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Parental Attitudes Towards Vaccination and Adolescent Sexual Health – A Cross-sectional Study

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ABSTRACT Positive parental role modeling is a protective factor for adolescent sexual and reproductive health (SRH). Our aim was to investigate parental opinion on adolescents' SRH and vaccination as well as sociodemographic determinants of child-parent communication regarding SRH. This nationally representative cross-sectional telephone survey with a random stratified sample included 500 parents from Croatia (74% mothers), with at least one child under 18 years of age. Stratification was performed by (a) region, and (b) size of settlement. Differences were found between parental beliefs regarding quality, safety, and efficacy of vaccines and potential hazardous effects. Although 95% confirmed their child was vaccinated according to the national program, only 12% vaccinated with optional, self-paid vaccines (excluding human papillomavirus). Almost every third parent was not acquainted with SRH, more commonly fathers. The preferred sources of information for parents regarding SRH were friends, followed by the media and professional healthcare sources, while communication with adolescents was reported by 84% respondents. More than 10% parents claimed that their child did not have accurate knowledge regarding SRH. Our study confirms predominantly positive parental attitudes vaccination and communication with adolescents regarding SRH. We emphasize the importance of effective parental engagement and indicate the need for educational interventions to strengthen knowledge on immunization and SRH.

KEYWORDS: sexual and reproductive health, vaccination, adolescence, parents, Croatia

INTRODUCTION

Adolescents are a heterogeneous group (1) of children and young people aged 10-19 years, considered one of the healthiest groups among the human population, especially in Europe (2). However, this period of life, when young people reach sexual maturity and initiate their sexual behavior (3), should be approached seriously and with well-planned sexual and reproductive health (SRH) educational interventions. Numerous studies have confirmed that these interventions are valuable both at a younger age and during adolescence, with the aim of supporting lifelong sexual health and wellbeing as well as reducing risky sexual behavior that might lead to sexually transmitted infections (STIs), unintended pregnancy, or having multiple sexual partners (4-6). Improving SRH issues of adolescents represents one of the main objectives of the Sustainable Development Goals (SDGs) (7).

Previously published studies have shown a beneficial effect of the active involvement of parents in improving adolescent knowledge and skills (8,9), while parenting styles and practices represent important predictors of adolescent SRH (10). Positive parental role modeling and parent-child communication about SRH issues enables transmission of positive values (11) and promotes healthy sexual behaviors (12,13). Furthermore, an influential parental role is necessary in the decision-making process of adolescents' health care needs, especially in relation to public health interventions such as vaccination.

Croatia has a long tradition of preventive work covered by school medicine specialists. Despite the national mandatory vaccination scheme for every child in Croatia, parents can refuse to vaccinate their child. This approach is common in other European countries (14).

The aim of this study was to assess parental attitudes and awareness regarding SRH knowledge and vaccination status among Croatian children and adolescents.

SUBJECTS AND METHODS

We designed a nationally representative cross-sectional questionnaire survey. In order to achieve representativeness, a random stratified sample of households with at least one child under 18 years of age was used in the study. Double stratification was performed according to the following characteristics: (a) by region (6 regions by county), and (b) by the size of settlement within each county/region. The settlements were grouped according to the number of inhabitants: up to 2000 inhabitants, between 2001 and 10 000 inhabitants, between 10 001 and 80 000 inhabitants, and more than 80 000 inhabitants. In total, 22 strata were created. Allocation of the sample by strata was carried out in proportion to their size, in accordance with the number of families with children under 18 years old living in the area. The data were adjusted according to the Census of Population, Households and Dwellings from 2011, issued by the Croatian Bureau of Statistics (15).

A professional telephone survey company conducted the recruitment and data collection. The questionnaire included questions on children's and adolescents' vaccination status and their knowledge about SRH, parental attitudes regarding vaccination, parent-children communication on SRH, and parental knowledge regarding SRH (Table 1).

The telephone interview lasted approximately 15 minutes, and examinee discontinuation of the questionnaire occurred in 8% cases. The survey took place between October 17 and October 30, 2018. Inclusion criteria for participation in the study were parents living with children aged 18 years or less. The telephone interview first screened for eligibility by age of children.

We present descriptive statistics of the questionnaire responses using absolute frequencies with percentages for analysis of categorical and continuous variables and chi-square (χ^2) for comparison between the groups in this study. The data were analyzed using SPSS FOR WINDOWS ver. 14.0 (SPSS, Chicago, IL, USA). A *P* value of <0.05 was considered statistically significant.

RESULTS

Non-parametric (χ^2 test) statistics were conducted in order to determine whether there were significant differences in attitudes about child vaccination, parental sources of information on SRH, parent-child communication on SRH issues and parental perception about children's knowledge of SRH.

Characteristics of the respondents (parents)

A total number of 500 respondents participated in the survey, with the majority aged between 40 and 49 years (Table 2) and a mean age of 41 years. Mothers predominantly participated in this study (74%). The majority of respondents had completed secondary school and were employed, with monthly household income lower than 10 000 HRK (approximately 1320 EUR).

Vaccination status of children and parental beliefs about vaccination

Around 95% of respondents confirmed that their child was vaccinated according to a national vaccination program (obligatory vaccines), and 12% of children were vaccinated with optional vaccines (excluding HPV). The most common additional non-mandatory vaccines the children were vaccinated with were against pneumococcal disease (5%), followed by rotavirus (2%) and *Haemophilus influenzae* type B (2%), excluding HPV.

Among the 5% of families whose children did not receive all age-appropriate mandatory vaccines, respondents primarily stated that the decision to not vaccinate their child was parental, while some expressed legitimate reasons why the children were not vaccinated, such as childhood illness, unavailability of vaccines, etc.

A statistically significant difference was found among the beliefs of parents regarding the quality of

Acta Dermatovenerol Croat
2022;30(2):67-75

Table 1. List of questions from the questionnaire.

Question	Variable	Provided answers
Socio-demographic characteristics	Age	≤ 29 years
		30 - 39 years
		40 - 49 years
		≥50 years
	Parent	Father
		Mother
	Education of the responding parent	Primary school
		Secondary school
		College graduate or higher
	Occupation	Employed
		Freelance
		Unemployed
		Retired
		Housewife
		Other
	Child's age	Up to 6 years
		7 - 14 years
		15 - 18 years
		18 years and older
	Household income (monthly)	Up to 3 000 kn
		From 3 001 to 5 000 kn
		From 5 001 to 7 000 kn
		From 7 001 to 10 000 kn
		More than 10 000 kn
		No answer
	Area of residency (according to population density)	More than 100 000 residents
		From 10 000 to 100 000 residents
		From 2 000 to 10 000 residents
		Up to 2 000 residents
	Region	Zagreb and surrounding area
		North of Croatia
		Slavonia
		Lika and Banovina
		Croatian Primorje and Istria
		Dalmatia
Parental beliefs about vaccination	Parents who refuse to vaccinate their children are unresponsible and uncosiderable	1 – Completely disagree 2 3 4 5 – Completely agree 8 – I do not know/No response
	Vaccination is dangerous and might lead to severe illness such as autism	
	Vaccination is a safe and good method of health protection	
	Children in Croatia are vaccinated with vaccines of questionable quality	
Primary source of knowledge on sexual and reproductive health for parents	(multiple-answer type of question)	None
		Other
		Social network or forum
		Professional advice
		Media
		Communication with friends
The person who usually initiates parent-child conversations about sex and sexual health in the family	(only parents with a child aged 10 years or older were asked this question)	More often initiated by parents
		More often initiated by child
		Equally initiated by parents and child
		I do not know/no answer
Parental perception regarding the child's knowledge about sexual and reproductive health and responsible sexual behavior	(only parents with a child aged 10 years or older were asked this question)	Not informed
		Very few
		Moderately
		Very good
		High
		I do not know/no answer

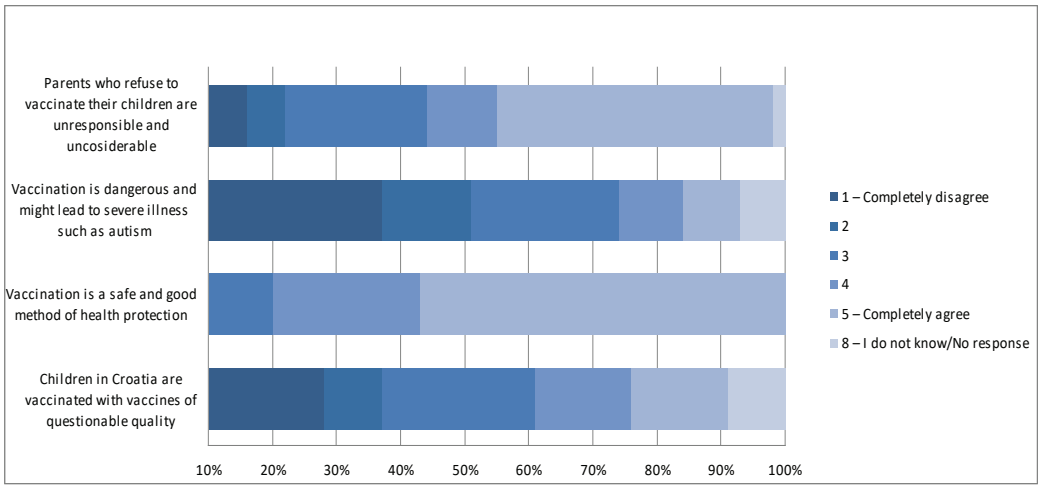

Figure 1. Parental beliefs about vaccination, Croatia, 2018 (N=500).

vaccines in Croatia (χ^2=18.34, df=5, *P*=0.001). About one third of parents believed that available vaccines were of questionable quality, and just as many thought that vaccines were of appropriate quality.

Most of the parents reported positive attitudes towards vaccination. Approximately 80% of respondents agreed that vaccination is a safe and good method of primary prevention in the population, whereas 7% disagreed with this statement and 13% were undecided (Figure 1). Statistically significant differences were also found regarding the belief that vaccination is a safe and good healthcare intervention (χ^2=138.88, df=5, *P*=0.001). In addition, a statistically significant difference was observed regarding the belief that vaccines are dangerous and can lead to diseases such as autism (χ^2=98.6, df=4, *P*<0.05). Most parents did not believe in this association, while 19% of parents still partially or completely considered vaccines to be dangerous. Almost 70% of parents had at least some information about the availability of a HPV vaccine in Croatia; most commonly, respondents were informed that the vaccine is provided free of charge for children in the 8th grade (age of 13/14 years old), however, less than 50% of these parents were aware that vaccine is available for both girls and boys.

Finally, a statistically significant difference was also found in parental perceptions regarding vaccination hesitancy (χ^2=98.6, df=4, *P*<0.05). More than half (54%) of respondents fully or partially considered the parents who avoided vaccinating their children as irresponsible and neglectful towards other members of the society.

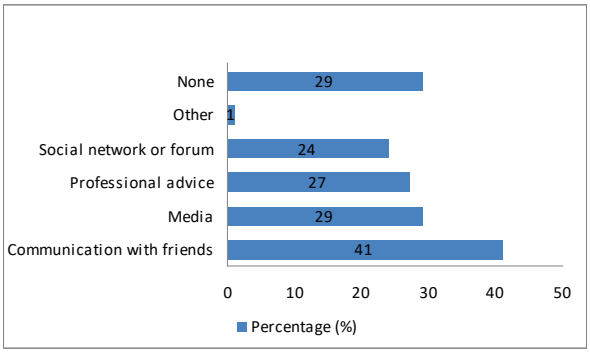

Figure 2. Primary source of knowledge on sexual and reproductive health for parents, Croatia, 2018 (N=500, multiple-answer type of the question).

Parental source of information on SRH issues

Statistically significant differences were found when analyzing the sources of information on SRH (χ^2=78.87, df=5, *P*=0.001). Parents most commonly sought information concerning SRH through communication with friends (41%) (Figure 2). Media (29%) and seeking professional advice (27%), such as consultations with a healthcare provider or reading published scientific literature, etc., were also a common way of gaining information about SRH, followed by information acquired through social networks and forums. Almost every third respondent (29%) was not acquainted with this topic, more commonly fathers (40%) in comparison with mothers (25%).

Parent-child communication on SRH issues

In a slightly larger number of cases, parent-child talks were initiated by parents (47%), however, children and parents initiated conversations equally (Figure 3) in a significant number of cases (43%) as well. There was no statistically significant difference between these answers (χ^2=0.723, df=1, *P*=0.40).

Acta Dermatovenerol Croat
2022;30(2):67-75

Table 2. Socio-demographic characteristics of respondents, Croatia, 2018 (N = 500).

Variable		Frequency (N)	Percentage (%)
Age	≤ 29 years	26	5
	30 - 39 years	179	36
	40 - 49 years	231	46
	≥50 years	64	13
Parent	Father	129	26
	Mother	371	74
Education of the responding parent	Primary school	21	4
	Secondary school	311	62
	College graduate or higher	168	34
Occupation	Employed	372	74
	Freelance	16	3
	Unemployed	42	8
	Retired	22	4
	Housewife	37	7
	Other	11	2
Child's age	Up to 6 years	186	37
	7 - 14 years	300	60
	15 - 18 years	185	37
	18 years and older	117	23
Household income (monthly)	Up to 3 000 kn	20	4
	From 3 001 to 5 000 kn	57	11
	From 5 001 to 7 000 kn	77	15
	From 7 001 to 10 000 kn	113	23
	More than 10 000 kn	157	31
	No answer	76	15
Area of residency (according to population density)	More than 100 000 residents	97	19
	From 10 000 to 100 000 residents	117	23
	From 2 000 to 10 000 residents	100	20
	Up to 2 000 residents	186	37
Region	Zagreb and surrounding area	109	22
	North of Croatia	94	19
	Slavonia	96	19
	Lika and Banovina	39	8
	Croatian Primorje and Istria	52	10
	Dalmatia	110	22

However, a statistically significant difference was found between these responses and the "more often initiated by the child" responses in that children themselves initiate these conversations less frequently (χ^2=64.4, df=3, *P*=0.001).

The majority of parents with children older than 10 years (84%) confirmed that communication concerning SRH took place in their family. A slightly smaller number of parents talked about STIs with their child (70%). Mothers tended to talk about SRH issues with their child more commonly than fathers.

Parental perception about children's knowledge of SRH issues

The majority of parents believe that their child (among families with a child aged 10-18 years) obtained sufficient and accurate knowledge on SRH (Figure 4). However, more than 10% parents claimed that their child did not have any knowledge or had a very low level of knowledge regarding SRH. More than half of children aged 10-14 years (60%) and 73% of children aged 15-18 had very good or excellent knowledge on SRH. A statistically significant difference was found regarding the parental beliefs about children's awareness of responsible sexual behavior and sexually transmitted diseases (χ^2=45.8, df=4, *P*=0.001). It was observed that 29% of respondents said that they were not acquainted with SRH issues, while only 11% of parents with children older than 10 years claimed that their child had very little or no knowledge at all, which may indicate a discrepancy between obtaining information and the belief that child has accurate knowledge on this topic.

DISCUSSION

As a dynamic and transitional period of human life, adolescence is filled with complex emotional,

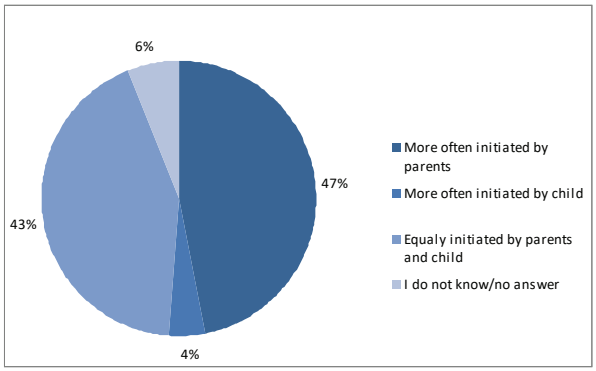

Figure 3. The person who usually initiates parent-child conversations about sex and sexual health in the family, Croatia, 2018 (N=345, only parents with a child aged 10 years or older were asked this question).

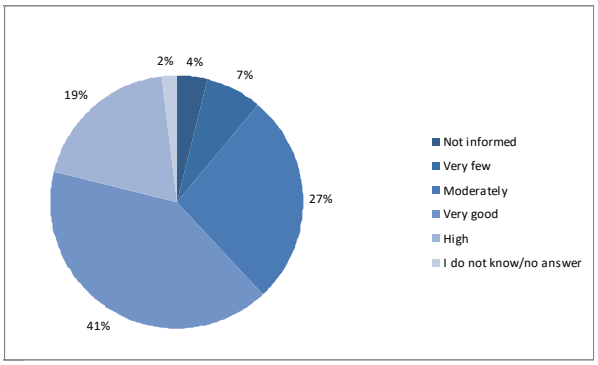

Figure 4. Parental perception regarding the child's knowledge about sexual and reproductive health and responsible sexual behavior, Croatia, 2018 (N=345, only parents with child aged 10 years or older were asked this question).

physical, cognitive, and hormonal changes (16). Numerous interpersonal relationships, gender and social norms, including parental expectations, attitudes, and behavior, undoubtedly affect adolescents' lives and beliefs (17).

Previous studies have indicated the importance of parent-child relationships; open communication and greater parental involvement and support have a significant positive influence on children's sexual behavior (11). Parents are role models to their children, and therefore prevention and education measures focused on children and adolescent health should rely more heavily on interpersonal relationships between parents and their child (12). The parental approach to adolescents should be affirmative, frequent, and straightforward (11), while limited knowledge about SRH might lead to discomfort, misinformation, communication challenges and higher vulnerability of parent-child trust (12). However, results from previous studies show that parents generally have low levels of comfort regarding discussing sexuality with their children (18).

Unfortunately, our findings suggest that every third parent is not informed about SRH issues, and only 27% of all interviewed parents consulted a health care professional or searched for information in scientific literature. These results indicate an unmet need for community-based interventions to address accurate parental SRH knowledge and encourage parental engagement towards effective adolescent-parent communication.

Mothers were the main source of information reported in our study, which is in line with a recently published review (17) and indicates that men are more reluctant to talk with their children about SRH issues. However, previous studies have reported that fathers have an influential role in vaccination decisions for their child (17); men should therefore be equally involved in parent-child communication about important topics such as vaccination and SRH issues (12).

Despite the need to overcome these barriers for effective parental engagement, the majority of parents (60%) believe that their child is well-informed regarding SRH-related matters. A previous study found that adolescents learn about SRH issues from other sources, including mass media and peers (13); however, information obtained through these channels might be incomplete and incorrect. Therefore, strong support for adolescent and parental communication is a prerequisite of success (19).

Vaccination is one of the most effective public health interventions; routine childhood immunization schemes have notably reduced the burden of numerous infectious diseases and their complications (20). Unfortunately, negative parental attitudes towards child vaccination, which are commonly due to a lack of relevant knowledge (21), have resulted in recent outbreaks of vaccine-preventable infectious diseases (22). Each EU member state has a national advisory body that designs an immunization program at the national level (23). Countries in Central and Eastern Europe went through a significant active immunization period during the last two decades, including a shift towards western-produced vaccines (24). However, vaccination schedules in these countries adhered to national recommendations regarding the mandatory immunization program and immunization policy (25). The childhood vaccination program in Croatia was introduced in 1948, and since then the program has been annually updated by the Ministry of Health based on recommendations of the Croatian Institute of Public Health (26). This program includes mandatory vaccinations that are fully covered by the obligatory health insurance in Croatia (24).

Even though vaccination coverage in Croatia in 2018 was satisfactory, ranging from 92.3%

(poliomyelitis revaccination) to 95.7% (hepatitis B vaccination), coverage rates should be better distributed at county levels in order to avoid local outbreaks of eradicated diseases (27). Therefore, the Republic of Croatia has recently developed a three-year compulsory vaccination program (2019-2021), which includes obligatory, free-of-charge vaccines against eleven diseases: diphtheria, tetanus, pertussis, polio, measles, mumps, rubella, tuberculosis, and hepatitis B, diseases caused by *Haemophilus influenzae* type B, and pneumococcal disease (28). Furthermore, Croatia currently offers non-obligatory, free-of-charge, gender-neutral human papillomavirus (HPV) vaccination, but only for adolescents who are 14 years of age (29).

In addition to the mandatory vaccines listed in the national immunization schedule, several self-paid vaccinations are also recommended for the pediatric and adolescent population in Croatia (vaccination against influenza, pneumococcal disease and rotavirus, HPV for some age groups, etc.) (24,26). These recommendations are in line with recommendations from other EU countries (30-32).

The majority of parents in our study (62%) believed that vaccines used in the child immunization program are completely safe, which is in line with recent studies conducted in Zagreb, Croatia (33) and in Poland (14). This parental opinion has been confirmed by a high vaccination coverage rate for Croatian children (95%), which is in accordance with the vaccination coverage in Zagreb (33). However, only 12% of parents decided to vaccinate their child with optional recommended self-paid vaccines (excluding HPV), which leaves the children susceptible to vaccine-preventable diseases.

Previous studies have confirmed that parents identified health care providers as a trusted source of health information (34). Therefore, school medicine and family medicine doctors play an important role in educating parents on the significance of accepting recommended vaccinations. Educational interventions can positively influence immunization coverage rates for children (33,34).

Our results show that a only small number of children are vaccinated with self-paid vaccinations that are recommended for Croatian children. The literature indicates that parental education levels and socioeconomic status are important determinants of vaccination uptake/refusal among parents (14). Self-payment for vaccination is a major barrier (30), and as a result many European countries continuously increase the number of vaccines in their mandatory vaccination programs.

In our study, we assessed parental attitudes and opinions on SRH and vaccination in general. To the best of our knowledge, this is the first national study conducted amongst parents in Croatia that has examined these issues.

Although this study included a nationally representative sample, we cannot guarantee that our findings are truly representative of all Croatian parents. Additionally, participation in the study was voluntary; consequently, no information is available as to which parents refused to participate in this survey and on reasons of refusal due to voluntary response bias. However, demographic characteristics of the sample are based on double stratification and therefore consistent with the population estimates for geographical and familial status (children aged 18 years or younger) of interviewed parents.

CONCLUSION

Our study has identified several barriers that potentially affect adolescent welfare. Parental lack of knowledge of adolescent SRH and high parental reluctance of accepting voluntary vaccination directly affect a crucial proportion of adolescents who remain vulnerable to potentially life-threating diseases.

Lack of accurate information regarding sexual health might cause a feeling of discomfort among parents and consequently lead to increased risky behavior and vulnerability of their children. Parent-adolescent sexual and reproductive health communication based on relevant sources of information supports adolescent development and prevents them from obtaining inaccurate information through other unreliable sources.

Hopefully, the results of this study have provided valuable data on parental attitudes towards SRH issues and vaccines and might help stakeholders develop educational interventions that could strengthen parental knowledge. Additionally, our results indicate the need to consider introducing additional free-of-charge vaccines in the mandatory immunization program in order to improve child welfare.

References:

1. Dessie Y, Berhane Y, Worku A. Parent-adolescent sexual and reproductive health communication is very limited and associated with adolescent poor behavioral beliefs and subjective norms: evidence from a community based cross-sectional study in Eastern Ethiopia. PLoS One. 2015;10:e0129941.
2. World Health Organisation. Adolescent Health and Development in the WHO European Region:

Can we do better? [cited 28 January 2021]. Available from: http://www.euro.who.int/__data/assets/pdf_file/0005/407219/AA-HA-adaptation-V7_maket_10.07.19_e_book_2.pdf?ua=1

3. World Health Organisation. Health behaviour in school-aged children (HBSC) study: International report from the 2013/2014 survey. Growing up unequal: gender and socioeconomic differences in young people's health and well-being. [cited 28 January 2021]. Available from: http://www.euro.who.int/en/publications/abstracts/growing-up-unequal.-hbsc-2016-study-20132014-survey
4. Chandra-Mouli V, Plesons M, Adebayo E, Amin A, Avni M, Kraft JM, *et al*. Implications of the global early adolescent study's formative research findings for action and for research. J Adolesc Health. 2017;61:5-9.
5. Commendador KA. Parental influences on adolescent decision making and contraceptive use. Pediatr Nurs. 2010;36:147-56.
6. Hicks MS, McRee AL, Eisenberg ME. Teens talking with their partners about sex: The role of parent communication. Am J Sex Educ. 2013;8:1-17.
7. United Nations Children's Fund. Adolescent health. [cited 28 January 2021]. Available from: https://www.unicef.org/health/index_92029.html
8. Lee YM, Florez E, Tariman J, McCarter S, Riesche L. Factors related to sexual behaviors and sexual education programs for Asian-American adolescents. Appl Nurs Res. 2015;28:222-8.
9. Grossman JM, Jenkins LJ, Richer AM. Parents' perspectives on family sexuality communication from middle school to high school. Int J Environ Res Public Health. 2018;15:E107.
10. Kajula LJ, Darling N, Kaaya SF, De Vries H. Parenting practices and styles associated with adolescent sexual health in Dar es Salaam, Tanzania. AIDS Care. 2016;28:1467-72.
11. Zakaria M, Xu J, Karim F, Cheng F. Reproductive health communication between mother and adolescent daughter in Bangladesh: a cross-sectional study. Reprod Health. 2019;16:114.
12. Faludi C, Rada C. Gender differences in sexual and reproductive health education in the family: a mixed methods study on Romanian young people. BMC Public Health. 2019;19:1103.
13. Motsomi K, Makanjee C, Basera T, Nyasulu P. Factors affecting effective communication about sexual and reproductive health issues between parents and adolescents in zandspruit informal settlement, Johannesburg, South Africa. Pan Afr Med J. 2016;25:120.
14. Braczkowska B, Kowalska M, Barański K, Gajda M, Kurowski T, Zejda JE. Parental opinions and attitudes about children's vaccination safety in Silesian Voivodeship, Poland. Int J Environ Res Public Health. 2018;15:E756.
15. Croatian Bureau of Statistics. Census of population, households and dwellings in the Republic of Croatia in 2011. Croatian. [cited 19 February 2021]. Available from: http://www.dzs.hr; 2013
16. Currie C. Development is not the same as ageing: the relevance of puberty to health of adolescents. Int J Public Health. 2019;64:149-50.
17. Coast E, Lattof SR, Strong J. Puberty and menstruation knowledge among young adolescents in low- and middle-income countries: a scoping review. Int J Public Health. 2019;64:293-304.
18. Liu W, Dennis JM, Edwards CP. Chinese parents' involvement in sexuality education for adolescents. Int J Sex Health. 2015;27:485-507.
19. Lehtinen M, Paavonen J, Apter D. Preventing common sexually transmitted infections in adolescents: time for rethinking. Eur J Contracept Reprod Health Care. 2006;11:247-9.
20. Lehmann CE, Brady RC, Battley RO, Huggins JL. Adolescent vaccination strategies: interventions to increase coverage. Paediatr Drugs. 2016;18:273-85.
21. Gilkey MB, McRee AL, Brewer NT. Forgone vaccination during childhood and adolescence: findings of a statewide survey of parents. Prev Med. 2013;56:202-6.
22. Dubé E, Vivion M, Sauvageau C, Gagneur A, Gagnon R, Guay M. "Nature does things well, why should we interfere?": Vaccine Hesitancy Among Mothers. Qual Health Res. 2016;26:411-25.
23. Salisbury DM, Olivé JM. Immunization in Europe. In: Plotkin SA, Orenstein WA, Offit PA, editors. Vaccines, 4th ed. Philadelphia: Saunders; 2004, pp. 1387-406.
24. Tešović G. Childhood vaccinations in Croatia. Period Biol. 2012;114:149-66.
25. Vaccine European New Integrated Collaboration Effort (VENICE). Report on First survey of Immunisation Programs in Europe. [cited 21 February 2021]. Available from: http://venice.cineca.org/Report_II_WP3.pdf
26. Kaić B, Gjenero-Margan I, Brzović M, Lakošeljac D, Aleraj B, Nemeth-Blažić T. Vaccine regulations in Croatia. Coll Antropol. 2007;31:117-20.
27. Croatian Institute of Public Health. Croatian Health Statistics Yearbook 2018. [cited 21 February 2021].

Available from: https://www.hzjz.hr/wp-content/uploads/2019/10/Ljetopis_Yearbook_2018-1.pdf

28. Ministry of Health. Three-year mandatory vaccination program in the Republic of Croatia for 2019 – 2021. Croatian. [cited 21 February 2021]. Available from: https://zdravlje.gov.hr/UserDocsImages/2018%20Programi%20i%20projekti/TROGODI%C5%A0NJI%20PROGRAM%20OBVEZNOG%20CIJEPLJENJA%201.pdf
29. Croatian Institute of Public Health. Vaccination against human papilloma virus. Croatian. [cited 21 February 2021]. Available from: https://www.hzjz.hr/aktualnosti/cijepljenje-protiv-humanog-papiloma-virusa-hpv-2018-2019/;
30. Malerba V, Costantino C, Napoli G, Marchese V, Casuccio A, Tabacchi G, *et al*; ESCULAPIO Working Group. Antimeningococcal and antipneumococcal vaccination determinants: a European systematic literature review. Epidemiol Prev. 2015;39:59-64.
31. McGuire A, Drummond M, Keeping S. Childhood and adolescent influenza vaccination in Europe: A review of current policies and recommendations for the future. Expert Rev Vaccines. 2016;15:659-70.
32. Mészner Z, Anca I, André F, Chlibek R, Čižman M, Grzesiowski P, *et al*; Central European Vaccine Awareness Group (CEVAG). Rotavirus vaccination in central Europe. J Pediatr Gastroenterol Nutr. 2013;56:586-96.
33. Lovrić Makarić Z, Kolarić B, Tomljenović M, Posavec M. Attitudes and beliefs related to childhood vaccinations among parents of 6 years old children in Zagreb, Croatia. Vaccine. 2018;36:7530-5.
34. Esposito S, Principi N, Cornaglia G; ESCMID Vaccine Study Group (EVASG). Barriers to the vaccination of children and adolescents and possible solutions. Clin Microbiol Infect. 2014;20:25-31.