

STAVOVI I ZNANJA RODITELJA ŠKOLSKJE DECE O HPV INFEKCIJI I VAKCINACIJI U ZEMLJAMA BIVŠE JUGOSLAVIJE: PREGLEDNI RAD

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SAŽETAK

U svetu, 2022. godine, rak grlića materice je bio četvrti najčešći rak kod žena sa preko 660.000 novoobolelih slučajeva godišnje. Uzrokuje ga perzistentna infekcija humanim papiloma virusom (HPV). Ključne mere prevencije raka grlića materice su skrining (Pap test) i HPV vakcina. U svetu, od 2023. godine, postoji 6 vrsta vakcina protiv HPV. Prema strategiji Svetske zdravstvene organizacije, kada bi pokrivenost vakcinacijom devojčica do 15 godina dostigla 90% bolest bi bila eliminisana. Zemlje članice SZO još uvek ne prelaze procenat obuhvata od 55%, dok zemlje bivše Jugoslavije imaju znatno niže procenat. Cilj ovog preglednog rada je da se analiziraju stavovi i znanja roditelja o HPV vakcinaciji njihove dece u državama bivše Jugoslavije. Pretražene su elektronske baze podataka (*PubMed*, *Scopus* i *Google Scholar*) pomoću sledećih ključnih reči na engleskom jeziku: stavovi roditelja, prihvatanje vakcinacije, neodlučnost prema vakcinaciji i HPV vakcina. Identifikovana su četiri članka koja su ispunjavala kriterijume za uključivanje. Analizirani radovi pokazali su da na prihvatanje vakcinacije protiv HPV infekcije od strane roditelja najveći uticaj ima preporuka pedijatra. U studijama sprovedenim u Srbiji pronađeno je da se češće vakcinišu devojčice nego dečaci. Roditelji su se izjasnili da se vakcinacija protiv HPV nedovoljno promovise, te bi bilo značajno da se tome posveti više pažnje u budućnosti. Uočeno je da su roditelji ciljna populacija u kojoj treba sprovesti edukativne intervencije o HPV infekciji i vakcinaciji, kako bi se postigla veća pokrivenost ovom vakcinom.

Ključne reči: HPV infekcija, HPV vakcina, stavovi roditelji, rak grlića materice

Uvod

U svetu, rak grlića materice je četvrti najčešći rak kod žena sa preko 660.000 novoobolelih slučajeva godišnje i oko 350.000 smrtnih slučajeva u 2022. godini (1). U zemljama Evrope, u 2022. godini, bilo je prijavljeno 58.219 novih slučajeva raka grlića materice, a 27.000 smrtnih slučajeva (2). Uprkos efikasnim i dostupnim merama prevencije, vakcinaciji i skriningu, i dalje postoji visoka stopa smrtnosti od ove bolesti. Rak grlića materice uzrokuje perzistentna infekcija humanim papiloma virusom (HPV). Identifikovano je preko 200 serotipova HPV-a, a kao visokorizični za nastanak malignih lezija označeni su podtipovi 16, 18, 31, 35, 39, 45, 51, 52 i 56 (3).

Vakcina protiv HPV-a odobrena je od strane FDA (eng. *Food and Drug Administration*) 2006. godine kao dvovalentna, a od 2014. godine dostupna je devetovalentna vakcina Gardasil 9. Od 2023. godine, u svetu postoji 6 vrsta vakcina protiv HPV-a i sve štite od seroloških tipova 16 i 18 koji su najčešći uzročnici karcinoma grlića materice (1,4). Prioritet je da se vakcina primeni pre kontakta sa virusom, odnosno pre stupanja u seksualne odnose, te su preporuke da je najbolje sprovesti vakcinaciju dece oba pola 9-14 godina sa dve doze vakcine u razmaku od 6 meseci (1). Svetska zdravstvena organizacija ulaže velike napore da se poveća obuhvat HPV vakcinom širom sveta.

ATTITUDES AND KNOWLEDGE OF PARENTS OF SCHOOL CHILDREN ABOUT HPV INFECTION AND VACCINATION IN THE COUNTRIES OF THE FORMER YUGOSLAVIA: REVIEW

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SUMMARY

In 2022, cervical cancer was the fourth most common cancer among women worldwide, with over 660,000 new cases annually. It is caused by persistent infection with the human papillomavirus (HPV). The key measures for cervical cancer prevention are screening (Pap test) and the HPV vaccine. As of 2023, six types of HPV vaccines are available worldwide. According to the World Health Organization (WHO) strategy, if vaccination coverage of girls up to the age of 15 were to reach 90%, the disease could be eliminated. However, WHO member states have not yet exceeded a coverage rate of 55%, while the countries of the former Yugoslavia show significantly lower rates. The aim of this review paper is to analyze parents' attitudes and knowledge regarding HPV vaccination of their children in the countries of the former Yugoslavia. Electronic databases (PubMed, Scopus, and Google Scholar) were searched using the following keywords in English: parental attitudes, vaccine acceptance, vaccine hesitancy, and HPV vaccine. Four articles meeting the inclusion criteria were identified. The analyzed studies showed that pediatricians' recommendations have the greatest influence on parents' acceptance of HPV vaccination. Studies conducted in Serbia found that girls are vaccinated more often than boys. Parents stated that HPV vaccination is insufficiently promoted, and that more attention should be dedicated to this issue in the future. It has been observed that parents are the target population for implementing educational interventions on HPV infection and vaccination in order to achieve higher coverage with this vaccine.

Keywords: HPV infection, HPV vaccine, parental attitudes, cervical cancer

Introduction

In the world, cervical cancer is the fourth most common cancer in women with more than 660,000 new cases per year and about 350,000 deaths registered in 2022 (1). In 2022, 58,219 new cases of cervical cancer and 27,000 deaths were reported in European countries (2). Despite the efficient and available preventive measures, vaccination and screening, there is still a high rate of mortality caused by this disease. Cervical cancer is caused by the persistent human papillomaviruses (HPV). More than 200 serotypes of HPV have been identified,

while the subtypes 16, 28, 31, 35, 39, 45, 51, 52 and 56 have been designated as high-risk for the development of malignant lesions (3).

The HPV vaccine was approved by the Food and Drug Administration (FDA) in 2006 as bivalent, while since 2014, the nine-valent HPV vaccine known as Gardasil 9, has been available. Since 2023, six types of HPV vaccines have been licensed worldwide, and all of them protect against the serological types 16 and 18, which are the most common causes of cervical cancer (1,4). The priority is to administer

Strategija doneta 2020. godine podrazumeva da je potrebno vakcinisati 90% devojčica do 15 godina (5), ali i posle 18 godina od uvođenja ove vakcine i dalje samo 55% država članica SZO primenjuje HPV vakcinu kao primarnu profikasu (6).

U zemljama Evrope procenat pokrivenosti sa dve doze HPV vakcine dečaka i devojčica do 15 godina je oko 30%, a razvijene zemlje kao što su Belgija, Kanada, Danska, Kipar, Island, Letonija, Portugal, Španija, Norveška i Švedska dostigle su obuhvat preko 80% dece do 15 godina oba pola (7).

Cilj ovog preglednog rada bio je da se analiziraju stavovi i znanja roditelja o HPV vakcinaciji njihove dece u državama bivše Jugoslavije.

Metod

Izvršena je pretraga literature i analiza radova drugih istraživača. Pretražene su elektronske baze podataka: *PubMed*, *Google Scholar*, *Web of Science* i *Embase* od januara do februara 2025. godine. Pretraživanje je sprovedeno za poslednjih deset godina korišćenjem sledećih ključnih reči: stavovi roditelja, prihvatanje vakcinacije, neodlučnost prema vakcinaciji i HPV vakcina. Napredna pretraga uključivala je kombinaciju relevantnih ključnih reči i veznika „i“: HPV vakcina, roditelji, stav, uverenje, prihvatanje, odbijanje, znanja i imena država. Obuhvaćeni su samo radovi koju su se bavili prihvatanjem HPV vakcinacije od strane roditelja u zemljama bivše Jugoslavije.

Kriterijumi za uključivanje bili su: originalno istraživanje objavljeno u poslednjih 10 godina sprovedeno u zemljama bivše Jugoslavije; članci koji su istraživali stavove i percepciju roditelja o HPV vakcinaciji; članci objavljeni na engleskom jeziku; i članci dostupni u punom tekstu. Iz pretrage su

isključeni članci koji su izveštavali samo o statusu vakcinacije ili nekim drugim aspektima HPV vakcinacije, zatim članci sa konferencija, sistematski pregledi i meta-analize.

Procenat obuhvata HPV vakcinom u zemljama bivše Jugoslavije

Države bivše Jugoslavije imaju izuzetno nizak procenat obuhvata HPV vakcinom, a tačni podaci iz baze SZO prikazani su u tabeli 1.

Iz navedene tabele vidimo da Republika Srbija i Bosna i Hercegovina imaju značajno niže procenat pokrivenosti HPV vakcinacijom u odnosu na ostale države bivše Jugoslavije, iako je i kod njih pokrivenost daleko ispod poželjnih 80%. Iako direktni podaci o incidenciji HPV infekcija kod školske dece u Srbiji nisu dostupni, postoje indikacije da je prisutnost HPV-a među mladima značajna. Nizak obuhvat vakcinacijom ukazuje na potrebu za dodatnim naporima u informisanju i motivaciji roditelja i dece za vakcinaciju.

Nacionalni programi vakcinacije protiv HPV-a podrazumevaju davanje saglasnosti roditelja dece do 15 godina za vakcinaciju. Svetska zdravstvena organizacija definisala je neodlučnost o vakcinaciji kao kasno prihvatanje ili odbijanje vakcinacije od strane roditelja (8).

Stavovi roditelja o prihvatanju vakcinacije njihove dece HPV vakcinom u zemljama bivše Jugoslavije i poređenje sa drugim zemljama sveta

Studije koje su se bavile ispitivanjem stavova roditelja o prihvatanju vakcinacije njihove dece HPV vakcinom prikazane su na tabeli 2.

Tabela 1. Procenat obuhvata sa dve doze HPV vakcine za decu do 15 godina oba pola u državama bivše Jugoslavije u 2023. godini (7)

Država	Procenat obuhvata HPV vakcinom sa dve doze devojčice do 15 godina (%)	Procenat obuhvata HPV vakcinom sa dve doze dečake do 15 godina (%)
Srbija	5	5
Crna Gora	20	/
Severna Makedonija	29	/
Hrvatska	55	36
Bosna i Hercegovina	5	/
Slovenija	52	/

*/ - nema podataka

the vaccine before any exposure to the virus, that is, before a person becomes sexually active, and therefore, the two-dose schedule with a 6-month interval between doses is recommended for children of both sexes aged 9 to 14 years (1). The World Health Organization is making great efforts to increase HPV vaccination coverage globally. The strategy adopted in 2020 implies that it is necessary to achieve 90% HPV vaccination coverage in girls by the age of 15 (5), but even after 18 years since the introduction of this vaccine, only 55% of WHO member states administer the HPV vaccine as the primary prophylaxis (6).

In European countries, the percentage of HPV vaccination coverage with two doses in boys and girls by the age of 15 is around 30%, while developed countries such as Belgium, Canada, Denmark, Cyprus, Iceland, Latvia, Portugal, Spain, Norway and Sweden have reached the vaccination coverage rates of over 80% in children of both sexes by the age of 15 (7).

The aim of this review article was to analyze the attitudes and knowledge of parents about the HPV vaccination of their children in the countries of the former Yugoslavia.

Methods

A literature search was done and the articles of other researchers were analyzed. The electronic databases PubMed, Google Scholar, Web of Science and Embase were searched from January to February 2025. The search was conducted for the last ten years using the following key words: parents' attitudes, acceptance of vaccination, vaccine hesitancy and HPV vaccine. The advanced search included the combination of relevant keywords

and the conjunction "and": HPV vaccine, parents, attitude, belief, acceptance, refusal, knowledge and names of countries. Only articles that dealt with the parental acceptance of HPV vaccination in the countries of the former Yugoslavia were included.

The inclusion criteria were the following: original research published in the last 10 years and conducted in the countries of the former Yugoslavia; articles that investigated parents' attitudes and perceptions about HPV vaccination; articles published in the English language; and articles available in full text. Articles that reported only on vaccination status or some other aspects of HPV vaccination, then conference articles, systematic reviews and meta-analyses were excluded from the search.

The percentage of HPV vaccination coverage in the countries of the former Yugoslavia

The countries of the former Yugoslavia have an extremely low percentage of HPV vaccination coverage, and the exact data from the WHO database are shown in Table 1.

From the above table, we can see that the Republic of Serbia and Bosnia and Herzegovina have significantly lower percentages of HPV vaccination in comparison to the other countries of the former Yugoslavia, even though the coverage in these countries is also far below the desirable 80%. Although direct data on the incidence of HPV infections in school children are not available, there are indications that the presence of HPV among young people is significant. Low vaccination coverage points to the need that additional efforts should be made to inform and motivate parents and children to agree to vaccination.

Table 1. Percentage of coverage for the full two-dose HPV vaccination in children of both sexes by the age of 15 in the countries of the former Yugoslavia in 2023 (7)

State	Percentage of HPV vaccination coverage in girls by age 15, two doses (%)	Percentage of HPV vaccination coverage in boys by age 15, two doses (%)
Serbia	5	5
Montenegro	20	/
North Macedonia	29	/
Croatia	55	36
Bosnia and Herzegovina	5	/
Slovenia	52	/

* / - there are no data

Tabela 2. Specifičnosti studija koje su se bavile ispitivanjem stavova roditelja o prihvatanju vakcinacije njihove dece HPV vakcinom

Studija	Država	Ispitivana populacija	Veličina uzorka	Uzrast dece	Vreme prikupljanja podataka	Broj vakcinisane dece	Broj nevakcinisane dece
Štrbac M et al. (2023) [9]	Srbija	Roditelji	436	12-18 godina	Januar – Decembar 2021.godine	676	/
Rančić N et al (2022) [10]	Srbija	Roditelji	615	9-19 godina	Jun - Oktobar 2022. godine	499 prvom dozom; 116 drugom dozom	/
Belavic A, Simetic Pavic I. (2020) [11]	Hrvatska	Roditelji	3350	14 godina	Maj 2016. godine	2077	1273
Marić G et al. (2018) [12]	Srbija	Roditelji	282	9-18 godina	Decembar 2015.- Maj 2016. godine		

Studija Štrbac i saradnika (9) sprovedena je u Novom Sadu na pedijatrijskom odeljenju Doma zdravlja Novi Sad putem strukturiranog upitnika konstruisanog za potrebe istraživanja sa 17 motiva/stavova o prihvatanju HPV vakcinacije od strane roditelja. Najsnažniji motiv za prihvatanje vakcinacije koji je izabrala većina roditelja (33%) bio je „preporuka pedijatra“. Slične rezultate pokazuje i istraživanje sprovedeno među roditeljima adolescenata u Španiji, gde se navodi da su pedijatri najrelevantniji izvor informacija o HPV vakcinaciji (13). Veliki broj novosadskih roditelja (15,4%) naveo je da bi vakcinisao svoje dete zbog svesti da HPV vakcina štiti od raka na različitim lokalizacijama, dok je nešto manji broj roditelja (13,3%) iskazao slaganje sa tvrdnjom da je „bolje vakcinisati dete nego ga izložiti riziku od HPV infekcija“ (9). U ovoj studiji otkriveno je i da je u ispitivanom uzorku devet puta više vakcinisanih devojčica od dečaka. To nije neuobičajeno, postoje zemlje u kojima se još uvek ne sprovodi vakcinacija dečaka ili se ona započinje kasnije, pa je obuhvat manji (14). Edukacija roditelja o HPV infekciji, raku grlića materice, informisanje o bezbednosti i efikasnosti HPV vakcine značajni su za prihvatanje vakcinacije. Ovi rezultati koreliraju sa rezultatima istraživanja sprovedenih i u drugim zemljama (9,15,16).

Istraživanje Rančića i sar. (10) je sprovedeno u Nišu i ispitivali su stavove roditelja o HPV vakcinaciji u jugoistočnoj Srbiji putem upitnika koji se sastojao iz dva dela: sociodemografski podaci i 15 stavki o HPV infekciji, znanjima i svesti o HPV vakcinaciji. Deca svih 615 roditelja uključenih u istraživanje bila su vakcinisana sa bar jednom dozom vakcine, a 3,9 puta više je bilo vakcinisanih devojčica nego

dečaka (398 devojčica, 101 dečak). Znatno više su vakcinisana deca iz gradskih sredina (90,2%), a roditelji koji su imali medicinsko obrazovanje su pokazali viši stepen znanja o HPV infekciji i vakcinaciji. Veliki procenat roditelja (78%) naveo je sve načine prenošenja HPV-a, a 82% roditelja znalo je načine prevencije infekcije. Preporuka pedijatra za vakcinaciju je značajno uticala na prihvatanje HPV vakcine, kao i u istraživanju Štrbac i sar. (9).

U studiji sprovedenoj u Hrvatskoj 2016. godine (11), pre primene upitnika o znanjima i stavovima o HPV infekciji i prihvatanju vakcinacije protiv HPV-a sprovedena je edukacija roditelja od strane školskih lekara i epidemiologa. Nakon toga roditelji su popunjavali evaluacioni upitnik koji se sastojao od sociodemografskih podataka i 10 tvrdnji o HPV infekciji i vakcinaciji. Roditelji su bili podeljeni u dve grupe: oni koji su zdravstveni profesionalci i oni koji nisu, a potom su odgovori ove dve grupe poređeni. Nisu pronađene značajne razlike u znanjima i stavovima o HPV infekciji i vakcinaciji između ove dve grupe roditelja što je u suprotnosti sa rezultatima drugih istraživanja gde su zdravstveni radnici pozitivno uticali na stavove roditelja i adolescenata o HPV vakcinaciji (17,18).

Istraživanje Marić i sar. (12) sprovedeno je u Beogradu u periodu 2015-2016. godine u dva doma zdravlja. Primijenjen je upitnik kreiran za ovo istraživanje sa 43 stavke (sociodemografski podaci, znanja o HPV infekciji i stavovi o HPV vakcinaciji). Većina roditelja (71%) je znala da vakcina protiv HPV-a postoji, a jedna četvrtina njih je imala pozitivan stav prema vakcinaciji. Većina roditelja se složila sa tvrdnjom da se vakcinacija protiv HPV-a nedovoljno promoviše u Republici Srbiji. Pozi-

Table 2. Specificities of studies that investigated parents' attitudes about the acceptance of vaccination of their children with the HPV vaccine

Study	Country	Study population	Sample size	Children's age	Time of data collection	Number of vaccinated children	Number of unvaccinated children
Štrbac M et al. (2023) [9]	Serbia	Parents	436	12-18 years	January – December 2021	676	/
Rančić N et al (2022) [10]	Serbia	Parents	615	9-19 years	June 2022-October 2022	499 first dose; 116 second dose	/
Belavic A, Simetic Pavic I. (2020) [11]	Croatia	Parents	3350	14 years	May 2016	2077	1273
Marić G et al. (2018) [12]	Serbia	Parents	282	9-18 years	December 2015-May 2016		

National HPV programs require the consent of parents of children up to 15 years of age for vaccination. The World Health Organization defined vaccine hesitancy as the delay in acceptance or refusal of vaccination by parents (8).

Parents' attitudes about the acceptance of vaccination of their children with the HPV vaccine in the countries of the former Yugoslavia and comparison with other countries of the world

Studies that examined parents' attitudes about the acceptance of HPV vaccination of their children are shown in Table 2.

A study by Štrbac et al. (9) was conducted in Novi Sad at the pediatric department of the Health Center Novi Sad using the structured questionnaire that was developed for research purposes with 17 motives/attitudes about the parental acceptance of HPV vaccination. The strongest motive for accepting vaccination chosen by the majority of parents (33%) was "pediatrician's recommendation". A study conducted among parents of adolescents in Spain shows similar results, where it is stated that pediatricians are the most relevant source of information about HPV vaccination (13). A large number of parents in Novi Sad (15.4%) stated that they would vaccinate their children because of the awareness that the HPV vaccine protects against cancer in different locations, while a slightly smaller number of parents (13.3%) expressed agreement with the statement that "it is better to vaccinate a child than to expose him to the risk of HPV infection" (9). In this study, it was also found out that there

were nine times more vaccinated girls than boys in the examined sample. This is not unusual, there are countries where vaccination of boys has not been conducted yet or it is started later, so the coverage is lower (14). Educating parents about the HPV infection, cervical cancer, informing them about the safety and effectiveness of the HPV vaccine are important for vaccination acceptance. These results correlate with the results of studies conducted in other countries (9,15,16).

A study by Rančić et al. (10) was conducted in Niš and examined the parents' attitudes about HPV vaccination in Southeastern Serbia using the questionnaire that consisted of two parts: sociodemographic data and 15 items about HPV infection, knowledge and awareness about HPV vaccination. The children of all 615 parents included in the study were vaccinated with at least one dose of the vaccine, and there were 3.9 times more vaccinated girls than boys (398 girls and 101 boys). Children from urban areas were vaccinated significantly more often (90.2%), and parents who had medical education showed a higher level of knowledge about HPV infection and vaccination. A large percentage of parents (78%) mentioned all ways of transmitting HPV, while 82% of parents knew ways to prevent this infection. The pediatrician's recommendation for vaccination significantly influenced the acceptance of the HPV vaccine, as in the study by Štrbac et al. (9).

In a study conducted in Croatia in 2016 (11), before the questionnaire about knowledge and attitudes about the HPV infection and the acceptance of HPV vaccination was applied, parents were educated by school doctors and

tivnije stavove prema vakcinaciji imali su roditelji ženske dece do 9 godina, roditelji sa više znanja o HPV infekciji, i oni koji su dobili preporuku pedijatra za vakcinaciju.

Iako direktni podaci o incidenciji HPV infekcija kod školske dece u Srbiji nisu dostupni, postoje indikacije da je prisutnost HPV-a među mladima značajna. Nizak obuhvat vakcinacijom ukazuje na potrebu za dodatnim naporima u informisanju i motivaciji roditelja i dece za vakcinaciju.

Podaci pokazuju da su zemlje sa najvećim obuhvatom HPV vakcinacijom Sjedinjene Američke Države i Australija. Izveštaj CDC za 2023. godinu pokazuje da je u Sjedinjenim Američkim Državama procenat vakcinisanih adolescenata do 17 godina sa obe doze HPV vakcine 61,4% (19). Australija je dostigla poželjnih 80% pokrivenosti HPV vakcinacijom. Podaci za 2023. godinu pokazuju da je 84,2% devojčica i 81,8% dečaka dobilo dve doze vakcine (20).

Zaključak

U bivšim zemljama Jugoslavije na prihvatanje vakcinacije protiv HPV-a od strane roditelja najveći uticaj su imale preporuke pedijataru. U većini studija češće se vakcinišu devojčice nego dečaci, a roditelji navode nedovoljno promovisanje HPV vakcine. Neophodna je edukacija roditelja o HPV infekciji i značaju HPV vakcine, uvođenje HPV vakcine u kalendar obavezne imunizacije i obezbeđivanje besplatne vakcine, što će doprineti većem obuhvatu mladih HPV vakcinom. Potrebna su dalja istraživanja faktora koji doprinose odbijanju roditelja da vakcinišu svoju decu HPV vakcinom.

Konflikt interesa

Autori su izjavili da nema konflikta interesa.

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epidemiologists. After that, the parents filled out the evaluation questionnaire that consisted of sociodemographic data and ten statements about the HPV infection and vaccination. The parents were divided into two groups: those who are health professionals and those who are not, and then the answers of these two groups were compared. There were no significant differences in knowledge and attitudes about the HPV infection and vaccination between these two groups of parents, which is in contrast to the results of other studies, where health professionals positively influenced the attitudes of parents and adolescents about HPV vaccination (17,18).

A study by Marić et al. (12) was conducted in Belgrade in two Health Centers in the period 2015-2016. The questionnaire which was created for this study was applied and it contained 43 items (sociodemographic data, knowledge about HPV infection and attitudes about HPV vaccination). The majority of parents (71%) knew that the HPV vaccine existed, and a quarter of them had a positive attitude towards vaccination. The majority of parents agreed with the statement that HPV vaccination was insufficiently promoted in the Republic of Serbia. The parents of female children aged up to 9 years old had more positive attitudes towards vaccination, as well as those who had more knowledge about HPV infection and those who got pediatrician's recommendation for vaccination.

Although direct data on the incidence of HPV infections among school children in Serbia are not available, there are indications that the presence of HPV among young people is significant. Low vaccination coverage indicates that additional efforts should be made to inform and motivate children and parents to agree to vaccination.

Data show that the countries with the highest HPV vaccination coverage are the United States of America and Australia. The CDC Report for the year 2023 shows that in the United States, the percentage of adolescents by the age of 17 vaccinated with both doses of the HPV vaccine was 61.4% (19). Australia reached the desirable 80% HPV vaccination coverage, and data for 2023 show that 84.2% of girls and 81.8% of boys received two doses of the vaccine (20).

Conclusion

In the former Yugoslav countries, pediatricians' recommendations had the greatest influence on parents' acceptance of HPV vaccination. In most studies, girls are vaccinated more often than boys, and parents report the insufficient promotion of the HPV vaccine. It is necessary to educate parents about the HPV infection and significance of the HPV vaccine, to introduce the HPV vaccine into the calendar of mandatory immunization, and provide the free vaccine, which will contribute to the greater coverage of young people with the HPV vaccine. Further research of factors that contribute to parents' refusal to vaccinate their children with the HPV vaccine is necessary.

Competing interests

The authors declared no competing interests.

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