

FAKTORI ZA NASTANAK DRUMSKOG SAOBRAĆAJNOG TRAUMATIZMA I BOLJEG ZBRINJAVANJA POVREĐENIH LICA

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SAŽETAK

U ovom radu biće predstavljene informacije iz relevantnih izvora podataka o saobraćajnom traumatizmu, faktorima rizika i značaju hitnog zbrinjavanja povređenih. Prema procenama Svetske zdravstvene organizacije (SZO), za 2021. godinu, godišnje u saobraćajnim nezgodama smrtno strada oko 1,19 miliona ljudi, odnosno desi se globalno 15 smrtnih ishoda usled saobraćajnih nesreća na 100.000 stanovnika. Vodeći je uzrok umiranja dece uzrasta 5-29 godina i 12 vodeći uzrok smrti kada se posmatraju svi uzrasti. Efikasno zbrinjavanje traume je prioritet u svim sistemima zdravstvene zaštite. S obzirom na veliku učestalost javljanja i smrtnost od traume, potrebno je sagledati sve potencijalne faktore rizika koji utiču na ishod lečenja povređenih. Faktori kao što su dostupnost adekvatne zdravstvene zaštite, vreme reakcije hitne medicinske službe, iskustvo i organizacija trauma tima, udaljenost hospitalne zdravstvene ustanove i njena opremljenost i stručna osposobljenost za adekvatno zbrinjavanje teško povređenih, direktno utiču na kvalitet i ishod lečenja povređenih lica i povećavaju šansu za preživljavanje. Ovaj rad pruža temeljno sagledavanje problema saobraćajnih nezgoda i ističe ključne aspekte koji utiču na kvalitet zdravstvene zaštite povređenih, istovremeno ukazujući na važnost adekvatne reakcije i organizacije zdravstvenih sistema, kako bi se poboljšali ishodi lečenja i smanjila smrtnost u saobraćajnim nezgodama.

Ključne reči: Saobraćajni traumatizam, faktori rizika, registar traume, prevencija

Uvod

Prema procenama Svetske zdravstvene organizacije (SZO), za 2021. godinu, godišnje u saobraćajnim nezgodama smrtno strada oko 1,19 miliona ljudi, odnosno desi se globalno 15 smrtnih ishoda usled saobraćajnih nesreća na 100.000 stanovnika (1-3). Vodeći je uzrok umiranja dece uzrasta 5-29 godina i 12 vodeći uzrok smrti kada se posmatraju svi uzrasti (2). Tri puta češće stradaju muškarci nego žene (1,2). *Ameratunga* i saradnici predviđaju da će porast broja vozila po stanovniku rezultirati povećanjem broja povređenih i smrtno stradalih u saobraćaju za 80%, kao i da će se troškovi lečenja zbog saobraćajnih nesreća povećati za 1,0% bruto nacionalnog dohotka u zemljama sa niskim

prihodima, 1,5% u zemljama sa srednjim prihodima, a za 2,0% u zemljama sa visokim prihodima (4). Međutim, prema podacima SZO za 2023. godinu, došlo je opadanja broja smrtnih ishoda usled saobraćajnog traumatizma za 5% od 2010. godine, kada je broj smrtnih ishoda usled saobraćajnog traumatizma iznosio 1,25 miliona (2). Ovo neznatno smanjenje je zabeleženo uprkos globalnom porastu broja stanovnika, broja motornih vozila i značajnom proširenju mreže puteva. U zemljama sa niskim i srednjim prihodima stopa mortaliteta je veća, a posebno za povrede glave i za populaciju mlađe životne dobi (2). Čak 92% svih smrtnih ishoda usled saobraćajnog traumatizma desi se u zem-

FACTORS FOR THE OCCURRENCE OF ROAD TRAFFIC INJURIES AND BETTER CARE OF INJURED PERSONS

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SUMMARY

This paper will present information from relevant data sources on road traffic injuries, risk factors, and the importance of emergency care of the injured. According to the estimates from the World Health Organization (WHO), approximately 1.19 million people die in road traffic accidents each year, while the number of deaths due to road traffic accidents is 15 per 100,000 inhabitants. It is the leading cause of death for children aged 5 to 29 years and the 12th leading cause of death when all ages are observed. Efficient trauma care is a priority in all health care systems. Given the high mortality and incidence of trauma, it is necessary to consider all potential risk factors that affect the outcome of treating the injured. Factors such as the availability of adequate healthcare, emergency medical service response time, trauma team experience and organization, distance to hospital facilities, and their equipment and expertise for adequate care of severely injured patients directly influence the quality and outcome of patient care and increase the chances of survival. This paper provides a thorough examination of the issues surrounding road traffic accidents and highlights key aspects that affect the quality of healthcare of the injured, while also emphasizing the importance of an appropriate response and organization of healthcare systems to improve treatment outcomes and reduce the mortality rate in traffic accidents.

Keywords: traffic trauma, risk factors, trauma registry, prevention

Introduction

According to the estimates of the World Health Organization (WHO) for the year 2021, approximately 1.19 million people die each year as a result of road traffic crashes, while the number of deaths caused by road traffic injuries is 15 per 100,000 inhabitants globally (1-3). Road traffic injuries are the leading cause of death for children and young adults aged 5 to 29 years and the 12th leading cause of death when all ages are observed (2). Males are three times more likely to be killed in road crashes than females (1,2). Ameratunga and associates predict that the upsurge in the number of vehicles per inhabitant will result in an anticipated 80% increase in the number of road

traffic injuries and deaths, and that the cost of treatment due to road traffic crashes will increase by 1.0% of gross national product in low-income countries, 1.5% in middle-income countries, and by 2.0% in high-income countries (4). However, according to the WHO data for the year 2023, there has been a decrease in the number of deaths due to road traffic injuries by 5% since 2010, when the number of deaths due to road traffic injuries was 1.25 million (2). The slight decrease was recorded despite the global population growth, the increase in the number of motor vehicles and the significant expansion of road networks. In low- and middle-income countries, the mortality

ljama sa niskim i srednjim prihodima (2). Procene su da je najveći broj svih smrtnih ishoda usled saobraćajnog traumatizma u jugoistočnoj Aziji (28%), na Zapadnom Pacifiku (25%), a zatim u u afričkom regionu (19%), 12% u regionu Amerika (12%), u istočnom Mediteranu (11%) i u Evropskom regionu (5%).

Rizik od saobraćajnog traumatizma se smanjuje primenom intervencija kao što su poboljšanje putne infrastrukture, smanjenje nebezbednog ponašanja, jače zakonodavstvo i sprovođenje zakona o drumskom saobraćaju, stroža primena standarda za bezbednost vozila i kvalitetnije prehospitalno zbrinjavanje i bolničko lečenje. Loša dostupnost specijalizovanih bolnica, edukovanog kadra, helikopterskog prevoza i/ili savremeno opremljenih hirurških centara je prisutna u društvima sa niskim prihodima i u zemljama u kojima je socijalna nejednakost, kao i zemljama osiromašenim ratom i sa zastarelom saobraćajnom infrastrukturom (2). Stoga postoji hitna potreba za razvojem dobrog modela zbrinjavanja lica sa traumama, kao i uspostavljanje kvalitetnog sistema nadzora nad traumama, što bi doprinelo identifikovanju faktora koji su ključni za što bolje zbrinjavanje povređenih lica, i omogućilo redukciju smrtnih ishoda.

Cilj ovog rada jeda analizira faktore koji doprinose nastanku saobraćajnog traumatizma i boljem zbrinjavanju povređenih lica, a sve u cilju uspostavljanja kvalitetnog sistema nadzora nad traumama i smanjivanja broja umrlih usled trauma.

Metode

U okviru ovog preglednog rada korišćena je literatura na engleskom jeziku, koja je dobijena pretraživanjem sledećih baza podataka: PubMed, MEDLAJN i SCOPUS. Ključne reči koje su korišćene su: faktori rizika, mortalitet, saobraćajni traumatizam i povrede u saobraćaju. Pretraživanje ovih baza podataka je obuhvatilo period za poslednjih dvadeset godina.

Faktori rizika za nastanak saobraćajnog traumatizma

U brojnim do sada sprovedenim studijama govori se o faktorima rizika za nastanak saobraćajnog traumatizma, a sve u cilju identifikovanja najboljih preventivnih mera za sprečavanje nastanka saobraćajnog traumatizma (5-7). Većina autora ističe da su tri ključna faktora za nastanak saobraćajnog

traumatizma: ljudi, vozila i uslovi na putevima (5).

Glavni faktori rizika za nastanak povreda u saobraćaju su: neprilagođena i nepropisna brzina kretanja vozila u saobraćaju, loša putna infrastruktura, izbegavanje upotrebe sigurnosnih pojaseva, vožnja nakon upotrebe alkohola i/ili drugih psihoaktivnih supstanci, umor vozača, nekorišćenje ili pogrešno korišćenje auto-sedišta za decu, nenošenje kacige kod motociklista, nenošenje zaštitne opreme kod biciklista, upotreba mobilnih uređaja tokom vožnje i neadekvatno održavana vozila (6).

Neprilagođena i nepropisna brzina kretanja vozila u saobraćaju

Brzina kretanja vozila u saobraćaju je identifikovana kao ključni faktor rizika koji utiče na nastanak saobraćajnih nesreća. Odgovorna je za jednu trećinu svih saobraćajnih nesreća, kao i za više od 50% smrtnih ishoda u saobraćajnim nesrećama u svetu (6). Prekomerna brzina kretanja vozila je posebno opasna na autoputevima i slabo osvetljenim deonicama. Prema podacima SZO, rizik od sudara, kao i od teške povrede, direktno raste sa povećanjem prosečne brzine kretanja vozila (1). Ako dolazi do porasta srednje brzine kretanja vozila za 1% onda se povećava rizik od sudara za 3% i od teške povrede za 4%. Rizik od smrtnog ishoda kod pešaka udarenog prednjim delom vozila raste 4,5 puta sa porastom brzine kretanja automobila sa 50 km na sat na 65 km na sat, a u bočnim sudarima rizik od smrti putnika u vozilu iznosi 85% pri brzini vožnje od 65 km na sat.

Prema poslednjem globalnom izveštaju o stanju sigurnosti na putevima (iz 2018. godine), SZO navodi da je prekoračenje brzine jedan od glavnih uzroka trauma i umiranja od saobraćajnog traumatizma u svetu (7). S druge strane, povećanje maksimalno dozvoljene brzine kretanja vozila ima direktnu korelaciju sa brojem saobraćajnih nesreća (8). Podaci SZO, takođe, pokazuju da ograničena brzina kretanja vozila efikasno smanjuje broj umrlih u saobraćajnim nesrećama u Švajcarskoj, Holandiji, Švedskoj i Sjedinjenim Američkim Državama (SAD). Francuska i Nemačka su smanjile broj umrlih u saobraćajnim nezgodama za 9% do 39% nakon nacionalnih strategija koje su se odnosile na zakonske regulative za smanjenje ograničenja brzine kretanja vozila na putu (9-11). U razvijenim zemljama uloženi su značajni naponi i novčana sredstva u edukaciju i obuku vozača, koji se odnose

rate is higher, especially for head injuries and in the younger population (2). As much as 92% of the world fatalities on the roads occur in low- and middle-income countries (2). It has been estimated that the highest number of deaths due to road traffic injuries is in Southeast Asia (28%), in the Western Pacific (25%), then in the African region (19%), in the Americas region (12%), in the East Mediterranean (11%), and in the European region (5%).

The risk of road traffic injuries is reduced by the implementation of interventions such as the improvement of road infrastructure, reduction of unsafe behavior, stronger legislation and implementation of laws on road traffic, stricter implementation of vehicle safety standards, and better pre-hospital care and hospital treatment. Limited access to specialized hospitals, educated personnel, helicopter transport and/or modern surgical centers is present in low-income societies and in countries with social inequality, as well as in countries impoverished by war and with outdated transport infrastructure (2). Therefore, there is an urgent need for the development of a good model of caring for persons with injuries, as well as the establishment of a quality surveillance system, which would contribute to the identification of factors that are essential for the best possible care of injured persons, and enable the reduction of fatal outcomes.

The aim of this study is to analyze the factors that contribute to the occurrence of road traffic injuries and better care of injured persons, with the aim of establishing good quality road traffic injuries surveillance system and reducing the number of deaths due to injuries.

Methods

Within this review article, literature in the English language was used, and it was obtained by searching the following databases: PubMed, Medline and Scopus. Key words were the following: risk factors, mortality, road traffic trauma, and road traffic injuries. The search of these databases covered the last twenty years.

Risk factors for the occurrence of road traffic injuries

Numerous studies, which have been conducted so far, consider the risk factors for the occurrence

of road traffic injuries, aimed at identifying the best preventive measures to prevent the occurrence of road traffic injuries (5-7). The majority of authors emphasize that there are three key factors for the occurrence of road traffic injuries: people, vehicles and road conditions (5). The main risk factors for road traffic injuries are the following: inappropriate and excessive speed of motor vehicles, unsafe road infrastructure, failing to wear seat belts, driving under the influence of alcohol and/or other psychoactive substances, driver fatigue, non-use or incorrect use of child restraints, non-use of motorcycle helmets, non-use of protective equipment among cyclists, use of mobile devices while driving and inadequately maintained vehicles (6).

Inappropriate and excessive speed of motor vehicles

The speed of motor vehicles has been identified as a key risk factor that affects the occurrence of road traffic injuries. It is responsible for one third of all traffic accidents, as well as for more than 50% of deaths caused by road traffic accidents in the world (6). Excessive vehicle speed is especially dangerous on highways and poorly lit sections. According to the WHO data, an increase in average speed is directly related to the likelihood of a crash. Every 1% increase in mean speed produces a 3% increase in the crash risk and a 4% increase in the fatal crash risk. The risk of death for pedestrians hit by car fronts rises 4.5 times when speed increases from 50 km/h to 65 km/h, while in car-to-car side collisions the fatality risk for car occupants is 85% at 65 km/h.

According to the latest global report on the state of road safety (from 2018), the WHO states that speeding is one of the main causes of injuries and death caused by road traffic injuries in the world (7). On the other hand, the increase in the maximum permitted speed is directly related to the number of traffic accidents (8). The WHO data also show that limited speed effectively reduces the number of deaths in traffic accidents in Switzerland, the Netherlands, Sweden and in the United States of America (USA). France and Germany have reduced the number of road traffic deaths by 9% to 39% after national strategies related to legal regulations that reduced the speed limit of motor vehicles (9-11). In developed

na sprovođenje pravila i zakonskih regulativa u vezi vožnje, posebno ograničenja brzine vožnje, te podsticanje vozača da usvoje odgovarajuće mere bezbednosti (7).

Izbegavanje upotrebe sigurnosnih pojaseva od strane vozača putničkih vozila i kaciga kod lica koja upravljaju motorima i biciklima

Mnoge studije ukazuju da je zbog manje upotrebe sigurnosnog pojasa i nošenja kacige trauma glave dominantna povreda kod saobraćajnog traumatizma (12,13). Tako se danas govori o „tihoj epidemiji” povreda glave (14,15). Rezultati mnogih studija ukazuju na značaj korišćenja sigurnosnih pojaseva prilikom vožnje putničkih vozila, zatim kacige kod motociklista i biciklista (14,15). Pravilna upotreba kacige, prema podacima SZO, može redukovati rizik od smrtnog ishoda u sudaru više od 6 puta, a primena sigurnosnog pojasa do 50%, a korišćenje dečijeg sedišta smrt odojčadi do 71% (1). Takođe, nošenjem kaciga može se redukovati rizik od povrede mozga do 74%.

Vožnja nakon upotrebe alkohola i drugih psihoaktivnih supstanci

Kao jedan od glavnih uzroka saobraćajnih nesreća i preuranjenih smrti navodi se korišćenje alkohola i drugih psihoaktivnih supstanci (5). Studije sprovedene u Finskoj, Meksiku i Južnoj Africi, su potvrdile da vožnja pod dejstvom alkohola narušava pažnju i kognitivne sposobnosti (16-18). Prema *Sauber-Schatz* i autorima, rezultati istraživanja iz zemalja sa visokim prihodima ukazuju da je vožnja pod dejstvom alkohola često povezana sa brzom vožnjom i nekorišćenjem sigurnosnih pojaseva i kaciga (19). Prema podacima SZO, čak i vožnja pod uticajem niske koncentracije alkohola u krvi doprinosi većem riziku od saobraćajne nesreće, a rizik značajno raste kada je koncentracija alkohola u krvi vozača $\geq 0,04$ g/dl (1). Vozači koje koriste amfetamin imaju oko 5 puta veći rizik od saobraćajne nesreće nego lica koja ne koriste psihoaktivne supstance (1).

Drugi faktori za nastanak saobraćajnog traumatizma

Danas se često kao uzrok saobraćajnog traumatizma navodi korišćenje mobilnih telefona to-

kom vožnje (pričanje na telefon ili slanje poruka), što dovodi do usporavanja reagovanja vozača tokom vožnje (npr. na saobraćajne signale, kočenje itd.) i otežava vožnju (otežava pravilno zadržavanje vozila u traci, pravilno održavanje odstojanja od drugog vozila, itd.) (1). Smatra se da osoba koja koristi telefon ima četiri puta veći rizik da doživi saobraćajnu nesreću nego lica koje ne koristi telefon tokom vožnje (1). Približno sličan rizik daje *hands-free* korišćenje telefona.

Akcentat se danas posebno stavlja na dobro dizajniranje puteva (npr. postojanje pešačke staze, biciklističke staze, više vozničkih traka, itd.), jer putevi treba da obezbede što veću bezbednost za sve učesnike u saobraćaju (1). Takođe, u cilju što veće bezbednosti očekuje se proizvodnja što bezbednijih vozila prilikom sudara, što može da spasi mnoge živote. To znači da proizvođači vozila treba da obezbede vazdušne jastuke, sigurnosne pojaseve, stabilnost vozila itd. Nadekvatno sprovođenje zakona o saobraćaju (npr. vožnja u alkoholisanom stanju, nevezivanje sigurnosnih pojaseva, nepoštovanje ograničenja brzine, nenošenje kacige itd.) vode daljem porastu, a ne smanjivanju, smrtnih slučajeva i povreda u saobraćaju.

Značaj hitnog zbrinjavanja povređenih lica

Brojni faktori mogu uticati na zdravstvene posledice povređenih, uključujući mehanizam povrede, težinu povrede, način transporta i vreme transporta (od mesta povrede do najbliže zdravstvene ustanove u kojoj se povređeni može zbrinuti) (20,21). Važno je naglasiti da svako povređeno lice treba da dobije prehospitalnu negu i da bude prevezeno u najbližu bolnicu koja može da pruži sve neophodne medicinske intervencije i negu povređenom licu. Za najbolje ishode, povređena lica treba prevesti do najbliže ustanove mestu nesreće, jer samo brzom reakcijom i adekvatnim medicinskim tretmanom može se izbeći smrt i sprečiti komplikacije (22,23).

Neposredne i rane smrti čine gotovo 80% smrtnih slučajeva kod traume i obično se javljaju u prvih nekoliko sati od povrede, kao rezultat traumatske povrede mozga ili većeg iskrvavljenja. Otprilike 50% smrtonosnih povreda uzrokuje trenutnu smrt, 30% smrt u roku od 48 sati od nastale povrede, a 20% smrt tokom narednih nekoliko dana ili nedelja. Kasni smrtni ishodi, ishodi u roku od nekoliko dana ili nedelja od početne povrede,

countries, significant efforts and resources have been invested in the education and training of drivers, which relate to the implementation of rules and legal regulations regarding driving, especially speed limits, and encouraging drivers to adopt appropriate safety measures (7).

Failing to use seat belts and motorcycle and bicycle helmets

Numerous studies indicate that head trauma is a dominant injury in road traffic injuries due to limited use of seat belts and helmets (12,13). Therefore, nowadays people talk about the “silent epidemic” of head injuries (14,15). The results of many studies indicate the importance of use of seat belts while driving, as well as the use of helmets in motorcyclists and cyclists (14,15). The correct use of a helmet, according to the WHO data, can reduce the risk of death in a crash by more than 6 times, while wearing a seat belt can reduce the risk of death by up to 50%, and the use of child restraints by up to 71%. (1). Also, correct helmet use can reduce the risk of brain injury by up to 74%.

Driving under the influence of alcohol and other psychoactive substances

The use of alcohol and other psychoactive substances is one of the main causes of road traffic accidents and premature deaths (5). Studies conducted in Finland, Mexico and South Africa have confirmed that driving under the influence of alcohol impairs attention and cognitive abilities (16-18). According to Sauber-Schatz and associates, research results from high-income countries indicate that driving under the influence of alcohol is often associated with speeding and non-use of seat belts and helmets (19). According to the WHO data, in the case of drink-driving, even low levels of blood alcohol concentration contribute to the risk of a road traffic crash, while this risk increases significantly when the driver's blood alcohol concentration is > 0.04 g/dl (1). The risk of a crash among drivers who have used amphetamines is about 5 times the risk of someone who has not (1).

Other risk factors for the occurrence of road traffic injuries

Nowadays, using a mobile phone while driving (talking on the phone or sending messages) is often stated to be the cause of road traffic injuries,

which slows down driver's reaction while driving (e.g. reaction to traffic signals, braking reaction time) and makes it difficult to drive (to keep in the correct lane, and to keep the correct following distances, etc.) (1). It is believed that drivers using mobile phones are 4 times more likely to be involved in a crash than drivers not using a mobile phone (1). Hands-free phones pose the similar risk.

A special emphasis is nowadays placed on the design of roads (e.g. footpaths, cycling lanes, several driving lanes) because roads should be designed to provide the safety of all road users (1). Also, the production of safe vehicles is expected to ensure the safety in case of road traffic injuries, which could potentially save many lives. This means that vehicle manufacturers should ensure air bags, seat belts, vehicle stability etc. The inadequate enforcement of traffic laws (driving under the influence of alcohol, failing to wear seat belts, not respecting speed limits, failing to use a helmet etc.) leads to a further increase, and not a reduction in road traffic injuries and deaths.

The importance of providing emergency care for injured persons

Numerous factors can influence the health repercussions in injured persons, including the mechanism of injury, the severity of injury, the mode and time of transport (from the place of injury to the nearest health facility where the injured can receive care) (20,21). It is important to emphasize that each injured person should receive pre-hospital care and be transported to the nearest hospital that can provide all necessary medical interventions and care for the injured. For the best outcomes, injured persons should be transported to the nearest trauma center, because only a quick reaction and adequate medical treatment can prevent death and complications (22,23).

Immediate and early deaths account for nearly 80% of deaths caused by trauma and they usually occur within the first few hours of injury, as a result of brain injury or major bleeding. Approximately 50% of fatal injuries cause immediate death, 30% cause death within 48 hours of the injury, and 20% cause death within the next few days or weeks. Late fatal outcomes within a few days or weeks of the initial injury are usually secondary, due to multiorgan failure or sepsis (24).

su obično sekundarni, zbog multiorganske insuficijencije ili sepse (24).

Profesor i vizionar *Richard Cowley* uveo je izraz „zlatni sat”, jer je tokom svog angažovanja u Baltimoru, SAD, i američkoj vojsci tokom Drugog svetskog rata, zaključio da se velika većina smrtnih ishoda dešava u prvih 60 minuta nakon ranjavanja i povređivanja (25).

„Zlatni sat” uključuje maksimalno vreme zbrinjavanja i transporta bolesnika radi boljeg ishoda i preživljavanja. Prvih sat vremena nakon povređivanja, tj. „zlatni sat”, podrazumeva period gde se unesrećeni zbrinjava, u tom periodu se dijagnostikuje težina traume, procenjuje mogući ishod i primenjuju se mere za održavanje života i mere definitivnog zbrinjavanja (24,26).

Zbog visoke učestalosti javljanja trauma i mortaliteta, medicinski radnici moraju usvojiti principe organizovanog pristupa u početnom zbrinjavanju i lečenju pacijenata (27). Efikasno zbrinjavanje traume je prioritet u svim sistemima zdravstvene zaštite. U cilju što efikasnijeg zbrinjavanja povređenih, neophodno je sagledati sve potencijalne faktore koji utiču na ishod lečenja povređenih (28-30). Hitan prehospitalni tretman povređenih je od esencijalnog značaja za konačni ishod lečenja, budući da postoji niz vremenski osetljivih radnji koje su neophodne za postizanje pune efikasnosti zbrinjavanja povređenih (3).

Koncepcija savremene urgentne medicine nalaže da se zbrinjavanje povreda započne što pre na mestu povređivanja, prema jedinstvenoj dijagnostičko-terapijskoj doktrini. Na taj način se postiže da svi povređeni dobiju podjednako kvalitetnu zdravstvenu zaštitu i negu, preveniraju se nepotrebni smrtni ishodi i invaliditet nakon traume, a istovremeno štede sredstva i resursi u okviru zdravstvenog sistema (3). Jačanje sistema hitne medicinske pomoći, koji služe kao prva tačka kontakta, od suštinskog je značaja za obezbeđivanje pravovremenog i pravičnog pristupa nezi povređenih (31). Nedavno objavljena metaanaliza, koja je obuhvatila rezultate osam studija iz šest zemalja sa niskim i srednjim prihodima, o uticaju prehospitalne nege na ishod lečenja povređenih lica, pokazala je da primena adekvatne prehospitalne nege može smanjiti rizik od umiranja kod povređenih lica za čak 25% (32). Osim toga, u većini studija, navodi se da su hitno reagovanjima blizina prve zdravstvene ustanove od mesta nesreće zna-

čajniji za bolje preživljavanje povređenih lica u saobraćajnim nesrećama (33-37).

Registar traume

U cilju unapređenja preživljavanja lica posle saobraćajnog traumatizma, neophodno je uspostaviti registar trauma. Registar trauma se odnosi na sistematsko prijavljivanje svakog povređenog lica i prikupljanje podataka za svakog od njih. U ovaj registar unose se podaci o pacijentu (starost, pol, etnička pripadnost, prethodne zdravstvene informacije itd.), povredi (vrsta povrede, mehanizam povrede - saobraćajna nesreća, pad, nasilje, mesto povrede itd.), lečenju (prehospitalna nega, intervencije u urgentnom centru, hirurški zahvati, dužina hospitalizacije, komplikacije itd.) i ishodu (letalni ishod, stepen invaliditeta, izlečenje itd.) (38). Ovaj registar služi kao važan alat za medicinske stručnjake, istraživače i kreatore zdravstvenih politika u cilju praćenja i analize podataka, unapređenja kvaliteta zdravstvene zaštite i kreiranja zdravstvenih politika sa akcentom na prevenciji (38). Registri traume imaju i važnu ulogu u identifikaciji faktora koji su uzrok nastanka povreda, što doprinosi donošenju i sprovođenju raznovrsnih stručnih i edukativnih programa koji teže prevenciji i sprečavanju nastanka traume (38). Značaj ovih registara je posebno važan u zemljama sa niskim i srednjim prihodima, u kojima je opterećenje povredama i dalje veliki izazov, zbog nepreduzimanja preventivnih intervencija (39). Zahvaljujući registru traume moguće je identifikovati neke od faktora rizika, na koje možemo uticati i delovati preventivno (unapređenje kvaliteta puteva, edukacija vozača i pešaka o saobraćajnim pravilima, saobraćajna kontrola, kontrola ispravnosti motornih vozila i drugo) (40). Dosadašnja iskustva govore da postoje određene barijere za implementaciju i korišćenje podataka iz registra traume, a to su loš kvalitet podataka, nedostatak informacionih tehnologija, adekvatne putne infrastrukture, finansiranja od strane fondova, kao i nedostatak edukovanog i stručnog kadra, i administrativne poteškoće, što može registre traume u određenoj meri činiti neefikasnim (40). U poslednje tri decenije zbog uvođenja registara traume, evidentno je poboljšanje saobraćajne infrastrukture, edukacije učesnika u saobraćaju i povećanje broja preventivnih kampanja, što je doprinelo značajnom smanjenju umrlih u saobraćajnim

Professor and visionary Richard Cowley introduced the term “golden hour”, because during his engagement in Baltimore, the USA, and in the US Army during the Second World War, he concluded that the vast majority of deaths occurred in the first 60 minutes after being wounded or injured (25). The “golden hour” includes the maximum time of patient care and transport for better outcome and survival. The first hour after the injury, that is, the “golden hour” is the period when care is provided for an injured person, during which the severity of the injury is diagnosed, the possible outcome is assessed, while life support and definitive care measures are implemented (24,26).

Due to the high incidence of injuries and mortality, medical professionals must adopt the principles of an organized approach in the initial care and treatment of patients (27). Effective trauma care is a priority in all health care systems. In order to treat the injured as efficiently as possible, it is necessary to consider all potential factors that affect the outcome of their treatment (28-30). Emergency pre-hospital care of the injured is essential for the final outcome of the treatment, because there are a series of time-sensitive actions that are necessary to provide effective care for the injured (3).

The concept of modern emergency medicine implies the provision of timely care at the scene, according to the uniform diagnostic and therapeutic doctrine. In this way, the injured persons receive equally high-quality health care, unnecessary deaths and disability are prevented, and at the same time funds and resources within the health care system are saved (3). Strengthening the emergency health care systems, which are the first point of contact, is essential to ensure timely and equitable access to care of injured persons (31). A recently published meta-analysis, which included the results of eight studies from six low-income and middle-income countries, on the impact of pre-hospital care on the outcome of treatment of injured persons, showed that the application of adequate pre-hospital care can reduce the risk of death in injured persons by as much as 25% (32). In addition, in most studies, it is stated that emergency response and the proximity of the first health care institution to the scene of the accident are significant for better survival of the injured in traffic accidents (33-37).

Trauma registry

In order to improve the survival of persons after road traffic injuries, it is necessary to establish a trauma registry. The trauma registry refers to the systematic reporting of each injured person and the collection of data for each of them. This registry contains information about the patient (age, gender, ethnicity, previous health information, etc.), injury (type of injury, mechanism of injury – road traffic accident, fall, violence, place of injury, etc.), treatment (pre-hospital care, interventions in emergency center, surgical procedures, duration of hospitalization, complications, etc.) and outcome (fatal outcome, degree of disability, healing, etc.) (38). This registry serves as an important tool for medical professionals, researchers and health policy makers aimed at monitoring and analyzing data, improving the quality of health care and creating health policies with an emphasis placed on prevention (38). Trauma registries also play an important role in identifying factors that cause injuries, which contributes to the adoption and implementation of various professional and educational programs aimed at the prevention of injuries (38). The significance of these registries is especially important in low- and middle-income countries, where the burden of injuries is still a big challenge, due to the lack of preventive interventions (39). Thanks to the trauma registry, it is possible to identify some of the risk factors, which can be identified and prevented (improvement of the quality of roads, education of drivers and pedestrians about traffic rules, traffic control, control of motor vehicles, etc.) (40). Previous experiences show that there are certain barriers to the implementation and use of data from the trauma registry, namely poor data quality, lack of information technologies, adequate road infrastructure, financing from funds, as well as the lack of educated and professional staff, and administrative difficulties, which can make trauma registries ineffective to some extent (40). In the last three decades, due to the introduction of trauma registries, the improvement of traffic infrastructure is evident, as well as the traffic education of all road users and an increase in the number of preventive campaigns, which contributed to a significant reduction in road traffic deaths in developed countries (41,42). An efficient trauma registry can significantly contribute to the

nesrećama u razvijenim delovima sveta (41,42). Efikasan registar traume može značajno doprineti unapređenju zdravstvenog sistema i boljim ishodi- ma za lica sa traumatskim povredama.

Zaključak

Efikasno zbrinjavanje traume je prioritet u svim sistemima zdravstvene zaštite. S obzirom na veliku učestalost i smrtnost od traume, potreb- no je sagledati sve potencijalne faktore rizika koji utiču na ishod lečenja povređenih. U cilju identi- fikovanja potencijalnih faktora rizika neophodno je razviti sistem nadzora nad traumama. U zem- ljama u kojima postoji registar traume došlo je do značajnog smanjivanja broja smrtnih ishoda među licima sa traumama i politraumama pre hospital- izacije, u toku hospitalizacije, nakon hospitalizacije i u procesu rehabilitacije. Neophodno je da svaka zemlja razvije sistem nadzora nad traumama, što će doprineti unapređenju dosadašnjih politika za kontrolu i smanjenje smrtnih ishoda kod trauma- tizovanih lica. Faktori kao što su dostupnost adekvatne zdravstvene zaštite, vreme reakcije hitne medicinske službe, iskustvo i organizacija trauma tima, udaljenost hospitalne zdravstvene ustanove i njena opremljenost i stručna osposobljenost za adekvatno zbrinjavanje teško povređenih, direk- tno utiču na kvalitet i ishod lečenja povređenih pacijenata i povećavaju šansu za preživljavanjem.

Konflikt interesa

Autori su izjavili da nema konflikta interesa.

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improvement of the health system and better outcomes in persons with traumatic injuries.

Conclusion

Effective trauma care is a priority in all health care systems. Given the high incidence and mortality rate of trauma, it is necessary to consider all potential risk factors that affect the outcome of the treatment of injured persons. In order to identify potential risk factors, it is necessary to develop a trauma surveillance system. In countries, which have trauma registries, there has been a significant reduction in the number of deaths among persons with trauma and polytrauma before hospitalization, during hospitalization, after hospitalization and during the rehabilitation process. Each country should necessarily develop its trauma surveillance system, which will contribute to the improvement of current policies for the control and reduction of fatal outcomes in traumatized persons. Factors such as the availability of adequate health care, the response time of the emergency medical service, the experience and organization of the trauma team, the distance of the hospital and its equipment and expertise for the adequate care of the seriously injured directly affect the quality and outcome of the treatment of injured patients and increase the chance of survival.

Competing interests

The author declared no competing interests.

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