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# AWARENESS, ATTITUDE, AND KNOWLEDGE OF DENTAL PATIENTS REGARDING DENTAL IMPLANT TREATMENT IN AN URBAN POPULATION: A CROSS-SECTIONAL STUDY IN TURKEY

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## ABSTRACT

**Introduction:** Nowadays, the popularity of implant dentistry is increasing among a wide population, but the decision for, and the success of, dental implant treatment depends on the knowledge and expectations of patients.

**Objectives:** The goal of this study is to show public awareness and knowledge of oral implants.

**Material and methods:** A standardised questionnaire with 18 questions was carried out in 314 males and 230 females in the Department of Maxillofacial Radiology, Dental Science Centre, Gulhane Military Medical Academy. Descriptive statistics was used for the analysis.

**Results:** In total 544 patients responded the survey. Only 6.9% of the participants had never heard of dental implants ($n$ = 37). Another 36 participants could not describe dental implants. 22.8% of the 544 respondents reported that dental implants required the same care as natural teeth. The major reason of rejection of the implant treatment was reported as its high cost. In addition, the respondents thought that the main factor of implant failure was bad oral hygiene or faulty production of dental implants. Internet, TV, or newspapers were the main source of information about dental implants for 57.7% ($n$ = 314) of the participants.

**Conclusions:** This survey showed an acceptable level of awareness about dental implant treatment, but it also showed the need to provide more information to the patients about this treatment modality.

**Key words:** knowledge, attitude, public dental health.

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## INTRODUCTION

Missing teeth may impact how a person's smile is as well as pronunciation. Given the importance of a smile and communication in the day-to-day life of a person, missing teeth may cause different challenges both physically and mentally [17].

Although new techniques and innovations have led to a revolution for the development of dental practice, missing teeth is still a huge problem in the general population all around the world [18]. Thus, replacement of the missing teeth is important for restoration of the chewing function and for the aesthetic expectations of patients. Although, there are different treat-

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ments for prosthetic therapy, it can be divided into two main categories: fixed and removable prosthesis. The treatment option depends on the patient's level of education, their awareness of oral health and different types of treatments [15]. For clinicians, it is important to be aware of what the patient knows about and expects from prosthetic rehabilitation [12]. Dental patients may be open to rehabilitation of missing teeth by using implant-supported prostheses [7]. Studies of the long-term performance dental implants have confirmed their efficacy and have led to wide-spread acceptance and popularity of oral rehabilitation with dental implants within dental professionals during the last decades [4, 11].

During the 1980s about 300,000 dental implants were inserted worldwide [8]. Therefore, implant dentistry became increasingly important in oral reconstruction [18]. These reflect the extensive basic and clinical research from implant surfaces to bioactive growth factors in dental implantology. Due to incorrect ideas about the nature and performance of dental implants, unsubstantial and high expectations by dentists and slogans in the media which show the implant's eternal and marvellous rise, patients might have increased expectations from dental implants [3, 5, 6]. In the authors' opinion, the success of oral rehabilitation with dental implants depends on improved implant technologies and the patient's knowledge and expectations.

In many cases implant therapy is applied as an alternative to other missing tooth treatments. Although dentists usually make a suggestion, patients decide for themselves on the type of treatment. Hence it is crucial that the patient has full knowledge of alternative therapies for a successful outcome. Lack of knowledge about treatment types presents a challenge, especially in developing countries [10].

To date, several studies have been performed stating the level of knowledge and public awareness about dental implants in different countries [2, 3, 5, 16]. As stated before, patient awareness is crucial in the success of missing tooth treatments. Unfortunately, there are no data on patients' knowledge about dental implants in Turkey, to the best of the authors' knowledge.

## OBJECTIVES

The aim of this study is to find out patients' awareness and knowledge of oral implants and compare them with the results of studies performed in the past decades. Additionally, the obtained data can be used by professionals in the dental industry to design suitable communication strategies for patients in Turkey.

## MATERIAL AND METHODS

Between March 2014 and October 2014, a standardised questionnaire was carried out in 544 randomly selected patients in the Department of Dentomaxillofacial Radiology, Health Sciences University, Gulhane Dentistry Faculty. The questionnaire was adapted from a previous study conducted by Tepper *et al.* [16], and it was performed as a pilot study on 57 patients to evaluate the efficiency of the survey. The final questionnaire, including 18 questions that assess dental patients' awareness, expectations, level and sources of information regarding dental implants, was designed. The survey also includes patients' oral health behaviour, demographic and socio-economic data such as sex, age, and education level, or monthly family incomes. The first four questions are multiple choice and one correct answer. The other 14 questions are not multiple choice, and each patient answered these questions according to himself or herself, and we grouped these answers. After collection of the data, descriptive statistics was used for the analysis.

The study protocol was carried out according to the principles described in the Declaration of Helsinki, including all amendments and revisions. Only the investigators had access to the collected data. The Ethics Committee of Gulhane Military Medical Academy approved the study protocol in their 34$^{th}$ meeting. All followed procedures were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1975, as revised in 2008.

The questionnaires were applied to the patients during their regular dental visits. Informed consent was obtained from all patients before inclusion in the study. All the participants were informed about the aim and goals of the research study. The patients who were not willing to participate in this study were excluded from the study. The participants who did not finish the questionnaire were also excluded from the study. The questionnaires were filled in by the patients themselves. About 314 males (57.7%) and 230 females (42.3%) participated in the study. The ages of the participants were ranged from 18 to 75 years. While the survey was being evaluated, the participants also were classified according to their education level as: primary school, secondary school, high school, undergraduate, and graduate.

The description of a dental implant as 'an artificial tooth fixed into the jawbone to replace a missing tooth' was given to the participants who had never heard of this treatment.

Data were analysed by descriptive statistics. Median and range were used to describe the age of the patients. Statistical analyses were performed using the SPSS software (version 15.0; SPSS Inc., Chicago, IL, USA) and MS Excel 2003.

## RESULTS

As mentioned above, in total 544 patients responded to the survey (314 male and 230 female). The age

ranged from 18 to 75 years. The mean age of females was 44.2 years and for males it was 42.6 years. Table 1 summarises the oral health behaviour, demographic, and socio-economic profile of the respondents. Despite 6.9% of the participants having never heard of dental implants ($n$ = 37), 60.8% thought that they had insufficient information about dental implants.

Participants believed that the dental implants are made of various materials such as titanium, platinum, porcelain, steel, mixture of composite and ceramic, mixture of plastic and porcelain, and a mixture of metal-plastic and bone powder. 42.5% of the participants had no idea what the implants are made of. While 36 participants could not describe dental implants, most of the respondents compared dental implants to screws ($n$ = 215), and another 121 participants described the dental implants as being like wall plugs. The majority of the subjects (76.8%) thought that dental implants are placed in the jawbone ($n$ = 418), 10.5% ($n$ = 57) in the gingiva, 5.5% in the adjacent teeth ($n$ = 30), and 7.1% ($n$ = 39) of the respondents did not know where the dental implants are placed. 124 patients believed that the durability of dental implants is for lifetime, and 19.3% ($n$ = 105) thought between 10 and 20 years. Most of the participants thought that dental implant loading should be made a few months after implant surgery ($n$ = 321). 22.8% of the 544 respondents believed that dental implants require the same care as natural teeth, and 59.6% said that dental implants need more care than natural teeth. The respondents thought that the main factor of implant failure was bad oral hygiene ($n$ = 202) or defective dental implants ($n$ = 145). Although 276 subjects described the aesthetics as important, 38 subjects answered otherwise. 343 participants thought that the function is very important, and 35 participants believed that it is not important (Table 2).

The main reason for rejection the implant therapy was reported as its high cost (43.9%) followed by fear of the implant therapy because of the need for surgery, long treatment time, and lack of sufficient knowledge about dental implants. In addition, the reported main reason patients preferred implant therapy was replacing a missing tooth without tooth preparation ($n$ = 158) (Table 3).

The Internet, TV, or newspaper were the main source of the information about dental implants for 57.7% ($n$ = 314) of the participants (Table 4).

**TABLE 1.** Demographic, socio-economic, and oral health profile of the population

| Factor | *n* | % |
|---|---|---|
| Sex | | |
| Male | 314 | 57.7 |
| Female | 230 | 42.3 |
| Education | | |
| Primary school | 58 | 10.7 |
| Secondary school | 14 | 2.6 |
| High school | 95 | 17.5 |
| University | 322 | 59.1 |
| Masters | 55 | 10.1 |
| Monthly income | | |
| < 1000 TL | 47 | 8.7 |
| 1000-3000 TL | 308 | 56.6 |
| > 3000-5000 TL | 124 | 22.8 |
| > 5000 TL | 65 | 11.9 |
| Tooth brushing frequency | | |
| Never | 19 | 3.5 |
| Not every day | 28 | 5.1 |
| Once a day | 276 | 50.7 |
| Twice a day | 200 | 36.8 |
| More than twice a day | 21 | 3.9 |

## DISCUSSION

Dental implant treatment has been at the forefront in clinical practice in the last decade. With the increase in the success of implant therapy, many patients try to solve the problem of a missing tooth with implant therapy as their first choice. Nearly one million dental implant applications are performed worldwide every year [12].

The present study gives some information about dental patients' awareness, expectations, and knowledge level about dental implants and signals the population's requirement for more correct information as an option in replacing missing teeth with dental implants in Ankara, Turkey. This small, randomly selected group increased their knowledge about dental implants with this survey.

Although Zimmer *et al.* [19], Berge [3], and Tepper *et al.* [16] reported the level of awareness as 77.0%, 70.1%, and 72.0%, respectively, in the present study the awareness rate was as high as 93.1%, so only 6.9% of the respondents had never heard about dental implants. These results were higher than in other studies. This finding might be due to continuous worldwide incremental growth of dental implant sales or their ability to obtain information more easily than in previous decades. Also, 60.8% of the respondents thought that they already had insufficient information about dental implants. In the present study most of the people preferred to get information from the Internet, TV, newspapers, or their friends. Media (57.7%) and friends (24.4%) were the main sources of information about dental implants. Only 76 respondents of 544 (14.0%) received information from their family dentists. This present study showed that the media or Internet play much

**TABLE 2.** The questions on the level of information about dental implant therapy

| Question | *n* | % |
|---|---|---|
| Have you ever heard about dental implants? | | |
| Yes | 507 | 93.1 |
| No | 37 | 6.9 |
| Do you think that you have sufficient information about dental implants? | | |
| Yes | 331 | 60.8 |
| No | 213 | 39.2 |
| What material is a dental implant made from? | | |
| Titanium | 47 | 8.6 |
| Metal | 123 | 22.6 |
| Platinum | 19 | 3.5 |
| Porcelain | 11 | 2.0 |
| Steel | 67 | 12.3 |
| Mixture of composite and ceramic | 16 | 3.0 |
| Mixture of plastic and porcelain | 8 | 1.5 |
| Mixture of metal and plastic | 12 | 2.2 |
| Bone powder | 10 | 1.8 |
| No idea | 231 | 42.5 |
| What is the shape of a dental implant? | | |
| Screw | 215 | 39.5 |
| Pin | 142 | 26.1 |
| Tooth | 30 | 5.5 |
| Wall plug | 121 | 22.2 |
| No idea | 36 | 6.6 |
| To what are dental implants anchored? | | |
| Jawbone | 418 | 76.8 |
| Gingiva | 57 | 10.5 |
| Adjacent teeth | 30 | 5.5 |
| No idea | 39 | 7.1 |
| What do you estimate as the functional lifespan of a dental implant? | | |
| < 5 years | 28 | 5.1 |
| 5-10 years | 85 | 15.6 |
| 10-20 years | 105 | 19.3 |
| > 20 years | 63 | 11.6 |
| Lifelong | 124 | 22.8 |
| No idea | 139 | 25.6 |
| When should a dental implant be loaded with prosthetic material? | | |
| Directly | 53 | 9.7 |
| In a matter of months | 321 | 59.0 |
| No idea | 170 | 31.3 |

**TABLE 2.** Cont.

| Question | *n* | % |
|---|---|---|
| Do you think that implants need special care and hygiene? | | |
| Like natural teeth | 124 | 22.8 |
| Less care than natural teeth | 0 | 0.0 |
| More care than natural teeth | 324 | 59.6 |
| No idea | 96 | 17.6 |
| Who/what would you blame for implant loss? | | |
| The dentist | 66 | 12.1 |
| No idea | 131 | 24.1 |
| Bad oral hygiene | 202 | 37.1 |
| Faulty production of dental implants | 145 | 26.7 |
| How important is the aesthetic outcome for you? | | |
| Not very important | 38 | 7.0 |
| Important | 276 | 50.8 |
| Very important | 190 | 34.9 |
| No idea | 40 | 7.3 |
| How important is the functional outcome for you? | | |
| Not very important | 35 | 6.4 |
| Important | 114 | 21.0 |
| Very important | 343 | 63.0 |
| No idea | 52 | 9.6 |

**TABLE 3.** Preference and rejection reasons for dental implant therapy

| What is the reason for the preference of dental implant therapy? | *n* | % |
|---|---|---|
| Missing tooth | 66 | 12.1 |
| Permanent solution | 57 | 10.5 |
| Like natural teeth | 38 | 7.0 |
| Aesthetic reasons | 28 | 5.1 |
| Suitable for chewing | 76 | 14.0 |
| Suitable for speaking | 23 | 4.3 |
| Replacing missing teeth without tooth preparation | 158 | 29.0 |
| Good oral health | 54 | 9.9 |
| No idea | 44 | 8.1 |
| **What is the reason for rejection of dental implant therapy?** | ***n*** | **%** |
| Fear | 148 | 27.2 |
| Lack of information about dental implants | 61 | 11.2 |
| Long treatment period | 96 | 17.7 |
| High cost | 239 | 43.9 |

**TABLE 4.** Sources information about dental implants

| Source | *n* | % |
|---|---|---|
| Dentists | 76 | 14.0 |
| Friends | 133 | 24.4 |
| Media (TV-Radio, Internet, magazines) | 314 | 57.7 |
| Others | 21 | 3.9 |

more important roles in getting information about dental implants among the patients. This result can be attributed to the fact that the patients in this region are less likely to go to the dentist than surf the Internet. Kaptein *et al.* [9] reported that in the Netherlands the top two sources of information were press or friends 52.0%. Akagawa *et al.* [1] conducted a survey among 358 patients, and only 20% of them first obtained information about oral implants from dentists. Zimmer *et al.* [19] reported that 17% of respondents got information first from family dentists. Similarly, Khosya *et al.* [10], Al-Johany *et al.* [2], and Saha *et al.* [14] found in their research that most of the people learnt about dental implants from their dentists.

Participants believed that dental implants are made from various materials like titanium, platinum, porcelain, or bone powder. Dramatically, 42.5% of the participants had no idea what the implant material is. While 36 participants could not describe dental implants, most of the respondents compared dental implants to screws ($n$ = 215), and another 121 participants described the dental implants as being like wall plugs. 76.8% of the respondents thought that dental implants are placed in the jawbone, 10.5% in the gingiva, and 5.5% in the adjacent teeth, and 7.1% of the respondents did not know where the dental implants are placed. In this study 124 (22.8%) patients of 544 believed that the durability of dental implants is for lifetime. 59.6% said that dental implants need more care than natural teeth, 22.8% of the respondents believed that dental implants require the same care as natural teeth, and nobody thought that dental implants require less care than natural teeth. A study by Tepper *et al.* [16] reported that only 4% believed an implant supported set to be less care than natural teeth, 46% expected a higher level of care, and 54% estimated the durability of oral implants to be 10-20 years. Rustemeyer and Bremerich [13] showed that only 7% of the patients expected a lower need for care, and the expected durability of dental implants was 18 years. These results reveal incomplete or incorrect information about dental implants. In our study a proportion as large as 42.5% indicated that they did not know what the implant material was, 76.8% of participants had knowledge of it being placed in the jawbone, and 59.6% of participants were able to give information that the implants needed more care than natural teeth. When we look at these ratios, it seems that the patients are mostly concerned with the practical part of the treatment and not the engineering or theoretical part. In this context, the number of patients with knowledge cannot be underestimated. But it would not be unfair to expect the rates to be even higher if improved technology, ease of access to dentists, and convenience in access to information are taken into consideration.

The main reason for refusing implant therapy was the high cost of treatment, as Zimmer *et al.* [19], Tepper *et al.* [16], and Al-Johany *et al.* [2] reported. Fear of the implant therapy because of surgery, long treatment time, and lack of sufficient knowledge about dental implants were the following reasons for refusing implant therapy. In some studies implant failure was blamed on the dentist (47%), and 51% blamed allergies and incompatibilities [16]. In the present study, the potential causes of failure were bad oral hygiene (37.1%) and faulty production of dental implants (26.7%). The answers we received for the reasons of failure in the subpopulation that we questioned are satisfactory. According to these answers, the patients related to the implant treatment mostly rely on the dentist. Only 12.1% of the respondents reported that the result may be due to the dentist when they experienced post-treatment failure.

Another issue assessed in the questionnaire study we conducted was the patients' aesthetic and functional expectations from the treatment. According to our results, 276 of the 544 patients reported that the aesthetics are important, and 190 said they are very important. 7% of the participants thought that the aesthetics are not very important. 63% of the participants thought that function is very important, and just 6.4% of the patients did not care much about function. If the success of treatment is thought to be related to the occurrence of patient expectations, these results can be interpreted as a guide for dentists. We see that both the aesthetic and functional expectations of patients are high.

Our study shows an awareness rate as high as 93.1%, which is much higher than previously reported. This study highlights patients' source of information as mostly the Internet or media, at 57.7%. It shows that patients do not really know about the implant material, but rely on their dentist for overall success. Patients also have high expectations for aesthetics.

## CONFLICT OF INTEREST

The authors declare no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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