritam, i drugi faktori [9]. Ciljevi rada su analiza učestalosti pojave VSZ i demografskih karakteristika reanimiranih pacijenata u Službi za hitnu medicinsku pomoć (SHMP) Pančevo u toku 2022. godine.

INTRODUCTION

Acute cardiac arrest (ACA) is a sudden and unexpected cessation of blood circulation caused by functional heart failure, resulting in loss of consciousness and cessation of breathing [1]. It is the most urgent and dramatic condition that medical workers encounter, both in out-of-hospital and hospital settings. Cardiopulmonary resuscitation (CPR) is a set of emergency measures and procedures for cardiac and respiratory arrest to restore circulation and breathing applied to the afflicted [2]. The sequence and procedure of actions applied in the treatment of ACA altogether are called a survival chain. It consists of 4 links - early recognition and call for help, early CPR, early defibrillation, and early post-reanimation treatment. Each of these links is equally important for obtaining a positive outcome [3]. Time is a key factor for the success of CPR measures. Early administration of CPR measures can triple the survival in out-of-hospital cardiac arrest (OHCA) [4]. Successful reanimation involves the return of previously temporarily lost life functions - breathing, consciousness, and heart work. ROSC (return of spontaneous circulation) as a positive outcome in reanimated patients is manifested by palpable pulse, measurable tension, the electrical activity of the heart compatible with life, or the presence of movement in the afflicted [5]. Frequency, etiology, and mortality from OHCA on the one hand, then the epidemiological characteristics of the afflicted on the other hand are parameters that vary according to the size and characteristics of the population being examined. The most common causes are cardiovascular diseases (CVD), where arrhythmia stands out in particular. Other causes include respiratory, endocrine, and metabolic diseases, traumatic factors, intoxication, as well as several other external factors [6]. In the EuReCa study, according to data from Serbia in the six-month period during 2017 on a population of 902,970 people, the results show that 446 people are registered with OHCA [7]. ACA is one of the leading causes of death globally. Research in the European Union shows that cardiac arrest is the cause of death in about 250,000 inhabitants per year [8]. OHCA is a challenge for medical workers, but also for laypeople who witness it. The BLS (Basic Life Support) measures initiated by a bystander show a likelihood of survival [3]. There is a correlation between the incidental elements and the outcome of the OHCA, such as the presence of bystanders, whether the bystander initiated resuscitation measures, what the initial rhythm was, and other factors [9]. The objectives of the paper are to analyze the frequency of occurrence of OHCA and demographic characteristics of resuscitated patients in the Emergency Medical Service (EMSP) Pančevo during 2022.

METODE

Istraživanje je u vidu retrospektivne studije koja obuhvata jednogodišnji period od 01.01.2022. do 31.12.2022. Podaci su prikupljeni iz protokola kućnih poseta (KP) i poziva (PP) SHMP Pančevo. U PP dispečer unosi podatke o imenu i prezimenu pacijenta, adresu i kontakt telefon pozivaoca, kratak opis tegoba, zatim vreme prijema poziva, vreme odlaska ekipe na teren kao i vreme povratka ekipe. Za primljene pozive koji spadaju u prvi red hitnosti, uključujući potvrđenu ili postavljenu sumnju na VSZ, ekipe se odmah šalju na teren, odnosno maksimalno minut od prijema poziva. U KP ekipe unose od medicinskih podataka kratku anamnezu, dijagnozu/e, fizikalni nalaz i terapiju, kao i eventualno upućivanje i transport pacijenta u Opštu bolnicu Pančevo (OBPVO). Parametri koji su prikupljeni i analizirani su: broj pacijenata sa VSZ, pol, starost, mesto nastupanja, etiologija, podaci o očevicima, vreme i mesec nastupanja, započinjanje BLS-a od strane očevica, inicijalni ritam i ishod KPR. Za obradu podataka je korišćena deskriptivna statistika, a podaci su prikazani tekstualno, kao i putem grafikona i tabela.

REZULTATI

Tokom 2022. godine u SHMP Pančevo je bilo ukupno 6207 KP. Od toga je VSZ na terenu imalo ukupno 36 (0,6%) pacijenata. Kod svih je primenjena KPR od strane ekipe SHMP. U odnosu na pol, bilo je više muškaraca (69,4%) nego žena (30,6%) (Tabela 1). Najmlađi reanimirani pacijent je bio muškarac starosti 36 godina, a najstariji takođe muškog pola starosti 94 godina. U ženskoj populaciji, najmlađa pacijentkinja je imala 64 godina, a najstarija 87 godina. Nije bilo dece sa VSZ to-

Tabela 1. Pacijenti sa VSZ i distribucija po polu

Table 1. Patients with OHCA and distribution by sex

	N	Procentat/ Percentage %
Ukupan broj KP / Total number of HV	6207	100
Ukupan broj VSZ / Total number of OHCA	36	0.6%
Pol / Sex		
Muški / Male	25	69.4
Ženski / Female	11	30.6

Objašnjenje- Broj (procentat) pacijenata po polu je izveden iz ukupnog broja VSZ
Explanation- The number (percentage) of patients by sex is derived from the total number of OHCA

N- number

KP- kućne posete

HV- home visits

VSZ- vanbolnički srčani zastoj

OHCA- out of hospital cardiac arrest

METHODS

The research is in the form of a retrospective study covering a one-year period from 01.01.2022. to 31.12.2022. The data were collected from the protocol of home visits (HV) and calls (CP) EMSP Pančevo. In CP dispatcher enters information about the name and surname of the patient, the address and contact phone of the caller, a brief description of the problem, then the time of receiving the call, the time of departure of the team to the site, as well as the time of return. Receiving calls that fall into the first line of urgency, including confirmed or placed suspicion of OHCA, teams are immediately sent to the site, i.e. a maximum of a minute after receiving the call. HV teams enter in medical data a short history, diagnosis/es, physical findings, and therapy, as well as possible referral and transport of the patient to the General Hospital Pančevo (GHP). The parameters that were collected and analyzed are the number of patients with OHCA, gender, age, place of occurrence, etiology, eyewitness data, time and month of occurrence, initiation of BLS by bystanders, initial rhythm, and outcome of CPR. Descriptive statistics were used to process the data, and the data were presented textually, as well as through graphs and tables.

RESULTS

In 2022 there were a total of 6207 HV in EMSP Pančevo. OHCA had a total of 36 (0.6%) patients on the site. All of them had CPR applied by the EMSP team. Compared to gender, there were more men 69.4% than women 30.6% (Table 1). The youngest resuscitated patient was a 36-year-old male, and the oldest, also a male, was 94 years old. In the female population, the youngest patient was 64 years old and the oldest was 87 years old. There were no children with OHCA in 2022. Distribution by age shows that the most OHCA occurs in the elderly population, in the age group 71-80 years (12) and the group 61-70 years (8); while there are no resuscitated patients in age groups under 30 years (Chart 1). The distribution by month shows a peak in October when there were 6 patients with OHCA. There were no cases in September. The distribution by month is shown in Chart 2. In most cases, it happened in patients' residences, where 26 (72.2%) patients were resuscitated, and the least during medical transport from the site to GHP 2 (5.6%). The OHCA distribution by residential places is shown in Chart 3. When it comes to the initial rhythm, the afflicted most often manifested a non-shockable rhythm, recorded in 25 (69.4%) patients. Asystole was the dominant non-shocking rhythm (23-92%). Shockable rhythms were registered in 11 (30.6%) patients. 8 of these patients (72.7%) had ventricular fibrillation (VF). The distribution according to the initial rhythm is

Tabela 2. Distribucija pacijenata sa VSZ po inicijalnom ritmu

Inicijalni ritam / Initial rhythm	N	Procenat / Percentage %
Šokabilni / Shockable	11	30.6
VT bez pulsa / pVT	3	27.3
Ventrikularna fibrilacija / VF	8	72.3
Nešokabilni / Non-shockable	25	69.4
Asistolija / Asystole	23	92
Elektromehanička disocijacija / PEA	2	8

Table 2. Distribution of patients with OHCA by initial rhythm

Objašnjenje- Broj (procenat) pacijenata sa šokabilnim i nešokabilnim ritmom je izveden iz ukupnog broja pacijenata sa VSZ. Broj (procenat) pacijenata sa VF i VT bez pulsa je izveden iz ukupnog broja pacijenata sa šokabilnim ritmom. Broj (procenat) pacijenata sa PEA i asistolijom je izveden iz ukupnog broja pacijenata sa nešokabilnim ritmom.

Explanation- The number (percentage) of patients with shockable and nonshockable rhythm is derived from the total number of patients with OHCA. The number (percentage) of patients with VF and pVT is derived from the total number of patients with shockable rhythm. The number (percentage) of patients with PEA and asystole is derived from the total number of patients with non-shockable rhythm.

N- number

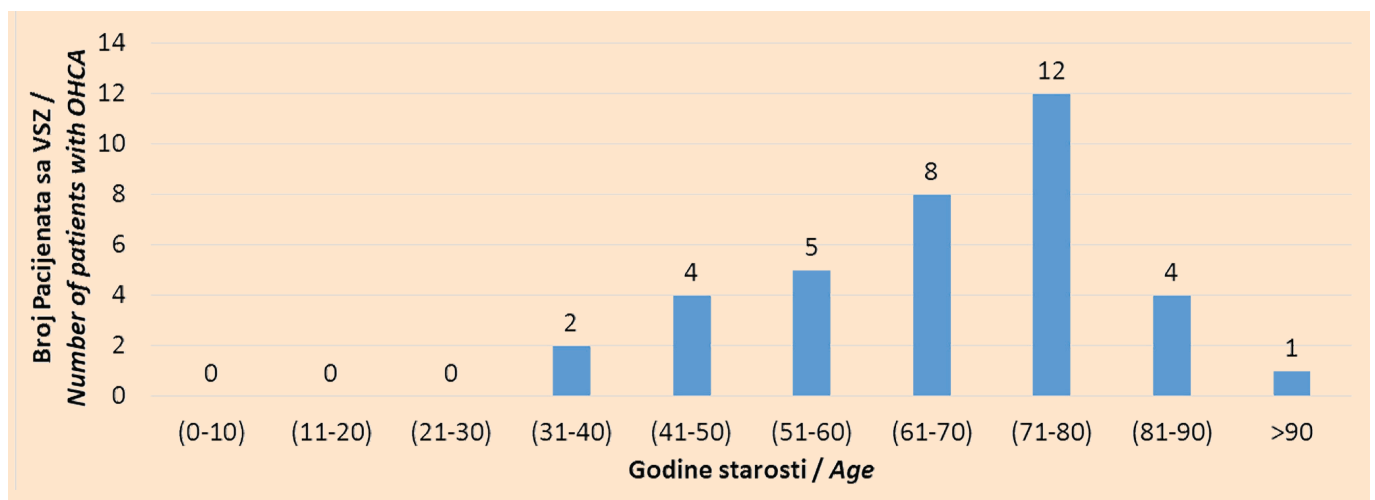
VSZ- Vanbolnički srčani zastoj; OHCA- out of hospital cardiac arrest;

VT- ventrikularna tehirardija; VF- ventricular fibrillation;

pVT- pulseless ventricular tachycardia; PEA- pulseless electrical activity;

kom 2022.godine. Distribucija po starosti pokazuje da se najviše VSZ dešava u starijoj populaciji, u starosnoj grupi 71-80 godina (12) i u grupi 61-70 godina (8), dok nema reanimiranih pacijenata u starosnim grupama ispod 30 godina (Grafikon 1). Raspodela po mesecima pokazuje pik u oktobru, kada je bilo 6 pacijenata sa VSZ. Tokom septembra nije bilo nijednog slučaja. Distribucija po mesecima je prikazana u Grafikonu 2. Mesto zadesa je u većini slučajeva bilo prebivalište, gde je reanimirano 26 (72,2%) pacijenata, a najmanje tokom sanitetskog transporta sa terena do OBPVO, svega 2 (5,6%). Distribucija VSZ po mestu zadesa je prikazana na Grafikonu 3. Kada je u pitanju inicijalni ritam, pacijenti su najčešće ispoljavali nešokabilni ritam, zabeležen kod 25 (69,4%) pacijenata. Asistolija je bila dominantan nešokabilni ritam (23-92%). Šokabilni ritmovi su registrovani kod 11 (30,6%) pacijenata. Od toga je 8

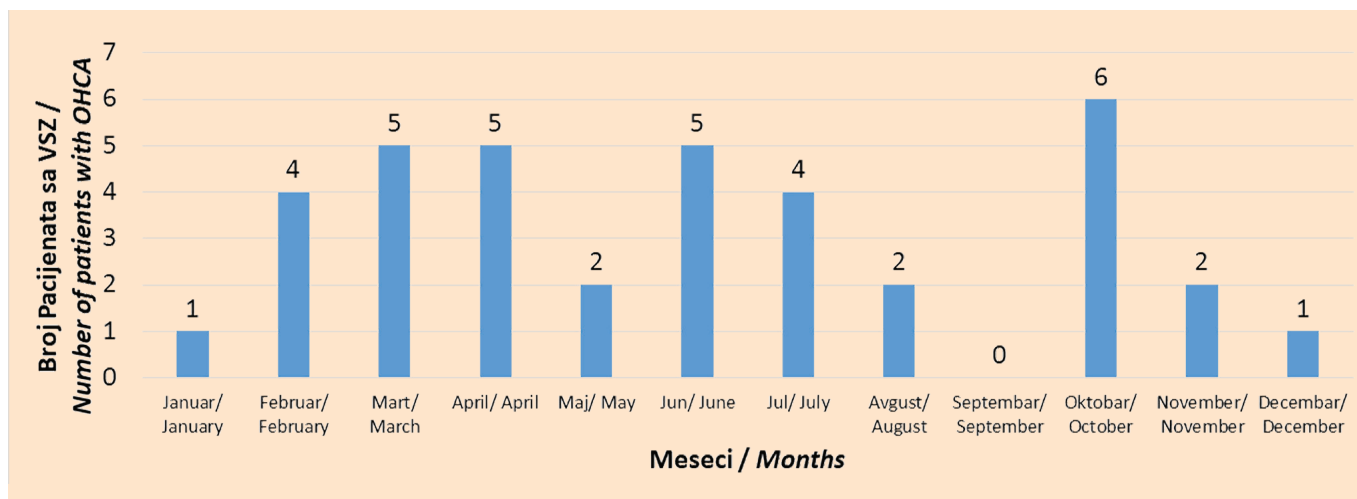
shown in Table 2. Etiological factors are primarily cardiovascular in 16 (44.4%) patients, and unknown cause in 10 (27.8%) patients. In the category of other causes are metabolic, endocrine, and malignant diseases. The distribution by etiology is shown in Chart 4. BLS measures were applied to only 5 (13.9%) patients (Table 3). In most cases, the bystander was a layman in 77.8% of them (Table 4). The time of the day in which OHCA most often occurred is in the period 15:00-15:59h in 4 (11.1%) patients, as well as in the period 19:00-19:59h also 4 (11.1%). The circadian rhythm distribution is shown in Chart 5. In relation to whether the dispatcher recognized/suspected that it was OHCA, two groups of patients are distinguished - the first consists of those in whom the OHCA is suspected or confirmed (recorded that the patient does not breathe, does not respond, or is unconscious), while in the second are those in whom



VSZ- Vanbolnički srčani zastoj/ OHCA- Out of hospital cardiac arrest

Slika 1. Distribucija pacijenata sa VSZ po godinama starosti

Figure 1. Distribution of patients with OHCA by age



VSZ – vanbolnički srčani zastoj/ OCHA- Out of hospital cardiac arrest

Slika 2. Distribucija pacijenata sa VSZ po mesecima

Figure 2. Distribution of patients with OHCA by months

Tabela 3. Distribucija u odnosu na primenjene mere BLS

Table 3. Distribution in terms of applied BLS measures

	N	Procenat / Percentage %
Ukupan broj VSZ / Total number of OHCA	36	100
BLS da / BLS yes	5	13.9
BLS ne / BLS no	31	86.1

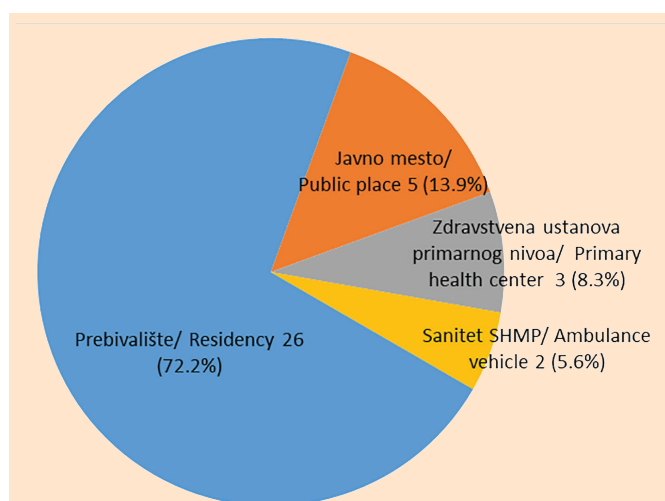
VSZ- vanbolnički srčani zastoj
OHCA- Out of hospital cardiac arrest
BLS- Basic life support

Tabela 4. Distribucija VSZ po svedoku

Table 4. Distribution of OHCA by witness

	N	Procenat / Percentage %
Ukupan broj VSZ / Total number of OHCA	36	100
Laik / layman	28	72.8
Zdravstveni radnik u ustanovi primarnog nivoa / Health professional in primary health institution	3	8.3
SHMP / EMS	5	13.9

VSZ- Vanbolnički srčani zastoj/ OHCA- Out of hospital cardiac arrest
SHMP- Služba hitne medicinske pomoći/ EMS- Emergency medical service

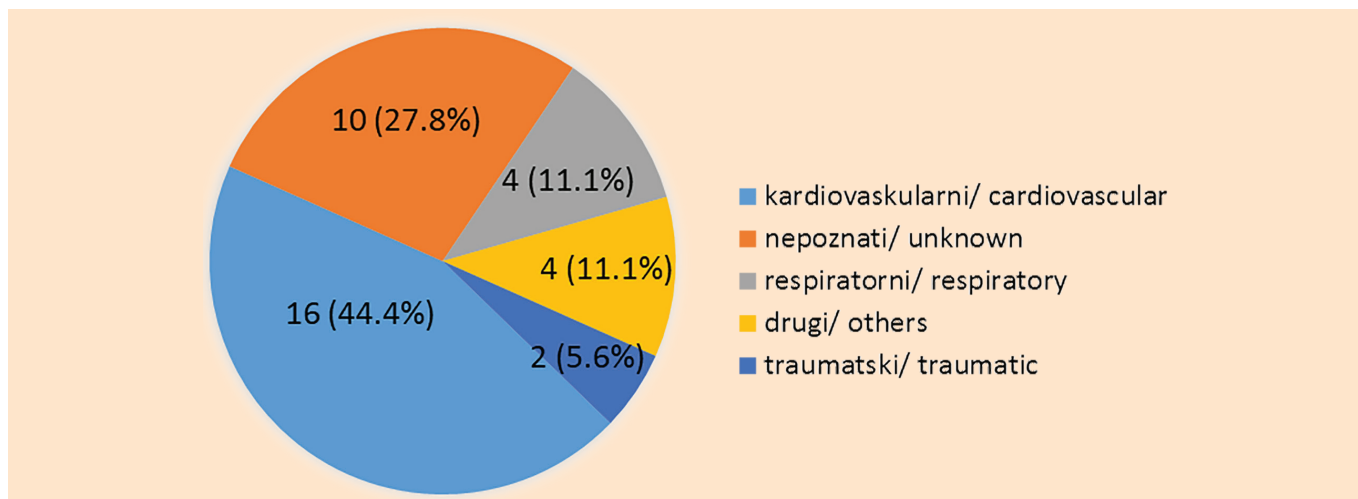


SHMP- Služba za hitnu medicinsku pomoć/ EMS- Emergency medical service
VSZ- Vanbolnički srčani zastoj/ OHCA- Out of hospital cardiac arrest

Slika 3. Distribucija VSZ po mestu zadesa

Figure 3. Distribution of OHCA by place of occurrence

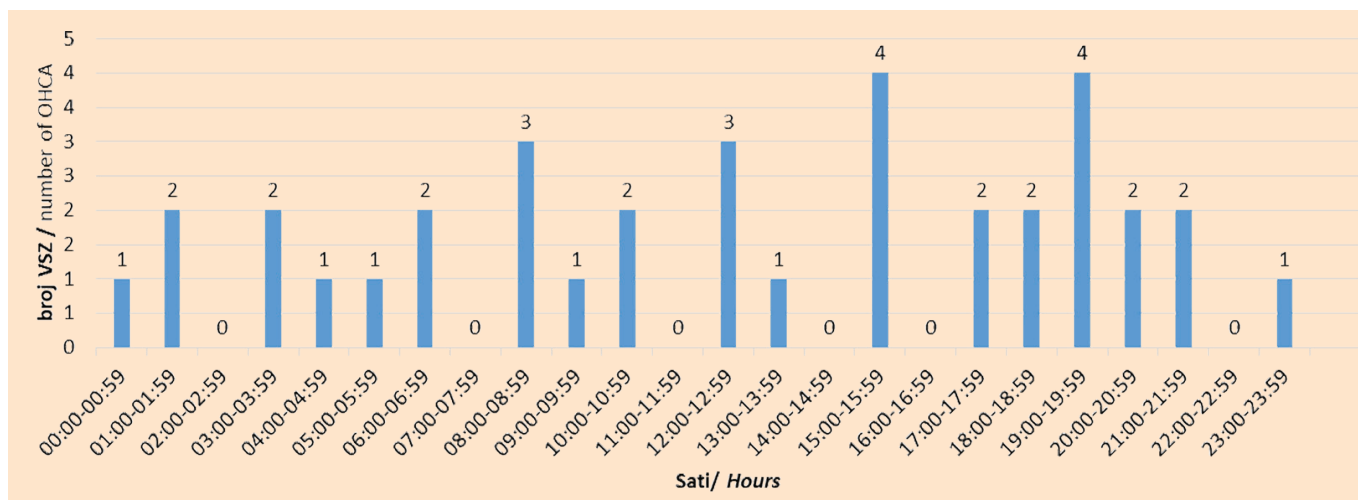
dispatchers did not recognize on the basis of available data from the caller. There are 27 (75%) patients in the first group and 9 (25%) in the second group. For patients who were not recognized as OHCA, unspecified problems were most often reported (the patient suddenly became ill) followed by choking and chest pain. Nevertheless, all patients in whom OHCA has occurred are perceived as urgent. No cases of telephone-guided CPR by dispatchers have been recorded. Distribution by dispatcher recognition OHCA is shown in **Chart 6**. ROSC was recorded in 14 (39%) patients. Established ROSC refers to those patients who are transported with a positive outcome of CPR and handed to the attending physician in the emergency service GHP. This number also includes the appearance of ROSC on the site, as well as ROSC during the resuscitation of patients who experienced OHCA during the transport from the site to the GHP. So, it applies only to those patients who survived until admission to the hospital. Further moni-



VSZ- Vanbolnički srčani zastoj/ OHCA- Out of hospital cardiac arrest

Slika 4. Distribucija VSZ po uzrocima

Figure 4. Distribution of OHCA by causes

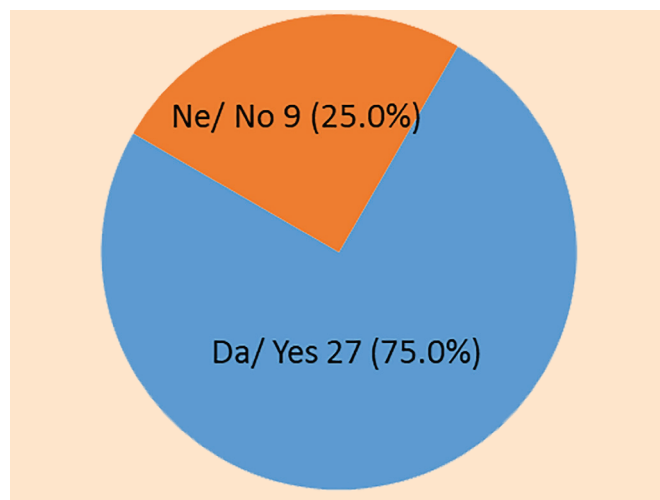


VSZ- Vanbolnički srčani zastoj/ OHCA- Out of hospital cardiac arrest

Slika 5. Distribucija VSZ po cirkadijalnom ritmu

Figure 5. Distribution of OHCA by circadian rhythm

(72,7%) pacijenata imalo ventrikularnu fibrilaciju (VF). Distribucija po inicijalnom ritmu je prikazana u Tabeli 2. Etiološki faktori su na prvom mestu kardiovaskularni kod 16 (44,4%) pacijenata, i nepoznatog uzroka kod 10 (27,8%) pacijenata. U kategoriji drugih uzroka su metaboličke, endokrinološke i maligne bolesti. Distribucija po etiologiji je prikazana na Grafikonu 4. Mere BLS-a su primenjene kod samo 5 (13,9%) pacijenata (Tabela 3). Očevicidac je u najvećem broju slučajeva bio laik kod njih 77,8% (Tabela 4). Doba dana u kome se najčešće desio VSZ je u periodu od 15:00-15:59h kod 4 (11,1%) pacijenata, kao i u periodu od 19:00-19:59h takođe 4 (11,1%). Distribucija po cirkadijalnom ritmu je prikazana na Grafikonu 5. U odnosu na to da li je dispečer prepoznao/posumnjao da se radi o VSZ, izdvajaju se dve grupe pacijenata- prvu čine oni kod kojih je postavljena sumnja ili potvrđen VSZ (zabeleženo da pacijent ne diše, ne reaguje ili je bez svesti), dok su u



VSZ- Vanbolnički srčani zastoj/ OHCA- Out of hospital cardiac arrest

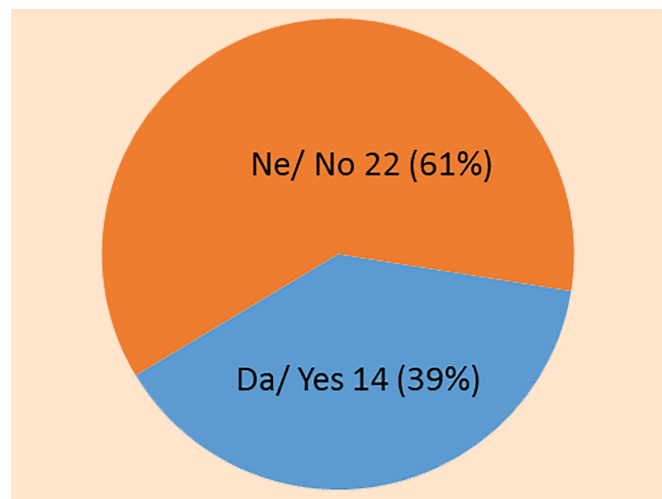
Slika 6. Distribucija VSZ po prepoznavanju od strane dispečera

Figure 6. Distribution of OHCA recognized by dispatchers

drugoj oni kod kojih dispečeri nisu prepoznali VSZ na osnovu dostupnih podataka od pozivaoca. U prvoj grupi se nalazi 27 (75%) pacijenata, a u drugoj 9 (25%). Za pacijente kod kojih se nije znalo da se radi o VSZ najčešće su prijavljivane neodređene tegobe (pacijentu odjednom pozlilo), potom gušenje i bol u grudima. Bez obzira na to, svi pacijenti kod kojih se desio VSZ su shvaćeni kao prvi red hitnosti. Nije zabeležen nijedan slučaj telefonski vođene KPR od strane dispečera. Distribucija po prepoznavanju VSZ od strane dispečera je prikazana na **Grafikonu 6**. ROSC je zabeležen kod 14 (39 %) pacijenata. Uspostavljeni ROSC se odnosi na one pacijente koji su sa pozitivnim ishodom KPR transportovani i predati dežurnom lekaru prijemne službe OBPVO. U taj broj je uračunata i pojava ROSC-a na samom terenu, kao i ROSC tokom reanimacije pacijenata koji su doživeli VSZ tokom transporta sa lica mesta do OBPVO. Dakle, odnosi se samo na one pacijente koji su preživeli do prijema u bolnicu. U ovom radu nije izvršeno dalje praćenje preživljavanja pacijenata po otpustu. Distribucija po uspostavljenom ROSC-u je prikazana na **Grafikonu 7**.

DISKUSIJA

U ovom istraživanju u periodu od godinu dana, VSZ je bio prisutan kod 36 pacijenata. Incidenca VSZ u drugim istraživanjima varira, pre svega u odnosu na veličinu posmatrane populacije i ukupan broj pacijenata kod kojih su intervenisale hitne službe, ali i u odnosu na dužinu posmatranog perioda. U novijim studijama u zemlji i regionu, podaci beleže razlike u broju pacijenata sa VSZ u toku jednogodišnjeg perioda, koji se kreću od 148 na teritoriji Novog Sada, do 7773 na teritoriji cele Hrvatske [10,11]. Incidenca u opštinama na teritoriji Srbije je raznolika; kreće se od oko 22 godišnje u Kanjiži [12], zatim 119 u Somboru [13], do 148 u Zrenjaninu [14]. Polna distribucija pokazuje predominaciju muškog pola, nešto manje od tri četvrtine, što je u skladu sa mnogim drugim istraživanjima u zemlji [10,15,16] i na globalnom nivou [17,18]. Kod njih se procentualno učešće kreće od nešto više od 50% do više od 70%. Kardiovaskularni uzroci su najčešći uzrok VSZ, što je u korelaciji sa podacima istraživanja na nivou cele Srbije, prikazanim u dvogodišnjoj analizi [19] i rezultatima novije studije u Kini [17]. To se može objasniti sve većom zastupljenošću KVS bolesti među domaćom i svetskom populacijom. Nepoznati uzroci zauzimaju drugo mesto u etiologiji VSZ, što je više nego u prospektivnoj studiji EuReCa Srbija [12,13,14,19]. Pacijenti u ovom istraživanju su uglavnom stariji; većina je starosti u rasponu od 60-80 godina. To se može dovesti u vezu sa najčešćim uzrokom VBS- KVS bolesti, koje su česte kod starije populacije, uz mnoge komorbiditete.



VSZ- Vanbolnički srčani zastoj/ OHCA- Out of hospital cardiac arrest

Slika 7. Distribucija VSZ po uspostavljenom ROSC-u

Figure 7. Distribution of OHCA by established ROSC

toring of patients' survival after discharge was not taken into account. The distribution for established ROSC is shown in **Chart 7**.

DISCUSSION

In this study, OHCA was present in 36 patients over a one-year period. The incidence of OHCA in other studies varies, primarily concerning the size of the observed population and the total number of patients in whom emergency services intervened, but also to the length of the observed period. In recent studies in the country and regions, data records differ in the number of patients with OHCA over a one-year period, ranging from 148 on the territory of Novi Sad, to 7773 on the territory of Croatia [10,11]. The incidence in municipalities on the territory of Serbia varies, ranging from about 22 per year in Kanjiža [12], then 119 in Sombor [13], to 148 in Zrenjanin [14]. Gender distribution shows male predominance, just under three-quarters, which is consistent with many other surveys in the country [10,15,16] and globally [17,18]. The percentage in males ranges from just over 50% to more than 70%. Cardiovascular causes are the most common cause of OHCA, which correlates with research data in the whole Serbia, presented in a two-year analysis [19] and the results of a recent study in China [17]. This can be explained by the increasing prevalence of CVS disease among the domestic and world population. Unknown causes occupy the second place in the etiology of OHCA, which is more than in the prospective study of EuReCa Serbia [12,13,14,19]. The patients in this study are mostly elderly, most of the ages from 60-80 years. This can be associated with the most common cause of VBS-CVS disease, which is common in the elderly population,

U poređenju sa sličnim istraživanjima, dobijeni rezultati takođe ukazuju na stariju populaciju, sa prosečnom starošću preko 65 godine [10,17,20]. Podaci iz svetske literature se slažu sa rezultatima ovog rada, pokazujući da je prebivalište ubedljivo na prvom mestu po lokaciji na kojoj se zadesio unesrećeni sa VSZ [17,21]. To ima višestruki značaj jer, pre svega, povlači za sobom pitanje izvođenja BLS-a u datim uslovima; u većini slučajeva svedoci na toj lokaciji su laici, uglavnom članovi porodice ili poznanici. Potom ukazuje na značaj obuke opšteg građanstva, posebno onih koji nisu zdravstveni radnici, s obzirom da su oni u više od 75% slučajeva svedoci VSZ [22]. U ovom istraživanju su takođe laici najčešći svedoci (77,8%). Mere BLS-a se uglavnom primenjuju kod malog broja pacijenata [15,20,23]; rezultati se kreću od 3,7% do oko 17%, što se slaže sa ovim rezultatima (13,9%). Kada se posmatra distribucija po mesecima, pik je prisutan u oktobru, potom martu i aprilu. Podaci iz literature su sa sličnom distribucijom; jesenji i zimski meseci su uglavnom na prvom mestu [16,23]. Cirkadijalni ritam ukazuje na pik u dva vremenska perioda 15:00-15:59h i 19:00-19:59h (po 4 VSZ) i u periodu 08:00h-08:59h i 12:00h-12:59h. Druga istraživanja potvrđuju da se VSZ dešava uglavnom u toku dana, sa manjim brojem unesrećenih tokom noći [24]. To se može objasniti učestalijom pojavom aritmija tokom dana u odnosu na noć, kao najčešćim uzrokom VBS među kardiološkom etiologijom, ali i manjim brojem poziva koji se odnose na VSZ tokom noći obično zbog odsustva svedoka koji bi to prijavili [25]. Inicijalni ritam je jedan od značajnih parametara koji određuju preživljavanje nakon VSZ. U ovoj studiji prevladavaju nešokabilni ritmovi. Podaci iz literature se razlikuju. Novije studije pokazuju da je procenat šokabilnih ritmova kod VSZ u padu poslednjih decenija [26], dok se u drugim istraživanjima uglavnom javljaju šokabilni ritmovi [27]. Šokabilni ritmovi pokazuju veći procenat uspostavljanja ROSC-a u odnosu na nešokabilne [26,27]. Procenat uspostavljenog ROSC-a do prijema u bolnicu se poslednjih godina kreće od oko 12% do skoro 40% u domaćim istraživanjima [10,15,19]. U odnosu na njih, rezultati ove studije se svrstavaju u grupu većeg procenta dobijenog ROSC-a. Dispečeri kao karika koja povezuje unesrećenog i ekipu SHMP, u ovom radu su prepoznali 75% VSZ, što je više u odnosu na novije rezultate domaćeg istraživanja, u kojima je procenat prepoznavanja oko 52% [10]. Procena dispečera se vrši na osnovu podataka od pozivaoca, zatim znanja i iskustva. U SHMP Pančevo ne postoji jedinstveni protokol primanja poziva i njihove klasifikacije po redovima hitnosti, što može objasniti 25% neprepoznatih VSZ. Takođe, pozivaoci često ne umeju da objasne situaciju na terenu, pa se dešava da se stanja prvog reda hitnosti ne

with more comorbidities. Compared to similar studies, the results obtained also indicate to older population, with an average age over 65 years [10,17,20]. Data from the world literature agree with the results of this study, showing that the residence is convincingly in the first place in terms of the location where the OHCA [17,21] occurred. This has considerable significance. First of all, it entails the issue of performing the BLS in the given conditions, since in most cases bystanders at this location are laypeople, mostly family members or acquaintances. Then it points to the importance of training citizens in general, especially those who are not healthcare workers, since they in more than 75% of cases witnessed the OHCA [22]. In this study, laypeople were also the most common witnesses (77.8%). BLS measures are mainly applied to a small number of afflicted [15,20,23]; results range from 3.7% to about 17%, which coincides with these results (13.9%). When observing the distribution by month, peaks are present in October, then March and April. Data from the literature are with a similar distribution, the autumn and winter months are generally in the first place [16,23]. Circadian rhythm indicates peaks in two time periods 15:00-15:59h and 19:00-19:59h (4 OHCA) and the period 08:00h-08:59h and 12:00h-12:59h. Other studies confirm that OHCA occurs mainly during the day, with fewer casualties during the night [24]. This can be explained by the more frequent occurrence of arrhythmia during the day compared to the night, as the most common cause of OHCA among cardiac etiology, but also a meagre number of calls relating to OHCA during the night, usually due to the absence of bystanders to report it [25]. The initial rhythm is one of the significant parameters that determine survival after OHCA. In this study, non-shockable rhythms predominate. Data from the literature differs. Recent studies show that the percentage of shockable rhythms in OHCA has been declining in recent decades [26], while in other studies there are mostly shockable rhythms [27]. Shockable rhythms show a higher percentage of established ROSC than non-shockable [26,27]. The percentage of established ROSC to hospital admission in recent years has ranged from about 12% to nearly 40% in domestic research [10,15,19]. According to that, the results of this study are classified as a higher percentage of ROSC established. The dispatcher is the link that connects the afflicted person and the EMS team, who in this study recognized 75% of OHCA, which is more than the recent results in domestic research, in which the percentage of recognition is about 52% [10]. The assessment of the dispatcher is carried out based on data from the caller, also knowledge and experience. In EMS Pančevo there is not a unique protocol for receiv-

prepoznaju. Podaci iz SAD govore u prilog većeg procenta uspostavljenog ROSC-a u grupi pacijenata kod kojih su dispečeri koristili protokol [28].

ZAKLJUČAK

Uzimajući u obzir analizirane parametre, vidi se da su najčešća mesta zadesa VSZ prebivalište, a najčešći svedoci laici, koji u malom procentu započnu mere KPR do dolaska ekipe SHMP. Zato je pored periodične obuke stanovništva neophodna sistematska i učestaliya obuka za BLS. Sa druge strane, beleži se četvrtina neprepoznatih VSZ od strane dispečera. Razlog leži u nepostojanju jedinstvenih dispečerskih protokola za sve SHMP na državnom nivou. Povećanjem broja edukacija zdravstvenih radnika i uvođenjem jedinstvenog protokola i upitnika za dispečere kojima bi lakše i brže donosili odluke o stepenu hitnosti i prepoznali VSZ, kao i edukacijama šire populacije za BLS, dovelo bi do porasta uspostavljanja ROSC-a, a samim tim i preživljavanja pacijenata sa VSZ.

SPISAK SKRAĆENICA

ASZ- akutni srčani zastoj
KPR- kardiopulmonalna reanimacija
VSZ- vanbolnički srčani zastoj
KVS- kardiovaskularni
ROSC- return of spontaneous circulation
SHMP- Služba za hitnu medicinsku pomoć
KP- kućna poseta
PP- protokol poziva
OBPVO- Opšta bolnica Pančevo
BLS- basic life support

Sukob interesa: Nije prijavljen.

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ing calls and their classification by order of urgency, which can explain 25% of unrecognized OHCA. Also, callers often do not know how to explain the situation on the site, so it happens that urgent conditions are not recognized. Data from the U.S. show a higher percentage of established ROSC in the group of patients in whom dispatchers used the protocol [28].

CONCLUSION

Taking into account the analyzed parameters, it can be seen that the most common places of accidents are residences, and the most common bystanders are lay-people, who in a small percentage start CPR measures until the arrival of the EMS team. Therefore, in addition to periodic training of the population, systematic and frequent training for the BLS is necessary. On the other hand, it was recorded a quarter of unrecognized OHCA by dispatchers. The reason lies in the non-existent unique dispatch protocols for all EMS on the state level. Educating health care workers, and introducing a unique protocol and questionnaire for dispatchers that would more easily and quickly make decisions about the degree of urgency and recognize OHCA, as well as education of the wider population for BLS would lead to an increase in the establishment of ROSC, and thus the survival of patients with OHCA.

LIST OF ABBREVIATIONS

ACA- acute cardiac arrest
CPR- cardiopulmonary resuscitation
CVS- cardiovascular
ROSC- the return of spontaneous circulation
EMS- Emergency Medical Service
HV- home visit
CP- call protocol
GHP - General Hospital Pančevo
BLS - Basic Life Support

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