

Knowledge and Attitudes of Patients about Dental Implants as a Treatment Option after Tooth Extraction

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ABSTRACT

The aim of the study is to determine patients' knowledge and attitudes toward dental implants as a therapeutic option after tooth extraction and to examine the sources of information about dental implants and determine the most common barriers in deciding for this type of therapy. The cross-sectional study included 130 patients. An anonymous survey questionnaire was used to conduct the research. The survey questionnaire consists of a total of 17 multiple-choice questions. Respondents showed good knowledge of dental implants except for knowledge of dental implant duration where subjects mostly stated that a dental implant lasts a lifetime. For most respondents, the dentist is the main source of information related to dental implants. The cost of the procedure for most respondents is a major barrier in decision to install a dental implant, but most of them want to know more about dental implants. Statistically significant differences were observed in patients' knowledge in relation to age and level of education and patients' attitudes in relation to gender, age, and level of education.

Key words: dental implant, treatment modality, knowledge, missing teeth

Introduction

Dental health greatly affects the well-being and quality of life of each individual. Healthy teeth complete a person's appearance and enable proper nutrition. Loss of one or more natural teeth often results in several deficiencies, such as difficulty in speaking and feeding. Also, loss of self-confidence and reduced social interactions due to discomfort caused by lack of teeth or wearing dentures are not excluded¹. The main task of prosthetics is the rehabilitation of patients after tooth loss and the establishment of a stable function of the stomatognathic system. With the progress of dental implantology, dental implants are increasingly coming into focus as the highest quality and longest-lasting solution in the rehabilitation of partially or completely toothless patients. The advantage of dental implants, over traditional prosthetic methods, is that dental implants provide satisfactory retention of prosthetic work and do not require additional grinding of adjacent teeth to compensate for the lost tooth¹. A dental implant is the best choice for tooth replacement because it lasts 15

to 20 years and has a high success rate². Despite the benefits of dental implants, the difference between need and demand is still large. It is assumed that such a difference occurs due to lack of information and lack of awareness within the dental patient population, but also due to financial factors¹.

It is known that tooth loss occurs with aging. Various studies have shown that the loss of the teeth of the upper jaw and then the lower jaw is more common. It has also been observed that posterior teeth are lost before anterior teeth³. Tooth deficiency impairs the integrity of the dentition and intermaxillary relationship leading to biostatic imbalance and causing impairment of the stomatognathic system⁴.

Today, aesthetics are more important to patients than dental function. They find it uncomfortable to be without front teeth and consequently revive the discomfort in everyday social contacts. Restoring facial aesthetics can be

a challenge and is a major factor in making decisions about the type of prosthetic procedures to be performed on a patient.

In the late 1950s, the first screw-shaped titanium implant was made in Sweden by anatomist P. I. Branemark. During this period, the first introduction of intraoral application of dental implants by osseointegration as it is known today occurs^{5,6}. Originally, dental implants were used to treat completely or partially edentulous patients⁵. Over time, they have proven to be very high quality and long-lasting solution for replacing natural teeth. Studies have shown that 89% of patients wear a dental implant more than 10 years after its placement. The introduction of a dental implant in place of a prosthesis carrier has led to great development and progress in reconstructive dental therapy⁷. In addition to not requiring additional grinding of adjacent teeth to compensate for a lost tooth, dental implants also provide good function, efficacy, stability, and provide support to dentures^{1,5}. By influencing all of these functions, dental implants can greatly improve quality of life and aid in rehabilitation in partially or completely edentulous patients and are today considered the gold standard in replacing a lost tooth^{5,8}. Given all the benefits of a dental implant, there are many indications for its use, such as the edentulous upper or lower jaw, partial edentulousness, and lack of only one tooth^{6,9}. It is important to mention that the first and most important step in preparing dental implant therapy is to make a thorough and detailed history, which includes assessing social and economic status, general health, and taking medical and dental history, and examining harmful habits⁷. Also, before the start of therapy, complete rehabilitation of the oral cavity is required, which includes the repair of caries, removal of plaque and tartar, treatment of periodontal pockets, inflammation, and the like⁶. Patient understanding, cooperation, and expectations are very important for initiating successful treatment⁷.

The aim of this study was to examine patients' knowledge and attitudes about dental implants as a therapeutic option after tooth extraction and to examine the sources of information about dental implants and determine the most common barriers in decision making for this type of therapy.

Participants and methods

Participants

The cross-sectional study included patients in the dental offices of the Health Center in Osijek. A total of 130 patients who agreed to complete the questionnaire at the time of the study were included in the study. Respondents were asked to fill in the questionnaire on their own, and before completing the questionnaire, the purpose of the study was explained to them. Respondents were provided with data confidentiality and the opportunity to withdraw from the study at any time. The research was approved by

the Ethics Committee of the Osijek Health Center. The survey was conducted during April and May 2019.

Questionnaire procedures

The survey questionnaire consists of a total of 17 questions to which multiple answers were offered. The first part of the questionnaire, ie. the first 5 questions, refers to general data on respondents: age, gender, place of residence, level of education, and financial status. The remaining questions, 12 of them, relate to patients' knowledge and attitudes about dental implants. Respondents answered if they were missing any teeth. Their position on the importance of tooth extraction, their information on available treatments, and general knowledge and sources of information on dental implants were examined. Also, their knowledge about the location of placement, the material from which they are made, the lifespan and hygiene of the dental implant were examined. Finally, their most important factor in deciding on dental implant therapy, who implants them, and interest in expanding their knowledge of dental implants were examined.

Data collection and statistical analysis

Category data are presented in absolute and relative frequencies. Numerical data are described by the median and limits of the interquartile range. Differences of categorical variables were tested by χ^2 test. The normality of the distribution of numerical variables was tested by the Kolmogorov-Smirnov test. All p values are two-sided. The significance level was set to $\alpha = 0.05$. The statistical program SPSS (version 24.0, SPSS Inc., Chicago, IL, USA) was used for statistical analysis¹⁰.

Results

130 respondents participated in the study, of which 53 (41%) were men and 77 (59%) were women. The median age is 39 years (interquartile range of 29 to 51) ranging from 18 to 78 years. The majority of respondents live in the city (79%), most of them stated that they have a high school diploma (52%) and describe their financial status as good (60%). Most respondents report missing at least one tooth (72%) (Table 1).

When we talk about the knowledge of respondents about dental implants, most of the state (61%) that the replacement of extracted teeth is very important, implants are placed in the bone of thought also most respondents (74%), 40% of them think they are built of titanium and that 39% of respondents (74%) believe that implants require the same care as natural teeth and 75% of respondents say that oral surgeons are the best trained to place implants (Table 2).

The majority of respondents in our study, 77 of them (59%), state that the cost of the procedure is their most important factor when deciding on the installation of a dental implant, 82% of respondents are familiar with the

TABLE 1
DEMOGRAPHIC DATA OF THE SUBJECTS

Variable		Number of subjects (%)
Gender	male	53 (41)
	female	77 (59)
Age groups	18 – 30	41 (32)
	31 – 43	35 (27)
	44 – 56	38 (29)
	57 – 69	12 (9)
	70 – 80	4 (3)
Residence	City	103 (79)
	County	27 (21)
Education	Elementary education	3 (2)
	High school	67 (52)
	College	21 (16)
	University and above	39 (30)
Financial status	Poor	7 (5)
	Good	78 (60)
	Very good	42 (32)
	Excellent	3 (2)
Any missing teeth?	Yes	94 (72)
	No	36 (28)
Total		130 (100)

possibility of implant placement and 90% would like to know more about dental implants (Table 3).

There is no significant difference in respondents' knowledge of dental implants in relation to gender (Table 4).

Subjects would be significantly more likely to know more about dental implants as opposed to subjects (χ^2 test, $p = 0.02$). In other attitudes, there is no significant difference in relation to gender (Table 5).

Subjects in the age group of 70 to 80 years significantly considered that the dental implant was ceramic in its composition (χ^2 test, $p = 0.04$) and significantly did not know how long the dental implant lasted (χ^2 test, $p = 0.006$) in contrast to younger subjects. age groups (Table 6).

Subjects of all age groups up to 70 years are significantly more familiar with the possibility of dental implants (χ^2 test, $p = 0.02$) than respondents of the age group 70 to 80 years who do not significantly know the possibility of dental implants as a source of information (χ^2 test, $p = 0.03$) (Table 7).

There is no significant difference in the respondents' knowledge of dental implants with regard to the place of residence (Table 8).

There is no significant difference in the attitudes of the respondents about dental implants with regard to the possibility of information (Table 9).

TABLE 2
PATIENTS' KNOWLEDGE ABOUT DENTAL IMPLANTS

Question		Number of subjects (%)
Do you think it is important to replace the extracted teeth?	It doesn't matter at all	1 (1)
	Neither important nor unimportant	5 (4)
	Somewhat important	44 (34)
	Very important	80 (61)
Where do you think dental implants are placed?	Into the bone	96 (74)
	Into the gums	23 (17)
	Into the adjacent teeth	5 (4)
	Onto the adjacent teeth	6 (5)
In your opinion, what is the composition of a dental implant?	Porcelain	19 (15)
	Stainless steel	11 (8)
	Titan	52 (40)
	Ceramics	19 (15)
	I do not know	29 (22)
How long do you think is a lifespan of a dental implant?	5 – 10 years	14 (11)
	More than 10 years	39 (30)
	Life long	51 (39)
	I do not know	26 (20)
Do you think that dental implants need special care and hygiene?	No special care is required	14 (11)
	It requires very little care	4 (3)
	Same as natural teeth	96 (74)
	Much more than natural teeth	16 (12)
Who do you think is qualified for dental implant placement?	Oral surgeons	97 (75)
	Prosthetists	19 (15)
	Periodontists	1 (1)
	Cosmetic dentists	2 (2)
	General dental practitioners	11 (8)
Total		130 (100)

In subjects with a university degree, the replacement of extracted teeth is significantly more important than in those with a lower level of education (χ^2 test, $p = 0.03$). While subjects with completed primary school do not significantly know how long a dental implant lasts, unlike subjects with completed secondary, higher, and tertiary education (χ^2 test, $p = 0.03$) (Table 10).

Subjects with completed primary school no longer know the available options for treatment with dental implants (χ^2 test, $p < 0.001$) and as a source of information do not know the possibility of implantation of dental implants, unlike respondents with completed secondary, higher or higher education who are more often their source of information is their dentist (χ^2 test, $p = 0.004$) and the cost of the installation procedure is a significantly important factor in deciding on the placement of a dental implant (χ^2 test, $p = 0.01$) (Table 11).

TABLE 3

PATIENTS' ATTITUDE TOWARDS DENTAL IMPLANTS

		Number of subjects (%)
To what extent are you familiar with the different treatment options?	I do not know	7 (5)
	Very little	26 (20)
	To some extent	73 (56)
	To a large degree	24 (18)
Are you familiar with the possibility of placing dental implants?	I am familiar	106 (82)
	I am not familiar	24 (18)
What is your main source of information regarding implants?	Dentist	62 (48)
	Friends and relatives	24 (18)
	Media	10 (8)
	Internet sources	25 (19)
	I am not familiar with the possibility of dental implant placement	9 (7)
What is the most important factor in deciding on a dental implant?	Cost of the procedure	77 (59)
	Fear of surgery	20 (15)
	I do not like having a foreign body inside me.	9 (7)
	None	24 (19)
Would you like to know more about dental implants?	Yes	117 (90)
	No	13 (10)
Total		130 (100)

Discussion

A total of 130 patients who agreed to complete the questionnaire at the time of the study were included in the study. In terms of gender, 41% of male respondents and 59% of female respondents participated in the study. A similar study was conducted in 2013 at a dental clinic in Khartoum, Sudan on a sample of 384 patients, and of the total number of patients, 47.1% were male and 52.9% were female¹¹.

The majority of respondents, 72%, state that they lack at least one tooth, while only 28% of respondents state that they have all teeth. A similar study was conducted in 2016 on 100 patients in India and found that 54% of them were missing at least one tooth, while 46% had all teeth¹². It can be seen that most patients in both studies are missing at least one tooth, but in the current study, the percentage of patients without at least one tooth is significantly higher. Taking into account the total number of subjects, the largest number of subjects showed a good level of knowledge related to dental implants.

The majority of respondents, 61% of them, believe that the replacement of extracted teeth is very important. Similar results were obtained in a study of the Austrian population as well as the population of subjects in the Hong Kong, SiChuan, and JiangSua areas where sub-

jects showed an objective level of general knowledge about dental implants¹³⁻¹⁵. However, a study conducted in the Malaysian population shows only 17% of well-informed respondents about the possibility of replacing missing teeth with implants¹⁶.

In our study, respondents had to answer a question about the location of a dental implant, and most patients, 96 of them (74%), believe that a dental implant is placed in a bone. A similar result on a total sample of 544 subjects, 418 of them (76.8%) on the location of dental implant placement was shown by a study in Turkey¹⁷. In a study conducted in Sudan, 25.5% of patients believe that a dental implant is implanted in the bone¹¹. Likewise, in a study conducted by Em Kalala-Kazadi et al.¹⁸, when asked about anchor implants, 86% of respondents did not know where a dental implant was placed. If we compare these data with our research, we can conclude that the patients from our research showed a higher level of knowledge.

When asked about the composition of a dental implant, the largest number of respondents, 52 of them (40%), believe that the implant is made of titanium. A similar result was shown by a study in Turkey where 42.5% of participants did not know what implants were made of¹⁷.

When asked about the duration of a dental implant, the largest number of respondents, 51 (39%), believe that a dental implant lasts a lifetime, while 39 (30%) believe that a dental implant lasts more than 10 years, which is also true. Respondents to a study conducted in Sudan had to answer the same question where 19.3% of them believe that a dental implant lasts a lifetime, while only 7.3% think it lasts more than 10 years¹¹. Also, a study conducted in Congo showed 92% of respondents did not know how long an implant lasts, and only 6% believe that a dental implant lasts a lifetime¹⁸. A majority of respondents (52.5%) said that implants would last for about 10 years, and only 21.7% of participants said they were for life, according to a study conducted at the University of Michigan¹⁹. Research conducted by Mayya et al. is consistent with this study and shows that 76.7% of respondents believe that implants will last for 10 years, and only 9.3% for life²⁰.

The majority of respondents in the current study, 96 of them (74%), believe that a dental implant needs the same hygiene as natural teeth. Taking into account the total number of respondents, a study conducted in Sudan gave worse results than ours and showed that the largest number of respondents, 49.7%, believe that dental implants need the same hygiene as natural teeth¹¹. A study conducted in Italy showed that 60% of respondents said that implants need more care than natural teeth²⁰. These data are consistent with another study where subjects felt in 79% that implants needed more care than natural teeth²⁰. In contrast, research conducted by Tepper et al.²², and Pommer et al.²³ showed that only 45% and 39% of respondents, respectively, believe that dental implants need more care than natural teeth.

TABLE 4
 PATIENT'S KNOWLEDGE OF DENTAL IMPLANTS BY GENDER

Knowledge	Number (%) of respondents			P*
	Male	Female	Total	
Do you think the replacement of extracted teeth is important?				
Not important at all	1 (2)	0 (0)	1 (1)	0.53
Neither important nor unimportant	2 (4)	3 (4)	5 (4)	
Somewhat important	20 (38)	24 (31)	44 (34)	
Very important	30 (56)	50 (65)	80 (61)	
Where do you think dental implants are placed?				
In the bone	39 (74)	57 (74)	96 (74)	0.33
In the mucosa	7 (13)	16 (20)	23 (17)	
Inside adjacent teeth	3 (6)	2 (3)	5 (4)	
On adjacent teeth	4 (7)	2 (3)	6 (5)	
In your opinion, what is the composition of a dental implant?				
Porcelain	7 (13)	12 (16)	19 (15)	0.99
Stainless Steel	5 (9)	6 (8)	11 (8)	
Titan	21 (40)	31 (40)	52 (40)	
Ceramics	8 (15)	11 (14)	19 (15)	
I don't know	12 (23)	17 (22)	29 (22)	
How long do you think a dental implant lasts?				
5 – 10 years	6 (12)	8 (10)	14 (11)	0.47
More than 10 years	14 (26)	25 (33)	39 (30)	
Lifetime	19 (36)	32 (42)	51 (39)	
I don't know	14 (26)	12 (15)	26 (20)	
Do you think that dental implants need special care and hygiene compared to natural teeth?				
No special care required	7 (13)	7 (9)	14 (11)	0.25
Very little care is needed	3 (6)	1 (1)	4 (3)	
Same as natural teeth	39 (74)	57 (75)	96 (74)	
Much more than natural teeth	4 (7)	12 (15)	16 (12)	
Who do you think is qualified to place dental implants?				
Oral Surgeons	41 (78)	56 (73)	97 (75)	0.45
Prosthetics	6 (11)	13 (17)	19 (15)	
Periodontists	1 (2)	0 (0)	1 (1)	
Cosmetic dentists	0 (0)	2 (2)	2 (2)	
General dentists	5 (9)	6 (8)	11 (8)	
Total	53 (100)	77 (100)	130 (100)	

* χ^2 test

When asked who is qualified to place dental implants, the majority of respondents in our study, 97 of them (75%), believe that oral surgeons are trained to do so. A study conducted in Austria shows that most respondents believe that only specialists should perform implant procedures¹⁴.

A statistically significant difference in our study was observed in the knowledge of patients in relation to age and level of education. It was found that respondents in the age group of 70 to 80 years significantly more consid-

er that the dental implant is ceramic in its composition and significantly do not know how long the dental implant lasts compared to respondents in younger age groups. In addition, it was found that for respondents with a university degree, significantly more extraction of extracted teeth is very important in contrast to respondents with lower education. Unlike respondents with completed secondary, higher, and tertiary education, respondents with completed primary school do not significantly know how long a dental implant lasts.

TABLE 5
ATTITUDES OF RESPONDENTS ABOUT DENTAL IMPLANTS BY GENDER

Attitudes	Number (%) of respondents			P*
	Male	Female	Total	
To what extent do you know the different treatment options available?				
I don't know	4 (7)	3 (4)	7 (5)	0.80
Very little	11 (21)	15 (19)	26 (20)	
Somewhat	28 (53)	45 (59)	73 (56)	
Large	10 (19)	14 (18)	24 (18)	
Do you know the possibility of inserting dental implants?				
I know	43 (81)	63 (82)	106 (82)	0.92
I don't know	10 (19)	14 (18)	24 (18)	
What is the source of your information?				
Dentist	21 (40)	41 (53)	62 (48)	0.09
Friends and relatives	8 (15)	16 (21)	24 (18)	
Media	7 (13)	3 (4)	10 (8)	
Internet Resources	11 (21)	14 (18)	25 (19)	
I do not know the possibility of inserting dental implants	6 (11)	3 (4)	9 (7)	
What is the most important factor in deciding on a dental implant?				
Costs of proceedings	33 (62)	44 (57)	77 (59)	0.13
Fear of surgery	4 (7)	16 (21)	20 (15)	
I don't like a foreign body located in my body	3 (6)	6 (7)	9 (7)	
None	13 (25)	11 (14)	24 (19)	
Would you like to know more about dental implants?				
Yes	44 (83)	73 (95)	117 (90)	0.02
No	9 (17)	4 (5)	13 (10)	
Total	53 (100)	77 (100)	130 (100)	

* χ^2 test

Awareness of dental implants was statistically significant in relation to the age of the subjects and their level of education in a study conducted in Croatia where it was shown that younger people with a higher level of education have better information about implants²⁴. Also, statistically significant differences were found between the age and socio-economic status of the population of northern India in a study conducted by Kour et al.²⁵. These data are consistent with what was reported by Yao et al. that younger subjects (<45 years) and those with a higher level of education (bachelor and postgraduate) tended to show a more realistic perception and lower expectations of the outcome of implant therapy¹⁵. A survey of the Saudi population also found that more than 50% of respondents referred for implants had education level higher than a bachelor's degree. This percentage was significantly higher than those referring to who could only read and write or who were bachelors²⁶.

The largest number of respondents, 73 of them (56%), only partially know the possibilities of replacing a lost tooth, while the majority of respondents, 106 of them (82%), know the possibilities of installing a dental im-

plant. A study conducted in Sudan showed that 68.5% of their respondents were aware of the possibility of installing dental implants¹¹. In contrast, in a study by Tandra Das et al., 70% of respondents did not know the possibility of implant placement²⁷.

When asked about the source of information related to dental implants, the majority of respondents, 62 of them (48%), stated that the dentist is the main source of their knowledge about dental implants. A survey conducted in 1998 in the Netherlands showed that 52% of respondents first heard information about dental implants from friends and relatives while 36% received the first information from a family dentist¹³. As the main source of information related to dental implants research, Pradha et al.²⁸, as well as Alshammari et al.²⁹ also state that the dentist is the main source of the knowledge of dental implants. The patient's interest in acquiring additional information related to dental implants leads to an attempt to seek additional information from other sources. Research done in England has shown the possibility of displaying false information about implants in various media³⁰.

TABLE 6
 PATIENTS' KNOWLEDGE OF DENTAL IMPLANTS IN RELATION TO AGE

Knowledge	Number (%) of respondents					P*
	18 – 30	31 – 43	44 – 56	57 – 69	70 – 80	
Do you think the replacement of extracted teeth is important?						
It doesn't matter at all	1 (2)	0 (0)	0 (0)	0 (0)	0 (0)	0.09
Neither important nor unimportant	3 (7)	0 (0)	1 (3)	1 (8)	0 (0)	
Somewhat important	15 (37)	18 (51)	9 (23)	0 (0)	2 (50)	
Very important	22 (54)	17 (49)	28 (74)	11 (92)	2 (50)	
Where do you think dental implants are placed?						
In the bone	29 (71)	27 (77)	31 (81)	7 (59)	2 (50)	0.64
In the mucosa	6 (15)	6 (17)	5 (13)	4 (33)	2 (50)	
Inside adjacent teeth	3 (7)	1 (3)	1 (3)	0 (0)	0 (0)	
On adjacent teeth	3 (7)	1 (3)	1 (3)	1 (8)	0 (0)	
In your opinion, what is the composition of a dental implant?						
Porcelain	9 (22)	2 (6)	6 (16)	2 (17)	0 (0)	0.04
Stainless steel	1 (2)	4 (11)	5 (13)	1 (8)	0 (0)	
Titan	9 (22)	16 (46)	19 (50)	7 (59)	1 (25)	
Ceramics	11 (27)	3 (8)	2 (5)	1 (8)	2 (50)	
I do not know	11 (27)	10 (29)	6 (16)	1 (8)	1 (25)	
How long do you think a dental implant lasts?						
5 – 10 years	8 (20)	2 (6)	4 (10)	0 (0)	0 (0)	0.006
More than 10 years	13 (32)	13 (37)	8 (21)	5 (42)	0 (0)	
Lifetime	14 (34)	14 (40)	20 (53)	3 (25)	0 (0)	
I do not know	6 (14)	6 (17)	6 (16)	4 (33)	4 (100)	
Do you think that dental implants need special care and hygiene compared to natural teeth?						
No special care is required	3 (7)	7 (20)	4 (11)	0 (0)	0 (0)	0.08
It requires very little care	2 (5)	2 (6)	0 (0)	0 (0)	0 (0)	
Same as natural teeth	28 (68)	23 (66)	33 (87)	8 (67)	4 (100)	
Much more than natural teeth	8 (20)	3 (8)	1 (2)	4 (33)	0 (0)	
Who do you think is qualified to place dental implants?						
Oral surgeons	32 (79)	24 (67)	28 (73)	11 (92)	2 (50)	0.63
Prosthetists	5 (12)	5 (14)	6 (16)	1 (8)	2 (50)	
Periodontists	1 (2)	0 (0)	0 (0)	0 (0)	0 (0)	
Cosmetic dentists	1 (2)	0 (0)	1 (3)	0 (0)	0 (0)	
General practitioners	2 (5)	6 (17)	3 (8)	0 (0)	0 (0)	
Total	41 (100)	35 (100)	38 (100)	12 (100)	4 (100)	

* χ^2 test

TABLE 7
 ATTITUDES OF RESPONDENTS ABOUT DENTAL IMPLANTS BY AGE

Attitude	Number (%) of respondents					P*
	18 – 30	31 – 43	44 – 56	57 – 69	70 – 80	
To what extent do you know the different treatment options available?						
I do not know	2 (5)	1 (3)	2 (5)	2 (17)	0 (0)	0.72
Very little	11 (27)	7 (20)	6 (16)	1 (8)	1 (25)	
To some extent	21 (52)	22 (63)	20 (53)	8 (67)	2 (50)	
Largely	7 (17)	5 (14)	10 (26)	1 (8)	1 (25)	

TABLE 7
CONTINUED...

Attitude	Number (%) of respondents					P*
	18 – 30	31 – 43	44 – 56	57 – 69	70 – 80	
Do you know the possibility of inserting dental implants?						
I know	34 (83)	31 (89)	32 (84)	8 (67)	1 (25)	0.02
I do not know	7 (17)	4 (11)	6 (16)	4 (33)	3 (75)	
What is the source of your information?						
Dentist	18 (44)	19 (54)	19 (50)	5 (43)	1 (25)	0.03
Friends and relatives	11 (27)	3 (9)	8 (21)	1 (8)	1 (25)	
Media	2 (5)	4 (11)	2 (5)	2 (17)	0 (0)	
Internet sources	8 (19)	8 (23)	8 (21)	1 (8)	25 (19)	
I do not know the possibility of inserting dental implants	2 (5)	1 (3)	1 (3)	3 (25)	2 (50)	
What is the most important factor in deciding on a dental implant?						
Costs of the proceedings	22 (54)	23 (66)	23 (61)	5 (42)	4 (100)	0.61
Fear of surgery	7 (17)	5 (14)	7 (18)	1 (8)	0 (0)	
I don't like a foreign body located in my body	4 (10)	1 (3)	3 (8)	1 (8)	0 (0)	
None	8 (19)	6 (17)	5 (13)	5 (42)	0 (0)	
Would you like to know more about dental implants?						
Yes	38 (93)	29 (83)	35 (92)	12 (100)	3 (75)	0.31
No	3 (7)	6 (17)	3 (8)	0 (0)	1 (25)	
Total	41 (100)	35 (100)	38 (100)	12 (100)	4 (100)	

* χ^2 test

TABLE 8
PATIENTS' KNOWLEDGE OF DENTAL IMPLANTS BY PLACE OF RESIDENCE

Knowledge	Number (%) of respondents			P*
	City	Village	Total	
Do you think the replacement of extracted teeth is important?				
It doesn't matter at all	1 (1)	0 (0)	1 (1)	0.63
Neither important nor unimportant	5 (5)	0 (0)	5 (4)	
Somewhat important	35 (34)	9 (13)	44 (34)	
Very important	62 (60)	18 (67)	80 (61)	
Where do you think dental implants are placed?				
In the bone	76 (74)	20 (74)	96 (74)	0.44
In the mucosa	18 (17)	5 (19)	23 (17)	
Inside adjacent teeth	3 (3)	2 (7)	5 (4)	
On adjacent teeth	6 (6)	0 (0)	6 (5)	
In your opinion, what is the composition of a dental implant?				
Porcelain	12 (12)	7 (26)	19 (15)	0.19
Stainless steel	11 (11)	0 (0)	11 (8)	
Titan	41 (40)	11 (41)	52 (40)	
Ceramics	16 (15)	3 (11)	19 (15)	
I do not know	23 (22)	6 (21)	29 (22)	

TABLE 8
CONTINUED...

Knowledge	Number (%) of respondents			P*
	City	Village	Total	
How long do you think a dental implant lasts?				
5 – 10 years	12 (12)	2 (7)	14 (11)	0.71
More than 10 years	29 (28)	10 (37)	39 (30)	
Lifetime	40 (39)	11 (41)	51 (39)	
I do not know	22 (21)	4 (15)	26 (20)	
Do you think that dental implants need special care and hygiene compared to natural teeth?				
No special care is required	11 (11)	3 (11)	14 (11)	0.57
It requires very little care	4 (4)	0 (0)	4 (3)	
Same as natural teeth	74 (72)	22 (82)	96 (74)	
Much more than natural teeth	14 (13)	2 (7)	16 (12)	
Who do you think is qualified to place dental implants?				
Oral surgeons	78 (76)	19 (70)	97 (75)	0.32
Prosthetists	15 (14)	4 (15)	19 (15)	
Periodontists	0 (0)	1 (4)	1 (1)	
Cosmetic dentists	2 (2)	0 (0)	2 (2)	
General practitioners	8 (8)	3 (11)	11 (8)	
Total	103 (100)	27 (100)	130 (100)	

* χ^2 test

TABLE 9
ATTITUDES OF RESPONDENTS ABOUT DENTAL IMPLANTS BY PLACE OF RESIDENCE

Attitudes	Number (%) of respondents			P*
	City	Village	Total	
To what extent do you know the different treatment options available?				
I do not know	6 (6)	1 (4)	7 (5)	0.36
Very little	20 (19)	6 (22)	26 (20)	
To some extent	55 (54)	18 (67)	73 (56)	
Largely	22 (21)	2 (7)	24 (18)	
Do you know the possibility of installing dental implants?				
I know	85 (83)	21 (78)	106 (82)	0.57
I do not know	18 (17)	6 (22)	24 (18)	
What is the source of your information?				
Dentist	49 (48)	13 (48)	62 (48)	0.94
Friends and relatives	20 (19)	4 (15)	24 (18)	
Media	7 (7)	3 (11)	10 (8)	
Internet sources	20 (19)	5 (19)	25 (19)	
I do not know the possibility of inserting dental implants	7 (7)	2 (7)	9 (7)	

TABLE 9
CONTINUED...

Attitudes	Number (%) of respondents			P*
	City	Village	Total	
What is the most important factor in deciding on a dental implant?				
Costs of proceedings	62 (60)	15 (56)	77 (59)	0.71
Fear of surgery	14 (14)	6 (22)	20 (15)	
I don't like a foreign body located in my body	7 (7)	2 (7)	9 (7)	
None	20 (19)	4 (15)	24 (19)	
Would you like to know more about dental implants?				
Yes	91 (88)	26 (96)	117 (90)	0.22
No	12 (12)	1 (4)	13 (10)	
Total	103 (100)	27 (100)	130 (100)	

* χ^2 test

TABLE 10
PATIENTS' KNOWLEDGE OF DENTAL IMPLANTS BY EDUCATION LEVEL

Knowledge	Number (%) of respondents					P*
	Primary school	Secondary education	Higher education	Tertiary education	Total	
Do you think the replacement of extracted teeth is important?						
It doesn't matter at all	0 (0)	0 (0)	1 (5)	0 (0)	1 (1)	0.03
Neither important nor unimportant	1 (33)	3 (5)	1 (5)	0 (0)	5 (4)	
Somewhat important	1 (33)	23 (34)	10 (48)	10 (26)	44 (34)	
Very important	1 (33)	41 (61)	9 (42)	29 (74)	80 (61)	
Where do you think dental implants are placed?						
In the bone	1 (33)	47 (70)	19 (90)	29 (74)	96 (74)	0.16
In the mucosa	1 (33)	13 (19)	1 (5)	8 (21)	23 (17)	
Inside adjacent teeth	0 (0)	4 (6)	1 (5)	0 (0)	5 (4)	
On adjacent teeth	1 (33)	3 (5)	0 (0)	2 (5)	6 (5)	
In your opinion, what is the composition of a dental implant?						
Porcelain	2 (67)	8 (12)	2 (10)	7 (18)	19 (15)	0.63
Stainless steel	0 (0)	5 (7)	2 (10)	4 (10)	11 (8)	
Titan	0 (0)	30 (45)	8 (38)	14 (36)	52 (40)	
Ceramics	0 (0)	10 (15)	4 (19)	5 (13)	19 (15)	
I do not know	1 (33)	14 (21)	5 (23)	9 (23)	29 (22)	
How long do you think a dental implant lasts?						
5 – 10 years	0 (0)	5 (7)	3 (14)	6 (15)	14 (11)	0.03
More than 10 years	0 (0)	19 (29)	6 (29)	14 (36)	39 (30)	
Lifetime	0 (0)	26 (39)	10 (48)	15 (39)	51 (39)	
I do not know	3 (100)	17 (25)	2 (9)	4 (10)	26 (20)	
Do you think that dental implants need special care and hygiene compared to natural teeth?						
No special care is required	0 (0)	9 (13)	3 (14)	2 (5)	14 (11)	0.83
It requires very little care	0 (0)	1 (2)	1 (5)	2 (5)	4 (3)	
Same as natural teeth	2 (67)	50 (75)	14 (67)	30 (77)	96 (74)	
Much more than natural teeth	1 (33)	7 (10)	3 (14)	5 (13)	16 (12)	

TABLE 10
CONTINUED...

Who do you think is qualified to place dental implants?						
Oral surgeons	2 (67)	51 (76)	16 (76)	28 (73)	97 (75)	0.74
Prosthetists	1 (33)	6 (9)	3 (14)	9 (23)	19 (15)	
Periodontists	0 (0)	1 (2)	0	0	1 (1)	
Cosmetic dentists	0 (0)	1 (2)	0	1 (2)	2 (2)	
General practitioners	0 (0)	8 (11)	2 (10)	1 (2)	11 (8)	
Total	3 (100)	67 (100)	21 (100)	39 (100)	130 (100)	

* χ^2 test

TABLE 11
ATTITUDES OF RESPONDENTS ABOUT DENTAL IMPLANTS BY EDUCATION LEVEL

Attitudes	Number (%) of respondents				Total	P*
	Primary school	Secondary education	Higher education	Tertiary education		
To what extent do you know the different treatment options available?						
I do not know	2 (67)	2 (3)	3 (14)	0 (0)	7 (5)	< 0.001
Very little	0 (0)	12 (18)	5 (24)	9 (23)	26 (20)	
To some extent	1 (33)	44 (66)	5 (24)	23 (59)	73 (56)	
Largely	0 (0)	9 (13)	8 (38)	7 (18)	24 (18)	
Do you know the possibility of inserting dental implants?						
I know	1 (33)	52 (78)	19 (90)	34 (87)	106 (82)	0.06
I do not know	2 (67)	15 (22)	2 (10)	5 (13)	24 (18)	
What is the source of your information?						
Dentist	0 (0)	32 (48)	11 (52)	19 (49)	62 (48)	0.004
Friends and relatives	0 (0)	11 (16)	6 (29)	7 (18)	24 (18)	
Media	0 (0)	6 (9)	3 (14)	1 (3)	10 (8)	
Internet sources	1 (33)	13 (19)	0 (0)	11 (28)	25 (19)	
I do not know the possibility of inserting dental implants	2 (67)	5 (7)	1 (5)	1 (3)	9 (7)	
What is the most important factor in deciding on a dental implant?						
Costs of the proceedings	1 (33)	43 (64)	10 (48)	23 (59)	77 (59)	0.01
Fear of surgery	0 (0)	9 (13)	5 (23)	6 (15)	20 (15)	
I don't like a foreign body located in my body	2 (67)	4 (6)	2 (10)	1 (3)	9 (7)	
None	0 (0)	11 (16)	4 (19)	9 (23)	24 (19)	
Would you like to know more about dental implants?						
Yes	3 (100)	60 (90)	20 (95)	34 (87)	117 (90)	0.72
No	0 (0)	7 (10)	1 (5)	5 (13)	13 (10)	
Total	3 (100)	67 (100)	21 (100)	39 (100)	130 (100)	

* χ^2 test

The majority of respondents in our study, 77 of them (59%), state that the cost of the procedure is their most important factor when deciding on the installation of a dental implant. A previously mentioned study in India found that 54% of respondents cite the high cost of implants and the implantation procedure as a crucial factor for the decision to install a dental implant¹². The results of these studies are consistent with the data by Kohli et al., Siddique et al. and Mahajani et al., showing that high

costs are a major limiting factor for implant treatment^{16,31,32}.

Conclusions

Most of the respondents are missing at least one tooth, and most of them think that the replacement of the extracted teeth is very important. Most subjects know

that a dental implant is placed in the bone, but they do not know its duration. Most respondents know that dental implants need the same hygiene as natural teeth and that they are installed by oral surgeons. The dentist is the main source of information about dental implants for most respondents, and the cost of the procedure is the main barrier in the decision to install a dental implant,

but despite this most of them want to know more about dental implants. There was a difference in patients' knowledge of dental implants in relation to age and level of education as well as a significant difference in patients' attitudes about dental implants in relation to gender, age, and level of education.

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ZNANJE I STAVOVI PACIJENATA O DENTALNIM IMPLANTATIMA KAO MOGUĆNOSTI LIJEČENJA NAKON EKSTRAKCIJE ZUBA

SAŽETAK

Cilj istraživanja je ispitati znanje i stavove pacijenata o dentalnim implantatima kao terapijskoj mogućnosti nakon ekstrakcije zuba te ispitati izvore informiranja pacijenta o dentalnim implantatima i utvrditi koje su najčešće barijere u donošenju odluke za takvu vrstu terapije. U presječno istraživanje je bilo uključeno 130 pacijenata. Radi provedbe istraživanja korišten je anonimni anketni upitnik. Anketni upitnik sastoji se od ukupno 17 pitanja s višestrukim odgovorima. Ispitanici su pokazali dobro znanje o dentalnim implantatima s iznimkom znanja o trajanju dentalnog implantata gdje su ispitanici većinom navodili kako dentalni implantat traje doživotno. Najvećem broju ispitanika, stomatolog je glavni izvor informacija vezanih za dentalne implantate. Troškovi postupka većini ispitanika predstavljaju glavnu barijeru pri odluci o ugradnji dentalnog implantata, ali ih većina želi znati više o dentalnim implantatima. Statistički značajne razlike uočene su kod znanja pacijenata u odnosu na dob i stupanj obrazovanja te kod stavova pacijenata u odnosu na spol, dob i stupanj obrazovanja.

