

Evaluation of Elderly Patients' Knowledge and Awareness of Dental Implant Treatments Applying to Periodontology and Prosthodontics Departments

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Abstract

Objective: Dental implants are a great treatment choice for replacing lost teeth with benefits like strong chewing ability, long-term use, and natural tooth preservation. The aim of our study was to evaluate the knowledge and awareness of the geriatric population in our nation regarding their preference for dental implants in prosthetic treatments.

Materials and Methods: A cross-sectional study was carried out by questionnaires, assessing knowledge about implants and demographic information, administered to patients attending the periodontology and prosthodontic clinics who volunteered to participate. The collected data were imported to Statistical Package for Social Sciences and the chi-square and Fisher's Exact tests were utilized to evaluate categorical variables represented as a percentage of study participants.

Results: A total of 200 individuals were enrolled. A significant correlation was found between implant knowledge with age, education and income level. According to the survey's findings, 95.5% of the respondents were aware of implants in varying degrees, and for the majority of them, their dentist was their primary source of information, followed by friends, family, and electronic media. While the majority of participants claimed that the cost of implants prevented them from considering getting one, 33.5% of them believed that the type of implant was the most crucial element influencing the treatment's outcome.

Conclusion: The results of this survey reveal that most geriatric patients are aware of implant treatment, but lack correct information. Dentists must pay close attention to patient-based assessment and education to assist patients and families comprehend the benefits and drawbacks of implant therapy.

Keywords: Geriatrics, dental implants, knowledge, awareness

Introduction

One of the most significant health issues still facing the elderly population is tooth loss, despite all the advancements in restorative and oral health care (1). Although the treatment protocols in elderly individuals are similar to those in young people, age-related tissue changes in the oral cavity, systemic diseases, and social and economic conditions should be evaluated more carefully (2).

With their advantages such as high chewing efficiency, long-term use and preservation of natural teeth, dental implants are an ideal treatment option for replacing missing teeth (1,2). Dental implants are used safely in elderly individuals through careful diagnosis and effective treatment planning. Overdenture prostheses are preferred, especially in the geriatric population, as they require less cost and surgical area due to the placement of fewer implants (3). The need for dental restoration increases with age and reaches 97.4% over 85 (1). Still, the prevalence

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of dental implants has been reported to be lower in older individuals compared to other age groups (4).

Studies conducted in different countries has been shown that fear of operation, high cost, and long treatment period negatively affect the choice of implant treatment (2,5,6). In addition, the availability of correct information can also affect the treatment choice (1,5). Our study aims to evaluate the knowledge and awareness of the geriatric population in our country about dental implant preference in prosthetic treatments.

Materials and Methods

The study included 200 individuals over 65 years old who applied to the periodontology and prosthetic dentistry departments at the University of Health Sciences Turkey Gülhane Faculty of Dentistry between November 25 and December 25, 2022. Only those patients who expressed an interest in participating in the trial were notified and involved. Written and oral informed consent was obtained, and participants were asked to complete the study-related questionnaire. In addition to the fundamental questions (age, gender) that provide demographic data, many questions are asked to evaluate the knowledge and awareness of the participants about implants and implant treatment. The patients' usual therapy procedures proceeded after they completed the questionnaire forms. Partially filled forms were excluded from the study.

This study was approved by University of Health Sciences Turkey Gülhane Scientific Research Ethics Committee (project no: 2022-341).

Statistics

The collected data from all participants were imported to Statistical Package for Social Sciences (SPSS) for Windows software, version 26.0 (SPSS Inc., Chicago, IL, USA). Descriptive statistics for categorical variables in our study; expressed as number (n) and percentage (%). The chi-square and Fisher's Exact tests were used to compare the categorical demographic variables. The confidence interval was set to 80% and $p < 0.05$ was considered statistically significant.

Results

A total of 200 participants' data were analyzed. Most of the participants (55.5%) were between the ages of 65-74, and 61% were women. The education level of the majority (61%) was high school and university, and 41% of the participants had a significantly less income level. The majority (67.5%) was found to reside with their family. The general descriptive statistics of the personal characteristics of the participants are given in Table 1.

Table 2 provides general descriptive statistics for the participants' knowledge and awareness of dental implants. As a result, 71%

of the participants lack dental implants. Despite this, 57.5% of them are aware that the implant is composed of titanium, and 53.5% understand that it is a screw that is inserted into the bone. When asked about how well they were informed about dental implants, only 10.5% of individuals stated that they were well informed.

The relationship and distribution between "age groups" and "dental implant awareness and knowledge level" are given in Table 3. Accordingly, the presence of implants did not differ between age groups ($p=0.066$). The question of what a dental implant is differed from according to age groups ($p < 0.05$). The 65-74 age range answered this question 69.2% with a screw placed in the bone in the absence of teeth. The answers given by the patients to the question to what extent they were informed about dental implants differed statistically according to age groups ($p=0.001$) and only 6 patients over the age of 85 stated that they were well and moderately informed. While the source of information about dental implant treatments showed a statistically significant difference according to age groups ($p=0.022$), 75 participants stated that they were informed by dentists. The question of "What material are dental implants made from" differed according to age groups ($p=0.001$). The titanium response increases in strength in those aged 65 to 74 and the number of people who answered "I don't know" increased as the age progressed. The biggest advantage of dental implants compared to other prostheses differed statistically according to age groups ($p=0.001$), and it was stated that they were more aesthetic in early old age. The reasons for not considering dental implants differed significantly according to the age groups ($p=0.001$). While those over the age of 85 mostly consider themselves old for this treatment, younger age

Table 1. Socio-demographic characteristics (n=200)

		n	%
Age	65-74 years	111	55.5%
	75-84 years	44	22.0%
	85+ years	45	22.5%
Gender	Female	122	61.0%
	Male	78	39.0%
Education level	Primary school	58	29.0%
	High school	61	30.5%
	University	61	30.5%
	Graduate	20	10.0%
Income	0.0-10.000 TL	82	41.0%
	10.000-20.000 TL	71	35.5%
	≥20.000 TL	47	23.5%
Staying with	Alone	23	11.5%
	With family	135	67.5%
	In nursing home	19	9.5%
	With caregiver	23	11.5%

Table 2. General descriptive statistics of participants' dental implant preference and knowledge levels			
		n	%
Implant presence	Yes	58	29.0%
	No	142	71.0%
What is a dental implant?	Never heard of it	9	4.5%
	I have heard about it, but cannot describe it	55	27.5%
	A screw applied in the bone in the absence of teeth	107	53.5%
	A needle applied in the bone in the absence of teeth	29	14.5%
How well informed are you about dental implants?	Well	21	10.5%
	Moderate	73	36.5%
	Insufficient	84	42.0%
	Don't know	22	11.0%
Source of your information	Dentists	74	37.0%
	Medical doctors	22	11.0%
	Family	30	15.0%
	Friends	40	20.0%
	TV/internet	28	14.0%
	Don't know	6	3.0%
From what material implants made?	Titanium	115	57.5%
	Acrylic	0	0.0%
	Porcelain	11	5.5%
	Don't know	74	37.0%
What do you think is the main advantage of dental implants as compared to other prostheses?	Aesthetic	65	32.5%
	Tissue-preserving	27	13.5%
	long lasting	65	32.5%
	Don't know	43	21.5%
I don't think getting dental implants because...	I don't have missing teeth	77	38.5%
	I consider myself too old for this treatment	31	15.5%
	I'm afraid of necessary surgery	4	2.0%
	I do not desire to have a foreign body inserted into my body.	3	1.5%
	I find it expensive	85	42.5%
	Don't know	0	0.0%
What do you think is the most important factor for implant success?	Implant type and material	67	33.5%
	Surgical technique	20	10.0%
	Patient compliance	10	5.0%
	Experience and skill of the surgeon	58	29.0%
	Don't know	45	22.5%
How long is a dental implant's lifespan, in your opinion?	0-10 years	16	8.0%
	10-20 years	33	16.5%
	Forever	98	49.0%
	Don't know	53	26.5%
Do you think that dental implants require additional oral hygiene maintenance?	No, it is cleaned like a natural tooth.	52	26.0%
	Yes, it needs different care than a natural tooth.	70	35.0%
	No, it does not need as much care as a natural tooth.	26	13.0%
	Don't know	52	26.0%

		Age range						*p
		65-74		75-84		85+		
		n	%	n	%	n	%	
Implant presence	Yes	38	65.5%	13	22.4%	7	12.1%	0.066
	No	73	51.4%	31	21.8%	38	26.8%	
What is a dental implant?	Never heard of it	1	11.1%	2	22.2%	6	66.7%	0.001
	I have heard about it, but cannot describe it	20	36.4%	12	21.8%	23	41.8%	
	A screw applied in the bone in the absence of teeth	74	69.2%	23	21.5%	10	9.3%	
	A needle applied in the bone in the absence of teeth	16	55.2%	7	24.1%	6	20.7%	
How well informed are you about dental implants?	Well	12	57.1%	6	28.6%	3	14.3%	0.001
	Moderate	55	75.3%	15	20.5%	3	4.1%	
	Insufficient	39	46.4%	21	25.0%	24	28.6%	
	Don't know	5	22.7%	2	9.1%	15	68.2%	
Source of your information	Dentists	49	66.2%	15	20.3%	10	13.5%	0.022
	Medical doctors	7	31.8%	5	22.7%	10	45.5%	
	Family	17	56.7%	6	20.0%	7	23.3%	
	Friends	19	47.5%	12	30.0%	9	22.5%	
	TV/internet	17	60.7%	6	21.4%	5	17.9%	
	Don't know	2	33.3%	0	0.0%	4	66.7%	
From what material implants made?	Titanium	81	70.4%	25	21.7%	9	7.8%	0.001
	Acrylic	0	0.0%	0	0.0%	0	0.0%	
	Porcelain	5	45.5%	3	27.3%	3	27.3%	
	Don't know	25	33.8%	16	21.6%	33	44.6%	
What do you think is the main advantage of dental implants as compared to other prostheses?	Aesthetic	39	60.0%	18	27.7%	8	12.3%	0.001
	Tissue-preserving	19	70.4%	7	25.9%	1	3.7%	
	Long lasting	41	63.1%	12	18.5%	12	18.5%	
	Don't know	12	27.9%	7	16.3%	24	55.8%	
I don't think getting dental implants because...	I don't have missing teeth	57	74.0%	15	19.5%	5	6.5%	0.001
	I consider myself too old for this treatment	0	0.0%	0	0.0%	31	100.0%	
	I'm afraid of necessary surgery	4	100.0%	0	0.0%	0	0.0%	
	I do not desire to have a foreign body inserted into my body.	0	0.0%	1	33.3%	2	66.7%	
	I find it expensive	50	58.8%	28	32.9%	7	8.2%	
	Don't know	0	0.0%	0	0.0%	0	0.0%	
What do you think is the most important factor for implant success?	Implant type and material	35	52.2%	21	31.3%	11	16.4%	0.074
	Surgical technique	15	75.0%	4	20.0%	1	5.0%	
	Patient compliance	7	70.0%	2	20.0%	1	10.0%	
	Experience and skill of the surgeon	31	53.4%	10	17.2%	17	29.3%	
	Don't know	23	51.1%	7	15.6%	15	33.3%	
How long is a dental implant's lifespan, in your opinion?	0-10 years	8	50.0%	6	37.5%	2	12.5%	0.001
	10-20 years	24	72.7%	7	21.2%	2	6.1%	
	Forever	63	64.3%	20	20.4%	15	15.3%	
	Don't know	16	30.2%	11	20.8%	26	49.1%	

Table 3. Continued

		Age range						*p
		65-74		75-84		85+		
		n	%	n	%	n	%	
Do you think that dental implants require additional oral hygiene maintenance?	No, it is cleaned like a natural tooth.	37	71.2%	12	23.1%	3	5.8%	0.001
	Yes, it needs different care than a natural tooth.	46	65.7%	11	15.7%	13	18.6%	
	No, it does not need as much care as a natural tooth.	12	46.2%	9	34.6%	5	19.2%	
	Don't know	16	30.8%	12	23.1%	24	46.2%	

* Significance level according to chi-square and Fisher's Exact test results

groups stated that they do not have missing teeth and that they find the treatment expensive. The idea of how long the life of dental implants is also showed a significant difference according to age ($p=0.001$), and it comes to the fore that there is no information as the age progresses. The answers given to the question of whether dental implants require additional oral hygiene care differed according to age groups ($p=0.001$), and the answer was predominantly yes at younger ages.

Only the responses to the question, "What do you think is the most critical aspect impacting the success of the implant?" did not reveal a statistically significant difference between the groups when the education ($p=0.62$) and income levels ($p=0.60$) were considered. It has been observed that most of those with implants are university graduates, and their monthly income is over 20 thousand Turkish Lira (TL). The same question only differed according to gender. Women stated that implant type and material were more critical.

There was a statistically significant link between monthly income and the prevalence ($p=0.03$) and knowledge ($p=0.001$) of dental implants ($p=0.03$). We observed that individuals with high monthly income receive information mostly from dentists (41.9%), while the low-income elderly people mainly source information from friends (52.5%), and this difference was statistically significant ($p=0.001$). The percentage of those who do not plan to have dental implants because they find it expensive also differed significantly according to the monthly income range ($p=0.03$).

It has been noted that a person's living situation has no bearing on whether or not she has an implant ($p=0.596$).

Discussion

According to a number of studies, people who lose teeth over time may experience varying degrees of cognitive impairment (7,8). Osseointegrated implant surgery is an option for medically sound elderly patients who want to improve their oral health, comfort, and the quality of life (9). Several factors are explored concerning the clinical effectiveness of implant therapy in elderly patients (10).

The use of age as a criterion in determining whether dental implants would be successful in senior patients is supported by conflicting data (9). Potential barriers to the effectiveness of osseointegration in elderly people include soft tissue reaction, bone resorption, bone remodeling, and patient health (11). On the other hand, some authors claim that older individuals who would benefit from treatment with dental implants should not be disqualified since the bone and soft tissue recovery are not always hindered in this age group. Age does not appear to be a clear predictor of implant failure (11,12).

Old and very old patients, terms that are often used when referring to persons 75 years or older, often present with functional dependency, multimorbidity, and frailty (13). Previous studies show that older people evaluate oral implants more negatively and are more skeptical of such treatments for themselves (14). In our study, it was observed that considering implantation differed significantly according to age groups. The majority of individuals over 85 stated that they consider themselves too elderly to receive implant treatment. The fact that this answer was never given in other age groups is one of the surprising results of our study. This shows that from the patients' perspective, financial hardships are a more significant barrier than age.

Numerous earlier studies have supported the importance of socio-economic factors in determining the use of dental care services (15-17). Similarly according to our research, there is a statistically significant link between monthly income and the prevalence of dental implants ($p=0.03$). Eighty five of the examined people said they were not interested in getting implants because they thought the procedure was too expensive, and it was determined that 71 of them had a monthly income less than 20.000 TL per month.

Education level and the existence of dental implants had a statistically significant beneficial link in our study ($p=0.001$). An earlier study linked a lesser degree of schooling to a higher risk of edentulism (18). Although this situation necessitates the increasing need for implants at low education levels, the fact that financial difficulties are more prominent in low education

levels, especially in our country, disproved this hypothesis in our study.

In the literature, there are studies reporting that women have less awareness of dental implants than men (19), as well as studies reporting that they have more awareness (20,21). Our investigation revealed that there were no gender differences in the implant knowledge and awareness levels in elderly patients ($p>0.05$).

According to the World Health Organization's World Health Report on Aging, cancer, respiratory diseases, osteoarthritis, diabetes mellitus, liver cirrhosis, cardiovascular diseases, and neurocognitive impairment are the most prevalent chronic conditions in older people (22). Treatment for these medical disorders may include additional risks, such as undesirable side effects. The patient or doctor may see any of these diseases or therapies as an absolute or relative contraindication to implant surgery or therapy (13,23). Only four participants in our study said they would not get this treatment because they were terrified of implant surgery. We would anticipate that this worry, which we commonly hear from patients of all ages while treatment planning, would be more prevalent in older people. We hypothesize that this may be because the doctors read the questionnaire questions to the patients and asked them for their responses.

According to the results of our study, relatively younger age groups think that implant treatment is more aesthetic than alternative treatment methods ($p=0.001$). In trials with a wider age range of participants, older patients' perceptions of the relevance of their teeth's look were lower than those of younger patients (24). The fact that social interactions are higher in relatively younger age groups may be the primary reason for this situation.

While the thought that implant treatment is long-lasting was the second most popular answer, this rate was also higher in the relatively younger age group (63.1%). Similarly, almost half of the elderly individuals included in the study stated that implant treatment is a lifelong treatment. Contrary to the results of our study the proportion of people who believe implant therapy is a permanent solution has declined with time, according to a previous research in the literature (25). We think that this may be due to the widespread use of implant treatment over the years and the increased trust in treatment. These were the outcomes we anticipated.

According to an earlier research, the media served as the primary source of information about dental implants, with dentists playing at best a supporting role (14). A recent study states that dentists are the leading source of information with 34.5%, followed by relatives and friends, family doctor, radio-television and multimedia, respectively (26). In our study, we

observed that dentists were the primary source of information for our patients with 37%, followed by friends with 20%, family with 15% and TV-internet with 14%. Considering that patients are likely to misinterpret oral health information obtained from the internet, it is promising that dentists are the source of information, especially for geriatric patients.

In our study, we observed that the level of implant knowledge differed statistically significantly according to age groups ($p=0.001$). These results are consistent with a recent study reporting higher implant knowledge in younger individuals (27). According to another recent study, the highest awareness of implants is between the ages of 20-30 and decreases as age increases (28). At the same time we observed that 95.5% of the elderly individuals who participated in our study had already heard about dental implants, but 53.5% of them had correct information. Moreover, we reported that relatively younger age groups are largely correct about what an implant is. A recent study involving a large number of dentistry patients of a wider age range reports that the awareness of dental implants is 74.8% (26). We believe that this result is a positive reflection of the health system in Turkey.

Despite the fact that our study yielded significant findings indicating the awareness of implants in the senior Turkish population, we believe that additional research is required in which a larger sample size is included and patient attitudes are assessed using a variety of measures.

Study Limitations

Our study's most significant restriction is that it only included patients who visited our hospital for dental care. Due to underlying medical issues and financial constraints, many older people put off getting dental work. Dental implant awareness may be much lower in the geriatric population randomly selected from the community.

Our lack of a scale to gauge participants' levels of awareness and knowledge is another drawback of our study. The survey questions were designed by us using samples from previous researches. Since this study is cross sectional in nature, it cannot conclusively establish cause and effect.

Conclusion

As the world's population ages, dentists may encounter individuals who need implant therapy and have complicated medical and socio-economic histories. Even with the deteriorated levels of oral hygiene that frequently come with aging and the lack of financial means, we concluded that old age is not a contraindication for implant therapy. Dentists need to focus on patient-based evaluation and education to help patients and families understand the advantages and disadvantages of implant therapy.

Ethics

Ethics Committee Approval: This study was approved by University of Health Sciences Turkey Gülhane Scientific Research Ethics Committee (project no: 2022-341).

Informed Consent: Written and oral informed consent was obtained, and participants were asked to complete the study-related questionnaire forms.

Peer-review: Externally peer-reviewed.

Authorship Contributions

Surgical and Medical Practices: Ö.S.A., Ü.T.K., Concept: Ö.S.A., Ü.T.K., Design: Ö.S.A., Ü.T.K., Data Collection or Processing: Ö.S.A., Ü.T.K., Analysis or Interpretation: Ö.S.A., Ü.T.K., Literature Search: Ö.S.A., Ü.T.K., Writing: Ö.S.A.

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References

- Müller F, Salem K, Barbezat C, Herrmann FR, Schimmel M. Knowledge and attitude of elderly persons towards dental implants. *Gerodontology* 2012;29:e914-e923.
- Alqahtani MK, Alammari MR, Fageeha YT. Awareness, Knowledge, and Acceptance of Dental Implants among the Geriatric Population of Jeddah, Saudi Arabia. *J Pharm Bioallied Sci* 2022;14(Suppl 1):S464-S469.
- Borges GA, Barbin T, Dini C, Maia LC, Magno MB, Barão VAR, Mesquita MF. Patient-reported outcome measures and clinical assessment of implant-supported overdentures and fixed prostheses in mandibular edentulous patients: A systematic review and meta-analysis. *J Prosthet Dent* 2022;127:565-577.
- Visser A, de Baat C, Hoeksema AR, Vissink A. Oral implants in dependent elderly persons: blessing or burden? *Gerodontology* 2011;28:76-80.
- Shaheen R, Al Nasser H, Al Salem M, Al Abdulwahab M, Al Nasser A, Al Saffan AD. Financial costs comparison between replacing a tooth with a dental implant or with a fixed dental prosthesis or saving the tooth with endodontic therapy in Riyadh and Al-Hasa. *Saudi J Oral Sci* 2018;5:119-124.
- Siddique EA, Bhat PR, Kulkarni SS, Trasad VA, Thakur SL. Public awareness, knowledge, attitude and acceptance of dental implants as a treatment modality among patients visiting SDM College of Dental Sciences and Hospital, Dharwad. *J Indian Soc Periodontol* 2019;23:58-63.
- Luo J, Wu B, Zhao Q, Guo Q, Meng H, Yu L, Zheng L, Hong Z, Ding D. Association between tooth loss and cognitive function among 3063 Chinese older adults: a community-based study. *PLoS One* 2015;10:e0120986.
- Peres MA, Bastos JL, Watt RG, Xavier AJ, Barbato PR, D'Orsi E. Tooth loss is associated with severe cognitive impairment among older people: findings from a population-based study in Brazil. *Aging Ment Health* 2015;19:876-884.
- Stanford CM. Dental implants. A role in geriatric dentistry for the general practice? *J Am Dent Assoc* 2007;138 Suppl:34S-40S. Erratum in: *J Am Dent Assoc* 2008;139:252-253.
- Al Jabbari Y, Nagy WW, Iacopino AM. Implant dentistry for geriatric patients: a review of the literature. *Quintessence Int* 2003;34:281-285.
- Salonen MA, Oikarinen K, Virtanen K, Pernu H. Failures in the osseointegration of endosseous implants. *Int J Oral Maxillofac Implants* 1993;8:92-97.
- Grant BT, Kraut RA. Dental implants in geriatric patients: a retrospective study of 47 cases. *Implant Dent* 2007;16:362-368.
- Schimmel M, Srinivasan M, McKenna G, Müller F. Effect of advanced age and/or systemic medical conditions on dental implant survival: A systematic review and meta-analysis. *Clin Oral Implants Res* 2018;29(Suppl 16):311-330.
- Berge TI. Public awareness, information sources and evaluation of oral implant treatment in Norway. *Clin Oral Implants Res* 2000;11:401-408.
- Somkotra T, Detsomboonrat P. Is there equity in oral healthcare utilization: experience after achieving Universal Coverage. *Community Dent Oral Epidemiol* 2009;37:85-96.
- Choi JS, Jung SH. The Impact of Expanded National Health Insurance Coverage of Dentures and Dental Implants on Dental Care Utilization among Older Adults in South Korea: A Study Based on the Korean Health Panel Survey. *Int J Environ Res Public Health* 2020;17:6417.
- Choi JS, Shin BM, Park DY, Park GY, Choi YK. The Association between Dental Implant Treatment Experience and Socioeconomic Factors in Korean Adults: A Cross-Sectional Survey Data Analysis. *Iran J Public Health* 2022;51:318-326.
- Choi YK, Han SY, Kim CS. Relationship between oral health status and socioeconomic status of elderly in Korea-based on 2010~2011 Korea National Health and Nutrition Examination survey data. *J Korean Dent Assoc* 2013;51:265-273.
- Suprakash B, Ahammed AR, Thareja A, Kandaswamy R, Nilesh K, Bhondwe Mahajan S. Knowledge and attitude of patients toward dental implants as an option for replacement of missing teeth. *J Contemp Dent Pract* 2013;14:115-118.
- Polychronopoulou A, Kawamura M. Oral self-care behaviours: comparing Greek and Japanese dental students. *Eur J Dent Educ* 2005;9:164-170.
- Kawamura M, Yip HK, Hu DY, Komabayashi T. A cross-cultural comparison of dental health attitudes and behaviour among freshman dental students in Japan, Hong Kong and West China. *Int Dent J* 2001;51:159-163.
- WHO. World report on ageing and health. Geneva, Switzerland: WHO Press, 2015.
- Zarb GA, Schmitt A. Osseointegration for elderly patients: the Toronto study. *J Prosthet Dent* 1994;72:559-568.
- York J, Holtzman J. Facial attractiveness and the aged. *Spec Care Dentist* 1999;19:84-88.
- Pommer B, Zechner W, Watzak G, Ulm C, Watzek G, Tepper G. Progress and trends in patients' mindset on dental implants. I: level of information, sources of information and need for patient information. *Clin Oral Implants Res* 2011;22:223-229.
- Arora K Jr, Kaur N, Kaur G, Garg U. Knowledge, Awareness, and Attitude in Using Dental Implants as an Option in Replacing Missing Teeth Among Dental Patients: Survey-Based Research in a Dental Teaching Hospital in Derabassi, Punjab. *Cureus* 2022;14:e27127.
- Davut U, Özyılmaz ÖY. Evaluation of Patients-Awareness Levels Regarding Implant And Implant-Supported Prosthesis Who were Admitted to Bezmialem Vakif University Faculty of Dentistry. *Bezmialem Science* 2022;10:96-104.
- Küçük AO, Keskinrüzgar A, Simsek HO. Evaluation of patients' perspective on dental implants. *Mersin Univ Sağlık Bilim Derg* 2021;14:232-241.