Connection between knowledge of oral hygiene and dental status of the elderly in Požeško-slavonska County

Povezanost znanja o oralnoj higijeni s dentalnim statusom starijih osoba u Požeško-slavonskoj županiji

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──────────────── **Summary** ────────────────

Timely visits to the dentist are extremely important for the preservation of dental health. Given the biological predisposition of teeth decay with age, it is important to act preventively in order to minimize the adverse effects of age on dental health.

Aim: The aim of this study is to establish the correlation between the various factors related to oral health and dental status in older age and to examine the differences in dental status between retirement home residents and those living at home.

Materials and methods: The data were collected through a survey consisting of 39 questions. The sample consisted of 110 participants located in the Požega HPP and the Home for the Elderly and Infirm in Požega, 42.7% of which were men and 57.3% women. The study used the selection criterion of persons over the age of 65. The average age in the sample was 77.35 years (SD = 7.18) ranging from 65 to 97 years of age. The data were collected in the period from January 2018 to July 2018. The participants were divided into two groups, those living in the Požega Nursing Home and those living in their own household but were hospitalized once in the Požega County Hospital.

Results: The obtained results showed that participants have different dental problems that were partially related to their knowledge of oral hygiene. This paper emphasizes the importance of additional training and education for the elderly population in order to preserve and improve the quality of their dental health.

Conclusion: The results of this study suggest that participants, in average, were less concerned about their dental health, which was confirmed by the small number of healthy teeth. There was a partial correlation between the knowledge about oral hygiene and the dental status of elderly people in Požega-Slavonia County, i.e. their knowledge was related only to some aspects of their dental status. According to the results obtained, it is important to organize training for the elderly about the importance of timely interventions when dental health is in question, as well as to further educate them about the harmful factors when it comes to the preservation of their dental health.

Key words: dental hygiene, dental status, elderly

──────────────── **Sažetak** ────────────────

Pravovremeni posjeti stomatologu iznimno su važni za očuvanje dentalnoga zdravlja. S obzirom na biološku predodređenost propadanja zubi s dobi, važno je djelovati preventivno, kako bi se što više smanjile negativne posljedice na dentalno zdravlje.

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Cilj: Cilj je ovoga istraživanja utvrditi povezanost različitih čimbenika vezanih uz oralno zdravlje i ponašanje s dentalnim statusom u starijoj životnoj dobi, te ispitati razlike u dentalnom statusu između ispitanika koji žive u domu za starije i nemoćne i onih koji žive u vlastitoj kući.

Materijali i metode: Podaci su prikupljani putem ankete koja se sastojala od 39 pitanja. Uzorak se sastojao od 110 ispitanika smještenih u OŽB Požega i Domu za starije i nemoćne osobe u Požegi, od čega je 42,7% muškaraca, a 57,3% žena. U studiji je korišten kriterij odabira osoba starijih od 65 godina. Prosječna starosna dob u uzorku je 77,35 godina (SD = 7,18) raspona od 65 do 97 godina. Podaci su prikupljeni u razdoblju od siječnja 2018. godine do srpnja 2018. godine. Ispitanici su bili podijeljeni u dvije skupine: oni koji žive u Domu umirovljenika Požega, te oni koji žive u vlastitom kućanstvu, ali su bili hospitalizirani u OŽB Požega.

Rezultati: Dobiveni rezultati pokazali su da ispitanici imaju različite dentalne probleme koji su djelomice povezani s njihovim znanjem o oralnoj higijeni. Ovaj rad upućuje na važnost dodatnog obrazovanja i educiranja starije populacije u cilju očuvanja i poboljšanja kvalitete dentalnoga zdravlja.

Zaključak: Rezultati ovoga istraživanja upućuju na to da se ispitanici u prosjeku slabije brinu o svojem dentalnom zdravlju, što potvrđuje mali broj zdravih zubi koje imaju. Znanje o oralnoj higijeni i dentalni status starijih osoba u Požeško-slavonskoj županiji djelomice su povezani, tj. znanje je povezano samo s nekim aspektima dentalnoga statusa. Prema dobivenim rezultatima, nameće se zaključak da je važno organizirati edukacije za starije osobe o važnosti pravovremenih intervencija u području dentalnoga zdravlja, te da ih je potrebno dodatno educirati o štetnim čimbenicima kada je u pitanju očuvanje dentalnoga zdravlja.

Ključne riječi: dentalna higijena, dentalni status, starije osobe

Introduction

Biological aging is an unavoidable process in the living world. The concept of age represents a certain lifetime present in the development of an individual, regardless of gender, race or economic status and it is defined by age. According to the UN definition, old age occurs after age 65 and according to the World Health Organization criteria, it is divided into three periods: early elderly (65-74 years), middle elderly (75-84 years) and deep age (85 years and over).[1,2] So far, over 300 theories of aging have been proposed, trying to explain the essence and nature of this complex process. Aging involves four processes: chronological aging, biological aging, psychological aging and social aging.[2] It is important to emphasize that the aging process varies from individual to individual. According to the 2011 census in the Republic of Croatia, the average age was 41.7 years, which makes the population of Croatia among the oldest population in Europe. The population aged 65 and over was 17.7%. Along with the many health and social problems of the older population, oral diseases, oral health and food consumption are major factors influencing the quality of their lives.[3] Numerous studies are also being conducted today that link paradontal diseases and heart disease or diabetes.[4,5] Elderly people who have difficulties in eating food are often ill-treated and lack the strength to perform everyday life activities as well as enjoying life.[4] Inadequate nutrition greatly affects oral health and bad oral health is reflected in the choice of food.[6,7] The attitude of elderly people to the choice of food is therefore strongly influenced by their ability to effectively consume it. Regular check-ups and visits to the dentist can certainly increase the quality of dental status and thus the quality of life. According to DZS (Bureau of statistics) in 2011 in Požeško-Slavonska County, there were 14,000 people over the age of 65, which is 1.8% in the total population of the Republic of Croatia. Since it is a large group of people, great attention should be paid to the quality of their life where nutrition is an especially important factor. The aim of this study was to establish the correlation between the various factors related to oral health and dental status in older age and to examine the differences in dental status between nursing home residents and those living at home.

Methods

Sample description

The research included 110 people of which 42.7% were men and 57.3% women. The study used the criteria of selection persons over the age of 65. The average age of the sample is 77.35 years (SD = 7.18) ranging from 65 to 97 years. The data were collected in the period from January 2018 to July 2018. The participants were divided into two groups, those living in the Požega Retirement Home and those living in their own household, but were once hospitalized at the Požega County Hospital.

Measuring instrument

The data were collected through a survey consisting of 39 questions. After completing the survey by the participants, it was always checked by the examiner. The participants could seek clarification for any

unclear question. Given the question of age, age of the first visit to the dentist, age of tooth loss, number of healthy teeth, number of dental bridges in the oral cavity, number of dental implants embedded in the oral cavity, number of teeth with fillings and age of dental prosthesis, the task of the examinee was to enter the number or the value X if the question did not apply to them. The questions about the frequency of consulting about teeth hygiene when visiting a dentist, the frequency of use of a brush to clean the interlayer's surface, the frequency of eating sweet and sour foods, the frequency of using a dental prosthesis pill, the frequency of using dentures for dental prosthesis, the frequency of falling out of the dental prosthesis, the frequency of fluid use for the disinfection of dental prostheses and the frequency of pinching of the dental prosthesis, the task was that examinees enter the answers on a scale from 1 (never) to 5 (always). In two questions regarding the degree of autonomy in performing oral hygiene and the degree of satisfaction with the quality of meal consumption, the task of the participants was on a scale of 1 (not even) - 5 (wholly) to mark the agreement with the statement. On the last question, the task was to evaluate the dental status on a scale of 1 (very bad) to 5 (excellent). In the remaining questions, participants were offered the answers given in Table 2 in the results.

Ethical Principles

Prior to the beginning of the research, consent for the conduct of the survey was obtained in the Požega General County Hospital and the Požega Retirement Home. All the participants were informed about the topic and purpose of the research. They were given the opportunity to choose if they wanted to participate in the examination.

Results

The average age of the examinees when it comes to first visit to the dentist was 21 years. On average, subjects are rarely advised about teeth hygiene when visiting a dentist, but are mostly self-sufficient in performing oral hygiene and they are satisfied with the quality of meal consumption. The average age of subjects when it comes to the beginning of losing teeth is 30.54 years and the participants have on average six healthy teeth. When it comes to the number of dental bridges, more than 70% of the participants have no teeth. 12.7% of participants have one bridge, 13.6% have two bridges and 0.9% of participants have five bridges. None of the participants has a dental implant and the average number of fillings is 0.57 because more than 80% of participants have no filling. Participants rarely pay attention to the quality when buying a toothbrush, they almost never use a brush to clean the interior dental space and often eat sweet and sour foods. The average age at getting a dental prosthesis is 54.08 years. Subjects rarely use a pill for dental prostheses, rarely use fixer for dental prostheses, their prosthesis rarely falls out, they rarely use dental disinfection fluids and rarely prune dental prostheses. Finally, the average estimate of the dental status is good. The results are shown in Table 1.

Table 1 Review of the number and proportion of respondents` answers by category
Tablica 1 Pregled broja i udjela odgovora ispitanika po kategorijama

Variables / V*arijable*	*M*	*SD*	Range *Raspon*	*N*
Age */ Dob*	77.35	7.18	65-97	110
The age of the first visit to the dentist *Dob prvog posjeta zubaru*	21.53	9.23	6-50	109
Frequency of consulting about teeth hygiene when visiting a dentist / *Učestalost savjetovanja o higijeni zuba prilikom posjeta stomatologu*	2.21	1.25	1-5	110
Independence in performing oral hygiene *Neovisnost kod obavljanja oralne higijene*	4.36	1.09	1-5	110
Satisfaction with the quality of eating meals *Zadovoljstvo kavlitetom obroka koji se jedu*	4.07	0.94	1-5	110
The age of beginning of tooth loss *Dob početka gubiljenja zubi*	30.54	10.33	15-60	110
Number of healthy teeth *Broj zdravih zuba*	6	6.17	0-29	110

Number of dental bridges in the mouth cavity *Broj zubnih mostova u usnoj šupljini*	0.45	0.84	0-5	110
Number of dental implants embedded in the oral cavity *Broj zubnih implantata ugrađenih u usnu šupljinu*	0	0	0	110
Number of filled teeth *Broj ispunjenih zuba*	0.57	1.45	0-7	110
Degree of attention to the quality of the toothbrush *Stupanj pažnje na kvalitetu četkice za zube*	2.65	1.44	1-5	110
Frequency of using a brush to clean the interlayer dental space *Učestalost upotrebe četkice za čišćenje međuslojnog zubnog prostora*	1.12	0.55	1-5	110
Frequencies of eating sweet and sour foods *Učestalost jedenja slatke i kisele hrane*	3.73	1.07	1-5	110
The age of getting a dental prosthesis *Dob dobivanja zubne proteze*	54.08	12.43	20-80	72
Frequencies of using a tablet for dental prosthesis *Učestalosti upotrebe tableta za zubne proteze*	2.08	1.63	1-5	72
Frequency of use of fixer for dental prosthesis *Učestalost upotrebe učvršćivača za zubne proteze*	1.44	1.12	1-5	72
Frequency of falling of the dental prosthesis when performing daily activities / *Učestalost ispadanja zubne proteze pri obavljanju svakodnevnih aktivnosti*	2.17	1.40	1-5	72
Frequency of use of disinfection fluid for the dental prosthesis in the oral cavity *Učestalost upotrebe tekućine za dezinfekciju za zubne proteze u usnoj šupljini*	1.61	1.13	1-5	72
Frequency of pinching of the dental prosthesis *Učestalost stezanja zubne proteze*	2.38	1.43	1-5	72
Evaluation of dental status *Procjena zubnog statusa*	3.18	0.98	1-5	110

Most of the participants have finished elementary school, they walk independently and they visit the dentist less than once a year. Usually they do not need to cut the food before meals and they never remove dental calculus at the dentist. Most of the participants clean their teeth before bed with toothpaste. They change the toothbrush when it is unusable. Most are aware of the importance of timely visits to the dentist in the case of a toothache and they don't know what the toothbrush strength is. They know that coffee, alcohol and cigarettes affect the quality of the teeth and believe that chocolate is harmful but think that fruit is healthy for teeth. Finally, most of the participants use a mobile dental prosthesis and have no periodontitis. The results are shown in Table 2.

Table 2 View of descriptive data for continuous variables used
Tablica 2. Prikaz opisnih podataka za korištene kontinuirane varijable

Variables/ *Varijable*	Categories/*Kategorije*	*N*	Percentage *Postotak*	*p* value *p vrijednost*
Sex/*Spol*	M	*47*	42.7%	0,13
	F/Ž	*63*	57.3%	
Education/*Obrazovanje*	Unfinished school *Nezavršena škola*	20	18.2%	0,01
	Elementary School *Osnovna škola*	**48**	**43.6%**	
	Secondary school/*srednja škola*	36	32.7%	
	College/*fakultet*	6	5.5%	

Are you staying in a retirement home or in your own household? *Boravite li u domu umirovljenika ili u vlastitom domaćinstvu?*	Retirement home *Dom za umirovljenike*	47	42.7%	0,13
	My house *Vlastiti dom*	63	57%	
Are you tied to the bed or walk alone? *Jeste li vezani za krevet ili hodate samostalno*	I'm bound to the bed *Vezan sam za krevet*	2	1.9%	0,01
	I walk alone *Hodam samostalno*	**66**	**61.1%**	
	I walk with help *Imam pomoć pri hodanju*	40	37%	
How often do you visit a dentist? *Koliko često projećujete zubara?*	Never/*nikada*	14	12.7%	0,01
	Less than once a year *Manje od jedanput godišnje*	**46**	**41.8%**	
	Once a year *Jednom godišnje*	37	33.6%	
	Several times a year *Nekoliko puta godišnje*	13	11.8%	
Do you have to chop food before eating? *Morate li nasjeckati hranu prije jela?*	Yes/*Da*	24	21.8%	0,01
	No/*Ne*	**55**	**50%**	
	Just certain food *Samo određenu hranu*	31	28.2%	
How often do you remove dental calculus at a dentist? *Koliko često uklanjate zubni kamenac kod zubara?*	2 times a year *2 puta godišnje*	4	3.6%	0,01
	Once a year *1 put godišnje*	7	6.4%	
	As required *Prema potrebi*	16	14.5%	
	Never/*Nikada*	**83**	**75.5%**	
Do you have an occasional heartburn? *Imate li povremene žgaravice?*	Yes/*Da*	47	43.1%	0,15
	No/*Ne*	62	56.9%	
How often do you brush your teeth? *Koliko često perete zube?*	After each meal *Nakon svakog jela*	26	23.6%	0,01
	After getting up *Nakon ustajanja*	21	19.1%	
	Before sleep *Prije spavanja*	**52**	**47.3%**	
	Every few days *Svako nekoliko dana*	10	9.1%	
	Never/*Nikada*	1	0.9%	
What do you use to brush your teeth? *Što koristite za čišćenje zube?*	Toothpaste *Pasta za zube*	**102**	**92.7%**	0,01
	Toothpaste and dental floss *Pasta za zube i zubni konac*	6	5.5%	
	I do not brush my teeth *Ne perem zube*	2	1.8%	
How often do you change your toothbrush? *Koliko često mijenjate četkicu za zube?*	Once a month *Jednom mjesečno*	13	11.8%	0,01
	Once in 6 months *Svakih 6 mjeseci*	32	29.1%	
	Once a year *Jednom godišnje*	25	22.7%	
	When it is worn out *Kada je istrošena*	**40**	**36.4%**	

Do you know the importance of a timely visits to the dentist in case of a toothache? *Znate li važnost pravovremenog posjeta stomatologu u slučaju zubobolje?*	Yes/*Da* No/*Ne*	**95** 15	**86.4%** 13.6%	0,01
What is the strength of the fiber on your toothbrush? *Kolika je čvrstoća vlakana na vašoj četkici za zube?*	I use a soft brush *Koristim mekanu četkicu* I use a medium hardness toothbrush *Koristim srednje tvrdu četkiću* I use a solid fiber toothbrush *Koristim četkicu od čvrstih vlakana* I do not know what the strength is *Ne znam koje je snage*	16 37 11 **46**	14.5% 33.6% 10% **41.8%**	0,01
Do you know how coffee, alcohol, and cigarettes affect the quality of your teeth? *Znate li kako kava, alkohol i cigarete utječu na kvalitetu vaših zuba?*	Yes/*Da* No/*Ne*	**78** 32	**70.9%** 29.1%	0,01
Do you think that chocolate is healthy for your teeth? *Mislite li da je čokolada zdrava za vaše zube?*	Yes/*Da* No/*Ne*	13 **97**	11.8% **88.2%**	0,01
Do you think fruit is healthy for your teeth? *Mislite li da je voće zdravo za vaše zube?*	Yes/*Da* No/*Ne*	**82** 27	**75.2%** 24.8%	0,01
What kind of dental prosthesis do you use? *Kakvu zubnu protezu koristite?*	Fixed /*pričvršćenu* Mobile/ *pomičnuu* I do not use a prosthesis *Ne koristim protezu*	10 **61** 39	9.1% **55.5%** 35.5%	0,01
Do you have periodontitis? *Imate li parodontitis?*	Yes/*Da* No/*Ne*	10 **100**	9.1% **90.9%**	0,01
Do you sleep at night with a dental prosthesis? *Spavate li noću sa zubnom protezom?*	I take out the prosthesis / *Vadim protezu* I don't take out the prosthesis *Ne vadim protezu* I occasionally take out the prosthesis *Povremeno vadim protezu*	**51** 17 4	**70.8%** 23.6% 5.6%	0,01

* Hi quadratic test was performed and bolded are those categories with statistically significant differences
* Izveden je hi kvadrat test i podebljane su one kategorije sa statistički značajnim razlikama

Mann-Whitney's, Kruskal-Wallisov and Hi quadratic tests were used to examine the connection of dental status with oral hygiene knowledge. Prior to testing, the differences/correlations, Kolmogorov-Smirnov's test for continuous variables was performed to check the normality of the variables distribution. The results show that the distribution significantly deviates from normal, which is why nonparametric substitutions have been used ($P < 0.01$).

Significant differences were obtained. Participants who know the importance of a timely visit to the dentist have a large number of bridges in the oral cavity. Participants who know that coffee, alcohol and cigarettes affect the quality of the teeth also have a larger number of bridges in the oral cavity. Paradoxically, participants who think that chocolate is healthy for teeth on average have more healthy teeth but also a greater number of dental bridges in the oral cavity. In the end, participants who think that fruits are healthy for teeth also have more healthy teeth. The results confirm that participants who recognize the importance of timely visits to the dentist in the case of toothache and understand the influence of coffee, alcohol and cigarettes on the quality of the teeth have on average a better dental status. Those who have a larger number of healthy teeth, a larger number of bridges in the oral cavity and a larger number of fillings in their teeth more often visit the dentist and usually clean their teeth after each meal. Finally, Spearman's correlation coefficient was calculated to examine the correlation between previously used variables about dental status and the remaining responses to oral hygiene questions. The results confirm that participants who pay attention to the quality of the toothbrush have more healthy teeth, more dental bridges in the oral cavity and more fills. Participants who use a brush to clean the interiors more often have more healthy teeth and more fills. Those who consume more sweet and sour foods have less fillings and evaluate their dental status more positively. In the end, participants who use pills for dental prosthesis report periodontitis less often. Participants who live in the Požega Retirement Home have significantly less healthy teeth than subjects living in their own home.

Discussion

The aim of this study was to examine the connection between the dental status and knowledge of oral hygiene in elderly persons in Požeško-Slavonska County. It is well-known that quality nutrition and regular and quality care of dental health affects the dental status. The relationship between oral health, daily consumption of food and general health is very complex. Timely visits to the dentist are extremely important for the preservation of dental health. Given the biological predisposition of teeth decay with age, it is important to act preventively in order to minimize the adverse effects of age on dental health. Food lacking vitamins, minerals, proteins and calories can reduce the immune system and disturb the general health condition.

In this research, results show that participants rarely consult their dentist about dental hygiene although most of them are self-sufficient in performing oral hygiene and they are satisfied with the quality of eating meals. Just a few participants have healthy teeth, which is probably related to their habits such as lack of attention to quality of toothbrushes as well as inadequate teeth cleaning. The same results had Kotronia E. among United States of America and United Kingdom elderly population.[8] The results have shown that participants who are aware of the importance of timely visits to the dentist have on average a larger number of bridges in the oral cavity, probably because they are more focused on dental health. An unusual finding has been obtained – participants who think that chocolate is healthy for teeth on average have more healthy teeth. It is possible that no adverse consequences of such excessive consumption of sweet products have occurred so they think this is not related. However, participants still have better dental status when they are introduced to the adverse effects of coffee, alcohol, and cigarettes on the quality of teeth. Those who have a larger number of healthy teeth, a larger number of bridges in the oral cavity, and a larger number of fillings in teeth visit the dentist more often. As expected, those who are more likely to go to the dentist and those who clean their teeth after each meal have better dental status than those who do not. It has been found that those who use the toothbrush to clean the interiors between teeth more often have more healthy teeth but also teeth with fillings. However, the participants who eat more often sweet and sour foods, in spite of the expectations, have less fillings and evaluate dental status more positively - probably because they have not developed the negative consequences of a poor diet.

Finally, it was examined whether there were differences in dental status between Retirement Home Residence based participants and those living in their own home. Participants living in the Požega Retirement Home have significantly less teeth but do not differ in other variables. Compared to oral health care among Retirement Home Residents, in Avon in the UK the residents levels of plaque and associated dental disease were high because staff did not effectively perform oral health care appropriate to the residents' needs.[9]

Conclusion

Proper nutrition of elderly people implies satisfying the energy needs and needs of essential nutrients while at the same time reduce the risk of developing chronic illnesses associated with eating habits. As certain changes in the functioning of the digestive system and

the quality of the gum occur during aging, great importance should be devoted to consuming food.

Based on the implementation of this study, it can be concluded that subjects rarely take advises about dental hygiene but they are mostly independent in performing oral hygiene and that they are satisfied with the quality of eating meals. The average age of tooth loss is 30.54 years and the participants have, on average, six healthy teeth. Over 70% of participants have no dental bridges and the average number of dental fillings is 0.57. When buying a new toothbrush, the participants rarely look at its quality and almost never use a brush to clean the interlayer. The average age of getting a dental prosthesis is 54.08 years old and they rarely use a pill to clean dental prosthesis. Participants who know the importance of a timely visit to the dentist, who know how coffee, alcohol and cigarettes affect the quality of their teeth and who think that chocolate is healthy for the teeth on average have a larger number of dental bridges in the oral cavity. Those who believe that fruit is healthy have a larger number of healthy teeth, and those who recognize the importance of timely visits to the dentist in the case of toothache and know about the effect of coffee, alcohol and cigarette on the quality of the teeth, have better dental status. The results also confirm that participants who have a larger number of healthy teeth, a larger number of bridges and larger number of fillings more often visit the dentist. In the end, participants living in their own home have a larger number of healthy teeth than those living in a nursing home.

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