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KNOWLEDGE OF HEALTHCARE WORKERS REGARDING ROAD TRAFFIC CHILD SAFETY IN SOUTH BAČKA DISTRICT, SERBIA

ZNANJE ZDRAVSTVENIH DELAVCEV O VARNOSTI OTROK V CESTNEM PROMETU V JUŽNOBAČKEM OKRAJU, SRBIJA

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ABSTRACT

Introduction: Healthcare workers (HCW) can have an important role in educating parents about child road safety, but research on the topic shows that they usually do not have adequate knowledge. Thus, the aim of our study was to analyze their knowledge in the field of child road safety.

Methods: The cross-sectional study was conducted among HCW from South Bačka district, Serbia, using a specially created questionnaire for assessing knowledge on road traffic injuries in children.

Results: The research involved the participation of 317 healthcare workers (86 physicians and 231 nurses). Healthcare workers from primary healthcare made up almost 70% of all respondents, followed by those from tertiary (21.8%) and secondary (11.3%) level institutions. The average percentage of correct answers on the knowledge test was 74.3% (mean=22.3, SD=4.0). Out of all respondents, HCWs employed in the paediatrics department had a significantly higher percentage of correct answers at 77.7% (mean=23.3, SD=3.4) compared to other health workers at 73% (mean=21.9, SD=4.1) (p=0.002). Association analysis demonstrated that HCW employed at paediatric departments on average scored 1.37 (95% CI: 0.40-2.33, p=0.006) points higher in comparison with other HCW.

Conclusion: This research demonstrated an unsatisfactory level of knowledge on child road safety by HCW, and the variability across different question domains, which underlines the need for continuous educations in order to improve their knowledge. Our results may serve in planning additional public health measures and can provide a reference for future studies.

Keywords:
Road traffic injuries
Children
Knowledge
Healthcare workers
Prevention

IZVLEČEK

Uvod: *Zdravstveni delavci imajo lahko pomembno vlogo pri izobraževanju staršev o varnosti otrok v cestnem prometu, vendar raziskave na to temo kažejo, da običajno nimajo ustreznega znanja. Tako je bil cilj naše raziskave analizirati njihovo znanje s področja varnosti otrok v cestnem prometu.*

Metode: *Presečna študija je bila izvedena med zdravstvenimi delavci iz južnobačkega okraja, Srbija, z uporabo posebej izdelanega vprašalnika za ocenjevanje znanja o prometnih poškodbah pri otrocih.*

Rezultati: *V raziskavi je sodelovalo 317 zdravstvenih delavcev (86 zdravnikov in 231 medicinskih sester). Med vsemi anketiranimi je bilo skoraj 70 % zdravstvenih delavcev na primarni ravni, sledijo pa jim zaposleni na terciarni (21,8 %) in sekundarni (11,3 %) ravni. Povprečni odstotek pravilnih odgovorov na preizkusu znanja je bil 74,3 % (povprečje = 22,3, SD = 4,0). Med vsemi anketiranci so imeli zdravstveni delavci, zaposleni na pediatričnem oddelku, značilno večji odstotek pravilnih odgovorov (77,7 %) (povprečje = 23,3, SD = 3,4) v primerjavi z drugimi zdravstvenimi delavci (73 %) (povprečje = 21,9, SD = 4,1) (p = 0,002). Asociacijska analiza je pokazala, da so zdravstveni delavci, zaposleni na pediatričnih oddelkih, v povprečju dosegli 1,37 (95 % IZ: 0,40-2,33, p = 0,006) točke višje rezultate v primerjavi z drugimi zdravstvenimi delavci.*

Zaključek: *Ta raziskava je pokazala nezadovoljivo raven znanja zdravstvenih delavcev o varnosti otrok v cestnem prometu in variabilnost med različnimi domenami vprašanj, kar poudarja potrebo po nenehnem izobraževanju za izboljšanje njihovega znanja. Naši rezultati lahko služijo pri načrtovanju dodatnih javnozdravstvenih ukrepov in so lahko referenca za prihodnje študije.*

Ključne besede:
poškodbe v cestnem prometu
otroci
znanje
zdravstveni delavci
preprečevanje

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1 INTRODUCTION

Road traffic accidents (RTA) still represent an extremely significant public health problem at the global level despite the numerous successful measures and activities implemented during the Decade of Action for Road Safety 2011-2020 (1). Progress, achieved primarily in the creation and implementation of legislation, improvement of vehicle standards and better access and care after an accident, has not succeeded in compensating for the growth of the population and the number of motor vehicles (1). If a comparison is made with the data from the previous WHO report, it can be seen that deaths as a result of traffic accidents increased from 1.25 million in 2013 to 1.36 million annually in 2018 (2, 3) that is, around 3,700 people die on the world's roads every day. It is estimated that, without appropriate actions aimed at improving traffic safety, the situation will worsen, that by 2030 traffic injuries will be the fifth leading cause of death, it is currently eight leading causes of death for (4). Proclaiming the Second Decade of Action for Road Safety 2021-2030 involves a new target to reduce road deaths and injuries by 50% by year 2030 (5).

Children represent one of the most vulnerable categories of road users, first of all because they do not have developed psychophysical abilities like adults, and they do not have enough experience or knowledge about safe participation in traffic. On the other hand, young road users do not have enough experience in driving a vehicle, and also the degree of emotional maturity, as well as the lifestyle of young people, increases the risk of traffic accidents and the severity of the consequences of traffic accidents (4, 6). It is documented that injuries in traffic accidents are the leading cause of death among young people between the ages of 5 and 29 years old, and are one of the three leading causes of death for people aged 15 to 44 years. Analysis of the age-specific mortality rates from injuries according to external causes, in both sexes, showed that in total, children (0-19 years) die mostly due to traffic accidents (4).

Road traffic injuries (RTI) in children are also an important public health issue in Serbia. When analyzing the number of children that died in road traffic accidents during the period 1997-2021 in the Republic of Serbia, a decreasing trend was reported, even though the number varied from year to year. In the last ten years, 34 children aged 0-14 years died in traffic accidents, while 16,147 children were injured. In 2021, 101 young people aged 15-30 years died in Serbia, which is 19% of the total number of people that died in traffic accidents, that is, every fifth person. In the same year, 6,587 young road users were injured, which is 33% of the total number of people injured in road traffic accidents (7, 8).

Preventive programmes and a systematic approach to solving the problems of traffic accident victims require a multidisciplinary engagement of different professionals, in which the health sector is one of the leading partners. The most successful programmes globally are those that have integrated legislative, regulatory and enforcement systems, combined with data collection and management systems, economic evaluation systems to inform investment decisions, significant technical and executive capacity, and a substantial knowledge base of social, medical and behavioural implications of road safety interventions (4, 9). The health sector is responsible for the implementation of measures of traffic safety education and training in order to acquire adequate knowledge, skills and habits necessary for safe participation in traffic through education of citizens on the health aspects of safe behaviour in traffic.

Healthcare workers (HCW) can have an important role in raising awareness and educating parents about child safety in traffic (10). A prerequisite for this is adequate knowledge of HCW themselves about traffic safety. However, research on the topic shows that health workers lack education in this area and that they usually do not have adequate knowledge of, nor do they regularly disseminate, this information (11). Healthcare professionals cite as the most common obstacles the lack of time and knowledge to advise their patients in the area of child safety in traffic (11, 12). According to data from the literature, the level of knowledge of HCW on this topic ranges from 4% (13) to around 53% (12).

Taking into account the authority that HCW have among the parents of the paediatric population for whom they provide healthcare, HCW and associates play a significant role in educating and forming the opinions of their patients and their families when it comes to various health aspects, including traffic injury prevention (14–17).
Therefore, the aim of this paper was to analyze the knowledge of HCW in the field of child safety in traffic.

2 METHODS

2.1 Study design

The research was carried out as a cross-sectional study. In the period from February to November 2022, HCW from four healthcare institutions in South Bačka district (the Primary Healthcare Centre (PHC) in Novi Sad, the Institute for Health Protection of Children and Youth of Vojvodina, Vrbas General Hospital, the Gynaecology and Obstetrics Clinic at the Clinical Centre of Vojvodina) were invited to participate in the survey. The opinion poll encompassed 317 HCW. There were 90 (28.4%) participants (doctors and nurses) from paediatric departments, and 227 (71.6%) from other departments, predominantly general medicine and surgery. In the paediatric departments,

a higher percent of nurses participated in this research (85.5%) compared to other medical departments (67.9%) ($p<0.001$). Participation in the study was voluntary and anonymous. Each HCW was informed about the purpose of the study and signed an informed consent form. The questionnaire was distributed to the HCW by a researcher, and during their regular working time the HCW completed the questionnaire on a paper form. The total number of questionnaires distributed to healthcare workers was around 1,225 in total, and after a few solicits the response rate was 25.9. The research instrument was a structured questionnaire for assessing knowledge on road traffic safety and injuries in children. The structured questionnaire was developed by the researcher based on the aim of the study and based on questions used in similar studies about RTI in children. The questionnaires contained 30 multiple choice questions. The questionnaire consisted of two parts, first covered the sociodemographic characteristics of the respondents (age, gender, level of education, years of clinical work, having underage children) and the second part comprised questions to determine level of knowledge, risk perception, preventive measures towards road traffic safety and injuries in children. Questions were coded during the analysis as one and zero based on whether the response was correct or incorrect respectively. The coded data were entered in a specially created database.

2.2 Statistical analyses

We used descriptive statistics and presented categorical variables as absolute frequencies with percentages (%) while continuous and discrete data were presented as mean with standard deviation (SD). We used a Chi-squared test (or Fisher's exact test, where appropriate) for categorical variables and Wilcoxon rank-sum or ANOVA test for discrete variables. We used univariate and multivariate linear regression analyses to identify independently associated factors with the score on the knowledge test. All statistical analyses were performed using statistical software package Stata v.16 (College Station, TX: Stata Corp LLC. 2019), and $p<0.05$ was set as the level of statistical significance.

3 RESULTS

The research involved the participation of 317 healthcare workers (86 physicians and 231 nurses) across four healthcare institutions in the South Bačka district. There were more women in the research (n=275, 86.7%) than male respondents (n=42, 13.3%), and the average age of participants was 40.2 (SD±11.7) years. The average number of years of clinical experience was 15.9 years (SD±11.6). The average years of work experience was 14.5 for doctors and 16.3 for nurses. HCW from primary healthcare made up almost 70% of all respondents, followed by those from tertiary (21.8%) and secondary (11.3%) level institutions. The majority of the participants (59.6%) did not have underage children at the time of the research. Around 87% of participants did not participate in any educational activities (courses, continuing medical education, etc.) related to traffic trauma prevention in the last three years. Also, a higher percentage of HCW from paediatric departments (20%) participated in previous educational activities related to traffic trauma prevention compared to other departments (10.1%) ($p=0.018$).

All sociodemographic and professional characteristics of the respondents are shown in Table 1.

Table 1. General characteristics of the participants based on the department's activity.

	Total (n=317)	Paediatric activity (n=90)	Total (n=317)	p-value[1]
Sex				
male	42 (13.3)	7 (7.8)	35 (15.4)	0.07
female	275 (86.7)	83 (92.2)	192 (84.6)	
Age, mean (SD)	40.2 (11.7)	40.7 (11.7)	40.1 (11.7)	0.622
Age category				
19-29 years	67 (21.1)	18 (20)	49 (21.6)	0.83
30-39 years	85 (26.8)	22 (24.5)	63 (27.8)	
40-49 years	91 (28.7)	29 (32.2)	62 (27.3)	
50-65 years	74 (23.4)	21 (23.3)	53 (23.3)	
Number of underage children				
none	189 (59.6)	52 (57.8)	137 (60.3)	0.905
one	56 (17.7)	17 (18.9)	39 (17.2)	
two or more	72 (22.7)	21 (23.3)	51 (22.5)	
Level of healthcare institution				
primary	212 (66.9)	38 (42.2)	174 (76.7)	**<0.001**
secondary	36 (11.3)	3 (3.3)	33 (14.5)	
tertiary	69 (21.8)	49 (54.5)	20 (8.8)	
Profession				
doctor	86 (27.1)	13 (14.5)	73 (32.2)	**<0.001**
nurse	188 (59.3)	56 (62.2)	132 (58.2)	
high/higher nurse	43 (13.6)	21 (23.3)	22 (9.7)	
Years of work, mean (SD)	15.9 (11.6)	17.4 (11.8)	15.2 (11.5)	0.088
Years of work category				
<1 year	17 (5.4)	3 (3.3)	14 (6.2)	0.133
1-5 years	71 (22.4)	22 (24.5)	49 (21.6)	
6-20 years	124 (39.1)	28 (31.1)	96 (42.3)	
>20 years	105 (33.1)	37 (41.1)	68 (29.9)	
Counselling about RTI prevention during work time				
yes	29 (9.2)	10 (11.1)	19 (8.4)	0.445
no	288 (90.8)	80 (88.9)	208 (91.6)	
Participation in road safety education in the past 3 years				
yes	41 (12.9)	18 (20.0)	23 (10.1)	**0.018**
no	276 (87.1)	72 (80.0)	204 (89.9)	

Legend: [1]Chi squared (Fisher's exact test) or Wilcoxon rank-sum test, where appropriate. Figures in bold are results at the significance level p<0.05. *Other medical activity includes wards: general practice, emergency medicine, gynaecology, orthopaedics, radiology, laboratory, dentistry.

In Table 2, we presented the comparison of the total score on the knowledge test between HCW employed in the paediatrics department and other HCW, based on their general characteristics. We found a significantly higher number of correct answers in HCW from paediatrics departments in comparison to other HCW for females (p<0.001), those in the age category 30-39 years old (p=0.023), as well as HCW without underage children (p=0.002), from primary healthcare institutions (p=0.042) and for nurses (p=0.007). Also, a significantly higher number of correct answers was reported in HCW from paediatrics departments with ≥6 years of work (6-20 years, p=0.024; >20 years, p=0.006) as well as from those that do not provide counseling about RTI prevention during work time (p=0.008) relative to HCW from other departments.

The average percentage of correct answers on the knowledge test was 74.3% (mean=22.3, SD=4.0). Out of all respondents, HCWs employed in the paediatrics department had a significantly higher percentage of correct answers 77.7% (mean=23.3, SD=3.4) compared to other health workers 73% (mean=21.9, SD=4.1) (p=0.002). More than 85% of HCW correctly identified road traffic injuries as a leading cause of death of children after the first year of life, with a higher percent of correct answers in those from paediatric departments (91.1%) compared to others (82.8%) (p=0.061). On the other hand, there was a statistically significant difference in the percent of correct answers in the domain child car seats are installed safely if they are in accordance with the manufacturer's instructions, between HCW from paediatric (92.2%)

Table 2. Number of correct answers based on general characteristics of the study participants.

	Total, mean (SD)	Paediatric activity, mean (SD)	Other medical activity, mean (SD)	p-value[1]
Sex				
male	21.6 (4.9)	20.9 (5.9)	21.8 (4.7)	0.72
female	22.4 (3.8)	23.5 (3.1)	22.0 (4.0)	<0.001
Age category				
19-29 years	21.5 (4.1)	21.3 (4.3)	21.6 (4.1)	0.992
30-39 years	22.7 (4.0)	24.5 (2.8)	22.1 (4.2)	0.023
40-49 years	22.6 (3.9)	23.8 (2.1)	22.1 (4.4)	0.054
50-65 years	22.2 (3.9)	23.1 (4.1)	21.8 (3.8)	0.092
Number of underage children				
none	21.7 (4.2)	22.8 (3.8)	21.3 (4.2)	0.002
one	23.6 (3.3)	24.1 (2.4)	23.5 (3.6)	0.863
two or more	22.9 (3.7)	23.9 (3.0)	22.6 (3.9)	0.167
Level of healthcare institution				
primary	21.6 (4.2)	22.6 (3.6)	21.3 (4.3)	0.042
secondary	23.4 (2.4)	24.0 (1.0)	23.4 (2.5)	0.641
tertiary	24.1 (3.1)	23.8 (3.3)	24.8 (2.6)	0.343
Profession				
doctor	22.8 (3.6)	23.9 (2.5)	22.6 (3.8)	0.288
nurse	21.9 (4.2)	23.1 (3.7)	21.5 (4.4)	0.007
high/higher nurse	23.0 (3.2)	23.5 (3.2)	22.5 (3.3)	0.135
Years of work category				
<1 year	22.3 (4.5)	22.7 (0.6)	22.2 (4.9)	0.941
1-5 years	21.7 (4.3)	22.1 (4.5)	21.6 (4.2)	0.545
6-20 years	22.9 (3.7)	24.3 (2.2)	22.5 (4.0)	0.024
>20 years	22.1 (3.9)	23.3 (3.4)	21.4 (4.0)	0.006
Counselling about RTI prevention during work time				
yes	22.4 (4.7)	24.3 (3.8)	21.4 (4.9)	0.07
no	22.3 (3.9)	23.2 (3.4)	22.0 (4.0)	0.008
Participation in road safety education in the past 3 years				
yes	22.2 (4.9)	24.6 (2.3)	20.3 (5.6)	0.013
no	22.3 (3.8)	23.0 (3.6)	22.1 (3.9)	0.035

Legend: [1]t-test or Wilcoxon rank-sum test (Fisher's exact test), where appropriate

and other departments (76.2%) (p=0.001), as well as in the domain of the correct handling of the child car seat between HCW from paediatric and other departments, 93.3% versus 84.6% (p=0.036) respectively.

Also, more than 90 percent of respondents knew that pregnant women must wear a seat belt, and that a child is safest in a rear-facing car seat. In contrast, a lack of knowledge was observed when answering the question about the age of a child up to which they must be transported in a rear-facing car seat; about a third of respondents correctly answered this question, where those employed in paediatrics scored higher relative to those from other departments (35.6% vs. 29.1, p=0.260). When it comes to using a child car seat, only 48.3% of the participants knew that in Serbia, the law stipulates that a child in a vehicle must be transported in a child car seat. However, a little more than a third of HCW (37.5%, n=119) were able to correctly answer the question when a child is big enough to wear a seat belt independently without using child car seats (being 150 cm tall and weighing 36 kg). The attitudes of HCW towards injury prevention and participation in these activities showed that 92.1% of the respondents recognize the injury of children in traffic as a public health problem, while only 27.8% consider it a part of their professional duties because they are the authority for parents. A detailed specification of correct answers on all other question domains and across participants' departments is presented in Table 3.

Table 3. Number of correct answers by study participants and across the department's main medical activity.

	Total, n (%)	Paediatric activity (n=90)	Other medical activity (n=227)	p-value[1]
Total correct answers on test, mean (SD)	22.3 (4.0)	23.3 (3.4)	21.9 (4.1)	**0.002**
How many people die every year as a result of traffic accidents in the world?	151 (47.6)	53 (58.9)	98 (43.2)	**0.012**
Leading cause of death for children and young adults aged 5-29 years in the world?	267 (84.2)	73 (81.1)	194 (85.5)	0.338
What is primary prevention of RTI?	245 (77.3)	76 (84.4)	169 (74.5)	0.055
Child seats and boosters reduce the risk of injury and death in a crash by what percentage?	234 (73.8)	67 (74.4)	167 (73.6)	0.873
Leading cause of death among children aged 1-14 years in Serbia	270 (85.2)	82 (91.1)	188 (82.8)	0.061
Minimum height for transition from booster seat belt to seat belt only	213 (67.2)	56 (62.2)	157 (69.2)	0.235
According to Serbian law, a child of what age can sit in the front seat	129 (40.7)	42 (46.7)	87 (38.3)	0.173
Whether the use of seat belts in both the front and back seats is mandatory by law	253 (79.8)	76 (84.4)	177 (78.0)	0.196
Is it prescribed by law in Serbia that in public transport we have to use a child car seat	153 (48.3)	46 (51.1)	107 (47.1)	0.523
For pregnant women it is prescribed by law that they must use a seat belt	286 (90.2)	85 (94.4)	201 (88.6)	0.111
The best possible protection for babies while riding in the car	286 (90.2)	84 (93.3)	202 (89.0)	0.24
Minimum age an infant can be forward-facing	98 (30.9)	32 (35.6)	66 (29.1)	0.26
A sign that you've outgrown the rear-facing car seat is	269 (84.9)	77 (85.6)	192 (84.6)	0.827
A properly restrained child in a car seat means	270 (85.2)	78 (86.7)	192 (84.6)	0.638
How many fingers can fit between the child's chest and harness if they are properly tight	264 (83.3)	79 (87.8)	185 (81.5)	0.177
Child car seats are installed safely if they are in accordance with the manufacturer's instructions	256 (80.8)	83 (92.2)	173 (76.2)	**0.001**
A newborn's first ride should be in a rear-facing car seat	273 (86.1)	82 (91.1)	191 (84.1)	0.106
Minimum height, weight and age to transition from car seat to booster seat	197 (62.2)	63 (70.0)	134 (59.0)	0.069
Minimum height and weight to graduate from booster seat with seat belt to seat belt only	119 (37.5)	33 (36.7)	86 (37.9)	0.84
Should we tighten the child in a car seat in a winter jacket?	248 (78.2)	67 (74.4)	181 (79.7)	0.303
Whether between the child and the car seat we can put something that is not an original part of the car seat (towel, blanket)	272 (85.8)	78 (86.7)	194 (85.5)	0.782
Each seat has a guarantee period for safe use specified by the manufacturer	229 (72.2)	71 (78.9)	158 (69.6)	0.096
Knowledge of the correct handling of the child car seat	276 (87.1)	84 (93.3)	192 (84.6)	**0.036**
Knowledge of the need to deactivate the airbag	303 (95.6)	89 (98.9	214 (94.3)	0.125
Regular use of seatbelts	269 (84.9)	79 (87.8)	190 (83.70)	0.361
Regular use of head restraints in the car	294 (92.7)	87 (96.7)	207 (91.2)	0.099
Responsibility for child RTI	292 (92.1)	84 (93.3)	208 (91.6)	0.612
Health providers are important partners in promoting the importance and proper use of child car seats	88 (27.8)	19 (21.1)	69 (30.4)	0.096
Advising parents on the importance of car seats	286 (90.2)	86 (95.6)	200 (88.1)	0.057
Source of information on proper use of car seats	286 (90.2)	86 (95.6)	200 (88.1)	0.057

Legend: [1]Chi squared (Fisher's exact test) or Wilcoxon rank-sum test, where appropriate. Figures in bold are the results at the significance level $p<0.05$.

We additionally explored the effect of years of professional activity on the level of knowledge of RTI in children. We classified participants in three categories, those with ≤5 years of active service (n=88, 27.8%), 6-20 years (n=124, 39.1%), and those with >20 years (n=105, 33.1%), and noticed that the highest mean value of the correct answers (22.9, SD±3.7) had respondents with 6-20 years of work experience. Additionally, HCW from category >20 years of professional activity scored the lowest (69.5% of correct answers) in the domain of fastening the child in a car seat in a winter jacket, compared to other categories (p=0.030). On the other hand, those from the youngest working category, with ≤5 years of active service, scored the lowest in the domain responsibility for child RTI (p=0.038).

Table 4. Univariate and multivariate analyses of association between personal characteristics of HCW and performance in the knowledge test.

				Model 1			Model 2		
	Coef.	**95% CI**	**p-value**	**Coef.**	**95% CI**	**p-value**	**Coef.**	**95% CI**	**p-value**
Sex									
male	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.
female	0.81	-0.49-2.11	0.219	0.63	-0.66-1.92	0.336	0.8	-0.43-2.04	0.203
Age, mean (SD)	0.01	-0.03-0.05	0.581	0.01	-0.03-0.05	0.628	0.04	0.01-0.08	0.02
Age category									
19-29 years	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.
30-39 years	1.21	-0.06-2.49	0.063	1.22	-0.04-2.49	0.057	1.19	-0.15-2.53	0.081
40-49 years	1.14	-0.12-2.40	0.075	1.07	-0.17-2.32	0.091	1.49	0.15-2.83	0.03
50-65 years	0.7	-0.62-2.01	0.3	0.67	-0.63-1.98	0.309	1.63	0.33-2.93	0.014
Number of underage children									
none	ref.	ref.	ref.	ref.	ref.	ref.	-	-	-
one	1.95	0.78-3.12	0.001	1.91	0.75-3.07	0.001	-	-	-
two or more	1.25	0.19-2.32	0.021	1.23	0.18-2.28	0.022	-	-	-
Level of healthcare institution									
primary	ref.	ref.	ref.	ref.	ref.	ref.	-	-	-
secondary	1.88	0.52-3.24	0.007	1.94	0.57-3.30	0.005	-	-	-
tertiary	2.51	1.47-3.56	<0.001	2.21	1.01-3.40	<0.001	-	-	-
Profession									
doctor	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.
nurse	-0.82	-1.84-0.19	0.112	-1.03	-2.05-(-0.02)	0.046	-1.54	-2.53-(-0.55)	0.002
high/higher nurse	0.22	-1.24-1.68	0.766	-0.27	-1.74-1.21	0.723	-0.17	-1.55-1.21	0.813
Department's main activity									
Paediatric activity	1.37	0.40-2.33	0.006	-	-	-	0.4	-0.64-1.43	0.449
Other medical activity	ref.	ref.	ref.	-	-	-	ref.	ref.	ref.
Years of work	-0.01	-0.04-0.03	0.771	-0.01	-0.05-0.03	0.592	0.02	-0.02-0.06	0.331
Years of work category									
<1 year	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.
1-5 years	-0.55	-2.66-1.56	0.61	-0.75	-2.83-1.34	0.481	-0.32	-2.34-1.71	0.757
6-20 years	0.59	-1.43-2.61	0.564	0.52	-1.47-2.51	0.609	1.08	-0.10-3.16	0.308
>20 years	-0.25	-2.29-1.79	0.812	-0.51	-2.53-1.51	0.619	0.65	-1.35-2.66	0.521
Counselling about RTI prevention during work time									
yes	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.
no	-0.1	-1.63-1.43	0.896	-0.01	-1.52-1.50	0.99	-0.02	-1.49-1.44	0.976
Participation in road safety education in the past 3 years									
yes	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.
no	0.17	-1.14-1.48	0.795	0.42	-0.88-1.73	0.524	0.52	-0.74-1.78	0.418

Legend: Model 1 - adjusted for the department's main activity. Model 2 - adjusted for level of healthcare institution and the number of underage children

When analyzing the association between personal characteristics of HCW and performance in the knowledge test we noticed that the score on the knowledge test was, on average, 1.95 (95% CI: 0.78-3.12, p=0.001) and 1.25 (95% CI: 0.19-2.32, p=0.021) points higher for those HCW with one and with two or more underage children, respectively, in comparison with those without underage children. Similarly, HCW from secondary and tertiary healthcare institutions scored 1.88 (95% CI: 0.52-3.24, p=0.007) and 2.51 (95% CI: 1.47-3.56, p<0.001) points higher compared to HCW from primary level institutions. On the other hand, HCW employed at the paediatric departments on average scored 1.37 (95% CI: 0.40-2.33, p=0.006) points higher in comparison with other HCW.

After adjustment for the department's main activity the results remained substantially the same, while when adjusting for the level of healthcare institution and the number of underage children, age was a significant predictor of the score on the knowledge test, where those of older age scored better (40-40 years old, coef: 1.49, 95% CI: 0.15-2.83, p=0.03; and 50-65 years old, coef: 1.63, 95% CI: 0.33-2.93, p=0.014) relative to their youngest colleagues (age 19-29 years old). Also, nurses on average scored 1.54 (95% CI: -2.53-(-0.55), p=0.002) points lower relative to physicians.

4 DISCUSSION

The fact is that the level of education of road users is very important for the prevention of traffic accidents, and it has also been confirmed that HCW can help reduce RTIs through the important role of communication/information in both their professional and private environments (18). The results of our research indicate insufficient knowledge, especially in several important domains among HCW regarding road traffic safety, given that the average percentage of correct answers in the test was 74.3%. Given that the results of the research indicate a lack of knowledge about the proper use of child car seats by health workers, it is necessary to prioritize the education of health workers as an important partner in health education work with parents as a priority in public health policies (19). HCWs also need "train the trainer" education to advise and teach parents the requisite knowledge and skills for the importance and safe use of child car restraints. In our study, only 13% of respondents reported that they had received education about child car seat systems in the last three years, reflecting the need for greater HCW knowledge. In the study by Tan et al. only 4.4% of respondents had previously attended teaching on child car seat systems (20).

In our study, we found that paediatric health professionals were more knowledgeable about road traffic injuries in children compared to other healthcare providers. The results of the survey conducted among healthcare workers in Croatia are in line with our results, where paediatric health professionals also had the highest score of correct answers at 60.8 (mean overall % correct) (14). The results of a study conducted in the USA suggest that healthcare providers also show a lack of knowledge about child safety in traffic, which can contribute to the suboptimal use of car safety seats when it comes to children aged 4-14 years (13). Similarly, among our respondents, healthcare professionals demonstrated insufficient knowledge regarding the safety of children in cars. Lack of knowledge is related to the questions what is the minimum age at which children can graduate from a rear-facing child safety seat to a forward-facing child safety seat, when should the child transition to a booster seat, at about what height are children generally ready to graduate from a booster seat to wearing only a-lap shoulder belt, and until what age are children safest riding in the back. Additionally, HCW in Poland also had insufficient knowledge about child restraint systems (21).

In the study by Cohen and Runyan almost all (94%) knew that injury was the leading cause of death for children aged 1 to 4 years, showing similar results to our study in which 91.1% of paediatric health professionals and 82.8% of other providers gave the correct answer (22, 23). Also, Brčina et al. reached similar results in their research, where more than 80% of HCW gave the correct answer regarding injuries as the leading cause of death of children after the age of first year (24).

The recommendations of the WHO advocated for health professionals being involved in road safety by adopting a coordinated public health and multisectoral approach, which is currently missing in Serbia. One of the best examples of how the involvement of health providers in road safety has been beneficial is Sweden, which with a death rate due to traffic trauma of 2.8 per 100,000 inhabitants, is a leader in the field of traffic safety. The experience in Sweden, which in the period from 1990 to 2015 reduced the number of traffic fatalities by 66%, shows what results can be achieved by long-term multi-year planning of a systematic approach based on evidence, with strong institutional support that includes leadership, multi-sectoral cooperation, sustainable investments and a focus on achieving road safety (25, 26)

Healthcare professionals play an important role in educating and forming the opinions of their patients and their families when it comes to various health aspects, including injury prevention (27). The results of research around the world confirm the fact that HCW are a key factor in the prevention of all types of traumas, especially

in children, and the improvement of road traffic safety among children and young people (10, 28–30). The research we conducted shows that HCW are aware of the problem, but do not recognize themselves as authorities for parents in this regard, which is contrary to the general view that HCW are the authority of the population for whom they provide healthcare. Our study indicates a gap between the attitudes of healthcare workers and their daily practice. Only 5% of the respondents in our study answered that they knew how to use car seats correctly and recognized themselves in advising parents about the safe carriage of children in a car. This low percentage of providers and their attitude can arise from a failure to recognize the importance of RTI as a health problem and lack of knowledge. Also, HCW in primary healthcare made up almost 70% of all respondents. A study by the American Medical Association also showed the importance of the role of the family physician in the recognition of risk factors and counselling in the field of road traffic safety (31).

In our study, we reported that HCW with underage children had a higher score in the knowledge test in comparison with those without underage children. This result is probably due to the fact that HCW with underage children also learned from their own experience and likely searched for RT prevention information compared to those without kids or with older children, since in the past there were very few or no such clear recommendations and regulations for child traffic safety. A recent study from Saudi Arabia demonstrated that parents with two underage children and those with higher education had better knowledge of child car safety seat regulations (32). The same study assessed the independent predictors of good knowledge and found that only age and education were among the demographic factors significantly associated with better knowledge.

In our study, the HCW employed at the paediatric departments on average scored higher points on the knowledge test in comparison with other HCW. Also, HCW from secondary and tertiary healthcare institutions scored better compared to HCW from primary level institutions. Similarly, the study from Croatia found that paediatricians had more knowledge about general injuries in children compared with other HCW (14). This is expected because HCW from paediatric departments, and especially those HCW from the secondary and tertiary level, were more informed about RT safety in children probably due to more frequently being involved in the treatment of children with RT trauma, and usually deal with more severe cases relative to HCW from the primary level. In general, paediatricians are recognized by parents as a credible source of information for injury prevention in childhood, and as such, must have updated information on laws and regulations regarding RT safety in children in order to provide quality counselling (33, 34).

Our research has some strengths and some limitations. A major strength of our study is that, to the best of our knowledge, this is the first study of its kind in our country to investigate this important topic and to collect valuable information about HCWs' knowledge regarding road traffic safety in children. Even though our sample is relatively small, we collected a large number of variables for risk factors which allowed us to explore independently associated factors with the overall score on the knowledge test. Our results may serve in planning additional public health measures and education of HCW. And finally, our study can provide a reference for future studies, and especially for pre-post interventional studies to assess the effect of specific education on RT safety in this country and in the region. On the other hand, our sample was limited and, even though we included several healthcare institutions from the primary, secondary and tertiary level, this research was conducted in just one district, thus our results should not be generalized to the national level. Also, since participation was voluntary and anonymous, the possibility remains of a selection bias, i.e., among those that are particularly interested in this topic or have (more) prior knowledge, thus we might not have included those with a low(er) level of knowledge. Thirdly, the questionnaire used was not validated prior to implementation in this study, and we cannot exclude the possibility that some questions might not be fully understood by the participants, even though we used clear language and precise terms. Fourthly, the study design did not allow us to assess changes in knowledge over time since it was assessed in a single time-point, thus further longitudinal studies are warranted to additionally explore this issue.

5 CONCLUSION

This research demonstrated an unsatisfactory level of knowledge of RTI in children by healthcare professionals, and the variability across different question domains. These results additionally underline the need for continuous medical education and promotional activities about road traffic safety in order to improve the knowledge of HCW in Serbia, and to apply the acquired knowledge and skills in everyday work with patients, at all levels of healthcare and, above all, for those who come into direct contact with the parents of children (paediatricians, gynaecologists, nurses, etc.). Future research is warranted to evaluate the effect of this education on the level of acquired knowledge of the HCW.

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CONFLICTS OF INTEREST

The authors declare that no conflicts of interest exist.

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ETHICAL APPROVAL

Ethical approval to conduct the study was obtained from the Ethics Committee of the Institute of Public Health of Vojvodina under the number 01-368/1.

AVAILABILITY OF DATA AND MATERIALS

All data and materials used in this study are available upon reasonable request.

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