

## SKRINING RAZVOJNIH POREMEĆAJA KOD DECE UPOTREBOM STANDARDIZOVANIH UPITNIKA „UZRASTI I RAZVOJ DETETA” (URD)

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### SAŽETAK

**Uvod/Cilj:** Uvođenjem upitnika za rano otkrivanje (skrining) smetnji u razvoju u ranom detinjstvu, blagovremeno bi se otkrilo kašnjenje u razvoju i doprinelo brzom intervenciji. Standardizovan upitnik *Ages and Stages Questionnaire* (ASQ-3) se primenjuje više od 30 godina širom sveta, a u Srbiji je standardizovan pod nazivom Uzrast i razvoj deteta (URD). Cilj našeg istraživanja je bio da upotrebom standardizovanog URD upitnika u primarnoj pedijatrijskoj praksi blagovremeno identifikujemo decu sa smetnjama u razvoju u ranom detinjstvu da bi se pravovremeno započeo odgovarajući tretman.

**Metode:** U ispitivanju je učestvovalo 31 dete uzrasta između 9 i 36 meseci. Ispitivana deca su bila podeljena u uzrasne grupe i za svako dete je korišćen standardizovan URD upitnik za uzrast. Dobijeni podaci obrađeni su kompjuterskim programom za statističku analizu podataka (SPSS, verzija 20), a korišćene su metode deskriptivne statistike.

**Rezultati:** Dobijeni rezultati su pokazali da je kod 71,0% ispitivane dece prepoznato odstupanje od normativnog razvoja što je zahtevalo dodatne aktivnosti učenja ili dalju dijagnostiku. Kod 45,2% ispitanika, bar u jednoj od pet ispitivanih oblasti, otkriveno je odstupanje od normativnog razvoja koje je zahtevalo dodatnu aktivnost učenja i dalje praćenje razvoja dece (tj. imali su rezultate u sivoj zoni), a kod 25,8% odstupanja su zahtevala konsultacije sa određenim stručnjacima radi dalje procene i lečenja (tj. imali su rezultate u crnoj zoni).

**Zaključak:** Uvođenjem standardizovanih URD upitnika kao obaveznog skrininga u primarnu pedijatrijsku praksu omogućilo bi se rano prepoznavanje dece sa odstupanjem od normativnog razvoja, započela bi se rana stimulacija razvoja, utvrdile bi se potrebe za ponovnom procenom, dopunskom dijagnostikom i podrškom rane intervencije.

**Ključne reči:** razvojni poremećaji, rana identifikacija, rana intervencija, URD upitnik

### Uvod

Rana identifikacija smetnji u razvoju u ranom detinjstvu je od suštinskog značaja za blagovremenu korektivnu intervenciju i rano lečenje dece sa neurorazvojnim poremećajima (1). Prema literaturnim podacima u svetu oko 17% dece ima neke razvojne teškoće, a tek kod 50% njih one se otkriju pre polaska u školu (2). Deca koja imaju niže kognitivne sposobnosti kasnije tokom života susreću se sa poteškoćama u obrazovanju u vidu lošijih školskih postignuća, zatim se suočavaju sa ozbiljnim problemima mentalnog i fizičkog zdravlja i lošijim socijalno-ekonomskim statusom (3). Uvođenjem

upitnika za skrining smetnji u razvoju u ranom detinjstvu, blagovremeno bi se otkrilo kašnjenje u razvoju i intervenisalo.

U primarnoj pedijatrijskoj praksi u Srbiji se u prvim godinama života svakog deteta obavi desetak sistematskih pregleda, ali je standardni klinički pregled ograničenog dometa i na taj način se otkrije tek trećina dece sa teškoćama ili odstupanjima u razvoju i mnoga deca sa teškoćama ostaju neprepoznata. Korišćenjem dodatnog instrumenta *Ages and Stages Questionnaire* (ASQ-3) za procenu razvoja deteta u svakodnevnoj praksi bi se prepoznalo

## SKRINING OF DEVELOPMENTAL DISORDERS IN CHILDREN BY USING THE STANDARDIZED QUESTIONNAIRES "AGES & STAGES QUESTIONNAIRES" (ASQ-3)

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### SUMMARY

**Introduction/Aim:** By introducing a questionnaire for screening developmental disabilities in early childhood, developmental delay would be detected in time thus enabling prompt intervention. The standardized questionnaire "Ages and Stages Questionnaire" (ASQ-3) has been used for more than 30 years all over the world, and in Serbia it was standardized under the name "*Uzrast i razvoj deteta*" (URD). The aim of our study was to identify children with developmental disabilities in early childhood using the standardized ASQ-3 questionnaire in primary pediatric practice, so that the appropriate treatment would be started on time.

**Methods:** This study included 31 subjects aged 9-36 months. The subjects were divided into age groups and the standardized ASQ-3 questionnaire was used for each child. The obtained data were analyzed with the help of a computer program for statistical analysis of data (SPSS, version 20), and the methods of descriptive statistics were used.

**Results:** The obtained results showed that 71% of the subjects suffered from developmental disorders, which demanded additional learning activities or further diagnostics. In 45.2% of the subjects, deviations from normal development were discovered in at least one of the examined areas, which demanded additional learning activities and further monitoring of children (that is, they had results in the grey zone), and in 25.8% of the subjects, deviations demanded consultations with experts for further assessment and treatment (that is, they had results in the black zone).

**Conclusion:** The introduction of standardized ASQ-3 questionnaires as a mandatory clinical instrument in primary pediatric practice would enable early recognition of children with deviations from normative development, when early stimulation of development would begin, and the need for re-evaluation, supplementary diagnostics and early intervention support would be established.

**Key words:** developmental disorders, early identification, early intervention, ASQ-3 questionnaire

### Introduction

Early identification of developmental disabilities in early childhood is essential for the timely corrective intervention and early treatment of children with neurodevelopmental disorders (1). According to the literature data, about 17% of children worldwide have some developmental difficulties, and only in 50% of them, these difficulties are diagnosed before they start school (2). Children who have lower cognitive abilities face difficulties later in life during their education in terms of poorer school results, and then face serious problems related to mental and physical

health and poorer socio-economic status (3). The introduction of the questionnaire for screening developmental disabilities in early childhood would help to detect developmental delay on time and intervene.

In the primary pediatric practice in Serbia, about ten systematic examinations are performed in the first years of life of every child, however, the standard clinical examination has its limitations and therefore, only one third of children with developmental difficulties or deviations are detected and many children with difficulties

70-80% dece sa odstupanjem od normativnog razvoja, započela bi se rana stimulacija razvoja, utvrdile potrebe za ponovnom procenom, dopunskom dijagnostikom i podrškom rane intervencije. To nam je zalag za budućnost, jer ekonomske analize pokazuju da ulaganje u razvoj u ranom detinjstvu donosi veće rezultate nego ulaganje u bilo koji drugi period razvoja i da je to najbolja investicija za koju zemlja može da se opredeli (4).

Nizom projekata u ovoj oblasti, edukacijom pedijataru i saradnika, primenom u praksi, testiran je i adaptiran, a u 2019. godini i standardizovan, upitnik *Ages and Stages Questionnaire* (ASQ-3) pod nazivom „Uzrasti i razvoj deteta” (URD). Posle standardizacije i unosa naših graničnih vrednosti, srpska verzija odobrena je od autora originalnog ASQ-3, i nalazi se na portalu izdavača (<https://brookespublishing.com/product/asq-3/>)(5). URD je instrument koji se preporučuje za obavezni skrining razvoja dece od rođenja do 5,5 godina u pet ključnih oblasti razvoja: 1. komunikacija; 2. fina motorika; 3. rešavanje problema; 4. lično/društveno; 5. opšte. U standardizaciji upitnika, radi njegove sistematske primene kod dece u Srbiji, pokazalo se da je ovaj upitnik pouzdan i valjan instrument koji omogućava identifikovanje dece kojoj je potrebno dalje praćenje ili upućivanje na detaljniju procenu. Uz standardizovani upitnik pripremljeno je i detaljno Stručno-metodološko uputstvo za njegovo korišćenje. Učešće roditelja u korišćenju URD upitnika omogućava njihov partnerski odnos sa profesionalcima uključenim u ranu procenu, kao i pružanje podrške deci sa identifikovanim kašnjenjima u razvoju. Važna razlika između upitnika URD i drugih alata za skrining je u tome što su ovi upitnici usmereni na ono što dete može da uradi, a ne na ono što dete ne može da uradi (6).

URD se primenjuje više od 30 godina širom sveta, a u Srbiji je kao pilot projekat uveden 2019. godine u sedam izabраниh domova zdravlja. Cilj ovog istraživanja je bio da se blagovremeno identifikuju deca sa smetnjama u razvoju u ranom detinjstvu u Koceljevi i da se pravovremeno započne odgovarajući tretman.

## Metode

Ispitivanje je sprovedeno, kao studija preseka, u Službi za zdravstvenu zaštitu dece Doma zdravlja „Dr Darinka Lukić” u Koceljevi tokom januara i februara meseca 2023. godine. U ispitivanju je učestvovalo 31 dete uzrasta između 9 i 36 meseci

(prosek  $23,00 \pm 9,70$  meseci). Ispitano je 17 (54,8%) dečaka i 14 (45,2%) devojčica. Roditelji svih ispitanika su bili saglasni da se dobijeni rezultati njihove dece iskoriste u istraživačke svrhe. Kriterijumi za učestvovanje u ispitivanju su bili sledeći: uzrast  $\leq 36$  meseci, da ne boluju od hroničnih bolesti i da im do trenutka testiranja nisu registrovane smetnje u razvoju. Uzrasne grupe definisali smo na osnovu rasporeda redovnih preventivnih pregleda kod izabranog pedijatra i za svaku grupu smo koristili standardizovan URD upitnik (Tabela 1). Upitnike su popunjavali roditelji, a za svako postavljeno pitanje iz pet ključnih oblasti razvoja (komunikacija, fina motorika, rešavanje problema, lično/društveno, opšte) mogli su odgovoriti sa „da”, „ponekad” i „još ne”. Svaki odgovor „da” bodovao se sa 10 poena, „ponekad” sa 5 poena i „još ne” sa 0 poena. Edukovane osobe (pedijatar i medicinska sestra) su bodovale svako dete za svaku oblast po prethodno objašnjenom sistemu, sabirali osvojene bodove i ukupan skor upisivali u za to predviđenu tabelu u kojoj se na osnovu ostvarenog rezultata pacijenti svrstavaju u svetlu, sivu i crnu zonu. Kako bismo odredili dalji odgovarajući postupak za svako dete pojedinačno, pristupili smo sledećem: 1. ako je dete u svim ispitivanim oblastima ostvarilo rezultate u svetloj zoni ukazuje na to da se dete dobro razvija i da mu nije potreban dodatni tretman; 2. ako je dete bar u jednoj od ispitivanih oblasti ostvarilo rezultat u svojoj zoni planirali smo dodatne aktivnosti učenja i dalje praćenje razvoja deteta; 3. ako je dete bar u jednoj od ispitivanih oblasti ostvarilo rezultat u crnoj zoni planirali smo konsultaciju određenih stručnjaka radi dalje procene i lečenja. Dobijeni podaci obrađeni su kompjuterskim programom za statističku analizu podataka (SPSS, verzija 20), a korišćene su metode deskriptivne statistike.

## Rezultati

Dobijeni rezultati pokazali su da se kod 71,0% ispitivane dece prepoznalo odstupanje od normativnog razvoja koje je zahtevalo dodatne aktivnosti učenja ili dalju dijagnostiku. Od ukupnog broja ispitanika samo 9 (29,0%) dece je u svim ispitivanim oblastima ostvarilo rezultate u svetloj oblasti (odnosno dete je u svih 5 ispitivanih oblasti ostvarilo rezultate koji ukazuju na to da se dete dobro razvija i da mu nije potreban dodatni tretman) (grafikon 1). Najveći broj ispitanika, njih 14 (45,2%) bar u jednoj od ispitivanih oblasti os-

remain unrecognized. By using the additional instrument for the assessment of children's development Ages and Stages Questionnaire (ASQ-3) in everyday practice, 70-80% of children with deviations from normative development would be recognized, the early stimulation of development would begin, while the need for re-evaluation, additional diagnostics and early intervention would be determined. This is a pledge for the future, because economic analyses show that investing in early childhood development brings greater results than investing in any other period of development and that is the best investment, which a country can opt for (4).

Ages and Stages Questionnaire (ASQ-3) was tested, adapted and standardized in 2019 under the name Age and Child Development (in Serbian: Uзраст i razvoj deteta – URD) through several projects in this field, education of pediatricians and associates, and implementation in practice. The Serbian version was approved by the author of the original ASQ-3 after standardization and entry of our threshold values and it is available on the publisher's portal (<https://brookespublishing.com/product/asq-3/>) (5). ASQ-3 is an instrument, which is recommended for the mandatory screening of development of children aged 0-5.5 years in five key areas of development: 1. Communication; 2. Fine motor skills; 3. Problem solving; 4. Personal/social; 5. General. In the standardization of the questionnaire, for its systematic application among children in Serbia, it was shown that this questionnaire is a reliable and valid instrument that enables the identification of children who need further monitoring or referral to a more detailed examination. In addition to the standardized questionnaire, a detailed professional-methodological instruction for its use was also prepared. The participation of parents in the use of the ASQ-3 questionnaire enables their partnership with the professionals involved in the early assessment, as well as providing support to children with identified developmental delays. An important difference between the ASQ-3 questionnaire and other screening tools is that these questionnaires focus on what a child can do, not on what the child cannot do (6).

The ASQ-3 has been applied for more than 30 years all around the world, while in Serbia, it was introduced as a pilot project in seven selected health centers in 2019. The aim of this study was

to identify on time children with developmental disorders in their early childhood in Koceljewa and to start the appropriate treatment on time.

## Methods

The study was conducted as a cross-sectional study in the Children's Health Care Service of the Health Center "Dr Darinka Lukic" in Koceljewa in January and February, 2023. The study included 31 children aged 9 to 36 months (average 23.00±9.70 months). 17 boys (54.8%) and 14 girls (45.2%) were examined. The parents of all participants gave their consent that the obtained results of their children could be used for research purposes. The inclusion criteria were the following: age < 36 months, children who did not suffer from chronic diseases and developmental disabilities had not been registered before the time of testing. Age groups were defined based on the schedule of regular preventive examinations performed by the chosen pediatrician and for each group, the standardized ASQ-3 questionnaire was used (Table 1). The questionnaires were filled in by parents, and they could answer each question from five areas of development (communication, fine motor skills, problem solving, personal/social, general) with "yes", "sometimes" and "not yet". Each answer "yes" was scored with 10 points, "sometimes" with 5 points and "not yet" with 0 points. Educated persons (pediatrician and nurse) scored each child for each area according to the previously explained system, added up the points, and entered the total score in the table prepared for that, in which patients were classified into white, grey and black zone based on the achieved results. In order to determine the further appropriate procedure for each child individually, the following was done: 1. if a child achieved results in the white zone in all examined areas, it meant that the child developed well and did not need additional treatment; 2. if the child's results were in the grey zone in at least one of the examined areas, additional learning activities were planned, as well as the further monitoring of the child's development; 3. If the child's results were in the black zone in at least one of the examined areas, we planned consultations with certain experts for further assessment and treatment. The obtained data were analyzed with the help of the computer program for the statistical analysis of data (SPSS, version 20), and the methods of descriptive statistics were used.

**Tabela 1.** Distribucija ispitanika prema uzrastu, polu i postignutom rezultatu

Uzrast	Pol		Svetla zona		Siva zona		Crna zona	
	Muški Br. (%)	Ženski Br. (%)	Muški Br. (%)	Ženski Br. (%)	Muški Br. (%)	Ženski Br. (%)	Muški Br. (%)	Ženski Br. (%)
9 meseci	3 (17,6)	1 (7,1)	2 (22,2)	0	1 (14,3)	1 (14,3)	0	0
12 meseci	3 (17,6)	2 (14,3)	1(11,1)	0	1 (14,3)	0	1 (25,0)	2 (50,0)
18 meseci	3 (17,6)	3 (21,4)	1 (11,1)	1 (33,3)	2 (28,6)	2 (28,6)	0	0
24 meseca	2 (11,8)	2 (14,3)	0	1 (33,3)	1 (14,3)	0	1 (25,0)	1 (25,0)
30 meseci	2 (11,8)	4 (28,6)	0	1 (33,3)	1 (14,3)	3 (42,9)	1 (25,0)	0
36 meseci	4 (23,5)	2 (14,3)	2 (22,2)	0	1 (14,3)	1 (14,3)	1 (25,0)	1 (25,0)
<b>Ukupno</b>	17 (54,8)	14 (45,2)	6 (66,7)	3(33,3)	7 (50,0)	7 (50,0)	4 (50,0)	4 (50,0)
	31 (100,0)		9 (29,0)		14 (45,2)		8 (25,8)	

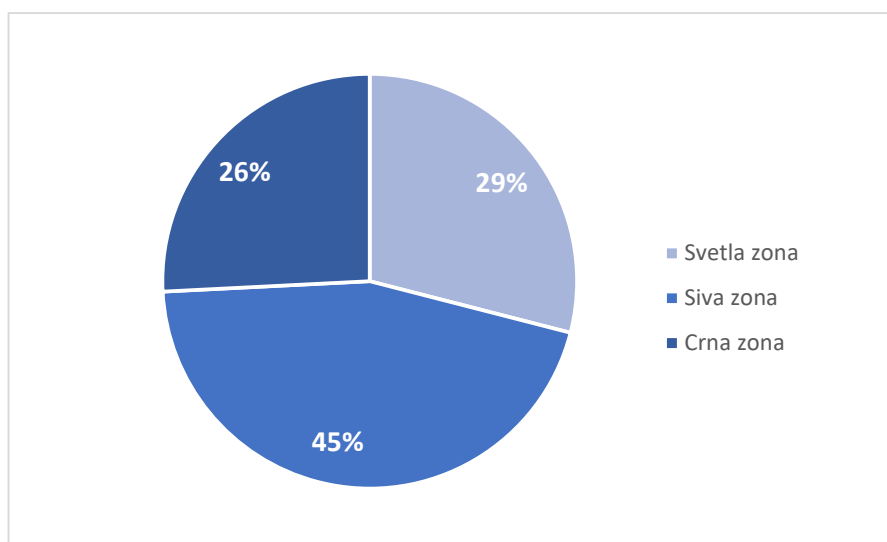
tvarilo je rezultat u sivoj zoni (što podrazumeva odstupanje od normativnog bar u jednoj od ispitivanih pet oblasti što zahteva dodatne aktivnosti učenja i dalje praćenje razvoja deteta), a 8 (25,8%) dece je bar u jednoj od ispitivanih oblasti ostvarilo rezultat u crnoj zoni (što podrazumeva odstupanje bar u jednoj od ispitivanih pet oblasti što zahteva konsultaciju određenih stručnjaka radi dalje procene i lečenja).

### Diskusija

Rezultati našeg istraživanja pokazali su da preko 70% ispitivane dece u prvoj godini ima odstupanje od normativnog psihomotornog raz-

voja. Imajući u vidu da deca koja imaju teškoće u razvoju kasnije tokom života mogu da se sretnu sa poteškoćama u obrazovanju u vidu lošijih školskih postignuća, zatim da se suoče sa ozbiljnim problemima mentalnog i fizičkog zdravlja, kao i lošijim socijalno-ekonomskim statusom, smatramo da su rana identifikacija i pravovremeno reagovanje i stimulacija razvoja neophodni na nivou primarne pedijatrijske prakse, a da je primena URD upitnika kao kliničkog instrumenta jednostavna i lako dostupna.

„Rana identifikacija razvojnih poremećaja je ključna za dobrobit dece i njihovih porodica”, naglašava Američka akademija za pedijatriju (AAP)



**Grafikon 1.** Distribucija ispitanika prema postignutim rezultatima upitnika Uzrast i razvoj deteta

Legenda: svetla zona - ako je dete u svim ispitivanim oblastima ostvarilo rezultate, odnosno dete se dobro razvija i nije mu potreban dodatni tretman; siva zona - ako je dete bar u jednoj od ispitivanih oblasti pokazalo da nema dobar razvoj i da je neophodna dodatna aktivnost učenja i dalje praćenje razvoja deteta; crna zona - ako je dete bar u jednoj od ispitivanih oblasti nema dobar razvoj i dalje se planira konsultacija određenih stručnjaka radi dalje procene i lečenja.



**Table 1.** Distribution of the subjects according to age, sex and achieved results

Age	Sex		White zone		Grey zone		Black zone	
	Males N (%)	Females N (%)	Males N (%)	Females N (%)	Males N (%)	Females N (%)	Males N (%)	Females N (%)
9 months	3 (17.6)	1 (7.1)	2 (22.2)	0	1 (14.3)	1 (14.3)	0	0
12 months	3 (17.6)	2 (14.3)	1(11.1)	0	1 (14.3)	0	1 (25.0)	2 (50.0)
18 months	3 (17.6)	3 (21.4)	1 (11.1)	1 (33.3)	2 (28.6)	2 (28.6)	0	0
24 months	2 (11.8)	2 (14.3)	0	1 (33.3)	1 (14.3)	0	1 (25.0)	1 (25.0)
30 months	2 (11.8)	4 (28.6)	0	1 (33.3)	1 (14.3)	3 (42.9)	1 (25.0)	0
36 months	4 (23.5)	2 (14.3)	2 (22.2)	0	1 (14.3)	1 (14.3)	1 (25.0)	1 (25.0)
<b>Total</b>	17 (54.8)	14 (45.2)	6 (66.7)	3(33.3)	7 (50.0)	7 (50.0)	4 (50.0)	4 (50.0)
	31 (100.0)		9 (29.0)		14 (45.2)		8 (25.8)	

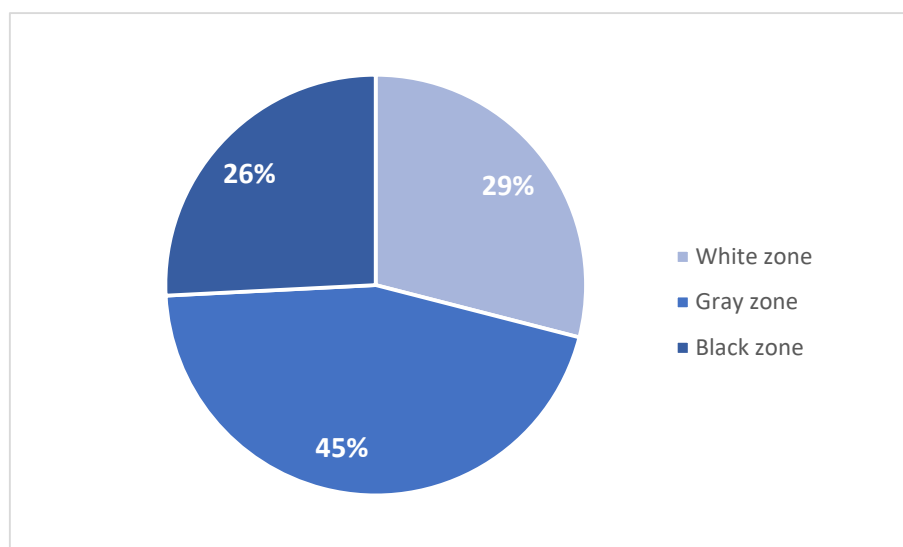
## Results

The obtained results showed that in 71% of the examined children, a deviation from normative development was recognized, which required additional learning activities or further diagnostics. Of the total number of participants, only 9 (29.0%) children achieved results in the white zone in all examined areas (that is, in all 5 examined areas, a child achieved results that indicated that the child developed well and did not need additional treatment) (Figure 1). The largest number of participants, that is, 14 of them (45.2%) achieved results in the grey zone in at least one of the examined areas (which implies a deviation

from the norm in at least one of the five examined areas, which demands additional learning activities and further monitoring of child's development), while 8 of them (25.8%) achieved results in the black zone in at least one of the examined areas (which means a deviation in at least one of the five examined areas, which requires consultations with certain experts for further assessment and treatment).

## Discussion

The results of our research showed that over 70% of the examined children in the first year had a deviation from normative psychomotor

**Figure 1.** Percentage distribution of the subjects according to achieved ASQ-3 results

Legend: white zone – if a child achieved results in all examined areas, that is, if the child was developing well and did not need additional treatment; grey zone – if a child was not developing well in at least one of the examined areas and that additional learning activities and further monitoring of development were necessary; black zone – if a child was not developing well in at least one of the examined areas, and consultations with certain experts were planned for further assessment and treatment.

(7). Takođe, britanska zajednička radna grupa za dečije zdravstvene usluge preporučuje razvojni nadzor za identifikaciju dece sa zaostajanjem u razvoju (8). Kanadsko pedijatrijsko društvo savetuje razvojni skrining dece do 18. meseca života koristeći odgovarajući instrument, odnosno upitnik (9). Svi se slažu u jednom, da efikasan alat za skrining treba da bude jeftin, jednostavan, tačan, važeći, pouzdan, kulturološki adaptiran, lak i brz za administriranje (10). Upravo takav alat za rani razvojni skrining koji se preko 30 godina koristi širom sveta predstavlja upitnik URD. Međunarodna istraživanja sprovedena u prethodnih 25 godina pokazala su da je URD veoma koristan za ranu identifikaciju rizične populacije, adekvatno i pravovremeno reagovanje i najzad, poboljšanje ishoda (11). Da bi demonstrirali korisnost razvojnog skrininga širom sveta, *Sing* i saradnici su uporedili rezultate ASQ-3 studija u Severnoj Americi (SAD), Južnoj Americi (Ekvador), Evropi (Norveška, Španija) i Aziji (Koreja, Tajvan), a ukupna osetljivost URD upitnika u otkrivanju kašnjenja u razvoju bila je 75,4% kod ispitivane dece uzrasta do 5 godina (12).

Izuzetno smo ponosni što smo se i mi našim istraživanjem priključili velikoj porodici korisnika URD upitnika kao instrumenta za rano otkrivanje razvojnih poremećaja u najranijem uzrastu. Naš dom zdravlja u Koceljevi nije bio učesnik pilot-projekta iz 2019. godine, tako da ovo istraživanje sigurno predstavlja korak dalje u primarnoj pedijatrijskoj praksi u Srbiji. Korišćenjem URD upitnika, prepoznali smo kod 70% ispitivane dece odstupanje od normativnog razvoja i na taj način demonstrirali korisnost ranog razvojnog skrininga. Kao ograničavajuću okolnost našeg istraživanja ističemo mali broj ispitanika i kratak vremenski period trajanja ispitivanja, ali smo želeli da kroz pilot-studiju pokažemo značaj upotrebe URD upitnika kao alata za rano otkrivanje razvojnih poremećaja u primarnoj pedijatrijskoj praksi.

## Zaključak

Rana identifikacija razvojnih poremećaja kod dece je veoma važna za blagovremenu korektivnu intervenciju i lečenje. Uvođenjem URD upitnika kao obaveznog kliničkog instrumenta u primarnu pedijatrijsku praksu omogućilo bi rano prepoznavanje dece sa odstupanjem od normativnog razvoja, započela bi se rana stimulacija razvoja, utvrdile bi

se potrebe za ponovnom procenom, dopunskom dijagnostikom i podrškom rane intervencije. Rezultati našeg istraživanja ukazuju na efikasnost i isplativost skrining programa za razvojne poremećaje koji bi se mogao sprovesti u rutinskoj pedijatrijskoj praksi, a bio bi dobro prihvaćen i od roditelja i od zdravstvenog osoblja.

## Konflikt interesa

Autori su izjavili da nema konflikta interesa.

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development. Having in mind that children who have difficulties in development can later in life face difficulties in terms of poorer school achievements, then face serious mental and physical health problems, as well as poorer socio-economic status, we believe that early identification and timely reaction and stimulation of development are necessary at the level of primary pediatric practice, and that the application of ASQ-3 questionnaire as a clinical instrument is simple and easily accessible.

As the American Academy of Pediatrics emphasizes “early identification of developmental disorders is crucial for the well-being of children and their families” (7). Also, the British Joint Working Group for Children’s Health Services recommends developmental surveillance to identify children with developmental delays (8). The Canadian Pediatric Society advises developmental screening of children up to 18 months of age using an appropriate instrument, that is, the questionnaire (9). All of them agree that an efficient screening tool should be inexpensive, simple, accurate, valid, reliable, culturally adapted, easy and quick to administer (10). Precisely such a tool for early developmental screening, which has been used for more than 30 years all around the world, is the ASQ-3. The international studies, which have been conducted over the past 25 years, have shown that the ASQ-3 is very useful for the early identification of the population at risk, adequate and timely reaction and, finally, improvement of outcomes (11). In order to demonstrate the usefulness of developmental screening worldwide, Sing and associates compared the results of ASQ-3 studies in North America (USA), South America (Ecuador), Europe (Norway, Spain), and Asia (Korea, Taiwan), and the total sensitivity of the ASQ-3 questionnaire in detecting developmental delays was 75.4% among the examined children aged up to 5 years (12).

We are very proud that with our research, we have joined the large family of users of the ASQ-3 questionnaire as an instrument for early detection of developmental disorders at the earliest age. Our Health Center in Koceljeva did not participate in the pilot project in 2019, and therefore, this research certainly presents a step forward in primary pediatric practice in Serbia. By using the ASQ-3 questionnaire, we recognized deviations from normative development in 70% of the

examined children, and thus demonstrated the usefulness of early developmental screening. As a limiting circumstance of our research, we point out the small number of participants and the short period of the examination. However, we wanted to show, through a pilot study, the importance of ASQ-3 questionnaire as a tool for the early detection of developmental disorders in primary pediatric practice.

## Conclusion

Early identification of developmental disorders in children is very important for timely corrective intervention and treatment. The introduction of the ASQ-3 questionnaire as a compulsory clinical instrument in primary pediatric practice would enable early recognition of children with deviations from normative development, early stimulation of development would begin, and the needs for the re-evaluation, additional diagnostics and early intervention support would be determined. The results of our study suggest the efficiency and cost-effectiveness of screening programs for developmental disorders that could be implemented in routine pediatric practice and would be well received by both the parents and healthcare professionals, as well.

## Competing interests

The authors declared no competing interests.

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