

ASSESSMENT OF PATIENT'S KNOWLEDGE ON IMPROVING FUNCTION AND APPEARANCE WITH DENTAL IMPLANT THERAPY

ABDULLAH AL FARRAJ ALDOSARI¹, SYED RASHID HABIB²

¹ Director of Dental Implant and Osseointegration Research Chair, Associate Professor and Consultant of Prosthodontics and Implantology, Department of Prosthetic Dental Sciences, College of Dentistry, King Saud University, Riyadh, Saudi Arabia

² Associate Professor, Department of Prosthetic Dental Sciences, College of Dentistry, King Saud University, Riyadh, Saudi Arabia

SUMMARY

Objectives. Introduction of dental implant therapy has completely revolutionized the treatment for partially and completely edentulous patients. The aim of the current study was to assess the patient's knowledge regarding improvement in function and appearance and expectations with dental implant therapy.

Methods. The required information was collected via a self-designed questionnaire. A total of 106 patients (response rate 70.66%) participated in the study. The subjects answered the questionnaire prior to dental implant therapy at university-based dental hospital.

Results. Almost equal number of males (48.1%) and females (51.9%) participated. The patients either self-contacted (53%) for the implants or were referred by their dentists (42%). 55% of participants were in need of > 1 implant. Two thirds of the participants got their first information about implants from dentists and for majority (68.9%) the feedback was positive. Dentists (85.8%) were the main source of information. 75.5% of the patients regularly visited dentists and their experiences were pleasant. Satisfactory chewing (37.7%) followed by longevity (27.4%) and improvement in esthetics (26.4%) were the main reasons for seeking implants, while cost was not an issue for majority (53.8%). The responses about the time for completion of the treatment ranged from 1-day to 1-year. However, most of them (38.7%) believed that treatment will be completed within 6-months. For 41.5% of the participants the implants would last for 10 to 20 years while a third (33%) believed it will last for the rest of their life.

Conclusions. Participants had moderate awareness about dental implants. Chewing/function and appearance/esthetics were found to be the primary reasons for seeking dental implant therapy. Expectations of the patients from the dental implant therapy were high.

Key words: Dental implants, implants, implant treatment, implant therapy, implant expectations, implant function.

Introduction

Dental health plays an important role in the overall well-being of any individual. Missing teeth which may be attributed to caries, trauma or periodontal disease affects the function and appearance of the individuals. The consequences of teeth loss have a great impact on the psychological and social well-being of the individual. However, an increase in awareness of dental health care, development of advanced materials and techniques the availability of options for restoration of the missing teeth are

wider than before. Gone are the days when edentulous spaces were seen due to no or limited availability of treatment options for missing teeth. Various options for the replacement of missing teeth are available like Complete Dentures for complete tooth loss and Removable Partial Dentures, Fixed Partial Dentures for partial tooth loss (1, 2).

In the recent decade's dental implants has become a reliable and suitable treatment option for patients experiencing tooth loss and a popular choice among clinicians for replacement of teeth. The dental implants can be used for restoration of single, multiple or completely

missing dentition. The number of dental implants placed annually worldwide has increased and estimated to be around a million (3). It is proven that even the prosthetic problem in mandibular atrophy can be resolved by using endosseous dental implants which give support and retention for an overdenture or fixed bridge and patients treated have reported high degree of satisfaction (4). The use of dental implants in the successful rehabilitation of patients with congenital syndromes has also been reported in the literature (5). However, the awareness and knowledge of the patients about dental implants as a treatment modality for replacement of missing teeth is still low (3).

In general, the dental implant therapy is an elective procedure and hence, the patient must be provided with complete information on implant or other alternative therapies to guide and help them to choose the most appropriate treatment option (6). Nevertheless, for the prognosis and long term success of the dental implant treatment an informed, motivated patient as well as effective execution of oral hygiene practices are essential (7). The patients must also be informed about the surgical procedures, potential risks and complications besides the information about the prospective longevity of the reconstruction and the economic aspects of treatment (8).

In the literature the knowledge and awareness of the individuals about the dental implants varies. In a study conducted in Japan by Alcagawa et al., almost 50% of the denture wearers was dissatisfied with dentures and desired to undergo implant therapy (9). Another study from Iran by Esfahani et al., showed that the level of public awareness and acceptance of implant treatment are moderate and not below the global average. It also highlighted the important role of dentists in providing accurate information about implant as a viable treatment option (10). Tomruk et al., in a study conducted in Istanbul, Turkey, reported that only 6% of the patients were very well informed about the dental implants where as 48.2% were poorly informed (11). A similar experience from Nigeria by Gbadebo et al., also emphasized the need for programs and coun-

selling for patient education on dental implants, its advantages and possible complications (12). According to a study conducted by Peeran et al., it is found that more than half of the surveyed adult population in this continent needed some or the other forms of prosthesis (13). However, the treatment availability is determined by the patient's ability to pay. The treatment expense has increased up to three times higher compared with a traditional conventional treatment options with a removable prosthesis (14). No matter the treatment cost, dental implants seem to be an attractive treatment option for the replacement of missing teeth among patients. The income and gender of the patient and the setting of the practice all seem to influence the decision making of the patients (15). A study from Switzerland revealed that more than 90% of the patients were found to be satisfied with implant therapy, both from a functional and esthetic point of view. The costs associated with implant therapy were considered to be justified (16).

Patients often have the fear of undergoing surgical procedures during the implant placement. Even though dental implant insertion most of time is considered to be a minor oral surgical procedure and is performed majorly under local anesthesia it is found to be one of the most stressful and anxiety-provoking procedures in dentistry. Therefore, it is important that oral surgeons who perform these procedures be aware of the patient's experience of pain and strategies for proper management of the patient's anxiety in relation with the treatment (17).

It can be concluded that dental implant therapy improves function and enhances self-esteem and social life of individuals and thus increases overall quality of life (17). Few focused studies are available on the patient's knowledge about the dental implant therapy globally and local studies are scarce. There is a need for local studies exploring this important topic. The objectives of the current study were to investigate the patient's knowledge, awareness and their expectations regarding dental implant therapy and to explore the reasons for choosing this treatment modality.

Methods

This cross sectional research study was reviewed and approved by the Ethical Committee of the College of Dentistry Research Center, King Saud University, Riyadh (CDRC Registration FR 0300). The study was conducted between September 2015 and March 2016.

The required information was collected via an anonymous questionnaire. The questionnaire was self-designed and some parts were adopted from previous studies (1-3) to suit the requirements of the present study. Questionnaires along with a cover letter stating the instructions, rationale and purpose of the survey as well as an informed consent were distributed to a conveniently selected sample of 150 male and female patients seeking dental implant therapy at implant clinic, college of dentistry, King Saud University. All the willing adult patients were encouraged to participate in the survey and once willing patients were identified the questionnaires along with the consent were provided to them for recording their responses. Although the printed questionnaire called for participants to express in written form, the dental staff were ready to help them in understanding questions and recording their responses.

The participating patients answered several questions related to the knowledge, awareness and reasons for choosing dental implant therapy as the treatment of choice. All the questionnaires were distributed by hand and the filled questionnaires were collected back and compiled immediately. The hand distribution was for convenience and to explain and answer any queries raised by the participants during answering the questions without any time limit.

In total, the questionnaire included thirty-seven questions (37) divided into five parts. The first part comprised of eight questions about their social situation. Apart from the respondent's demographic data, this area tried to capture his/her educational background, smoking habits and level of knowledge about the dental implants.

The second part comprised of eight questions that were designed to draw more information on

reasons behind choosing the implant treatment and source of information regarding this mode of treatment. This section also recorded, the dentist's role in imparting information to the patient and the mode of communication.

The third part had five questions targeting the treatment experience and the level of their mental preparedness to go through the treatment procedure. The fourth part comprised of eight questions about the expectations on the treatment result. The patient's level of satisfaction was being rated on a five-point scale starting from 'completely satisfied' to 'not satisfied'. Similarly, the level of importance they assigned to the implant treatment was also being measured on a five-point scale starting from 'very important' to 'not important'. Aspects related to financial affordability, understanding on the duration of treatment and the most decisive factor that influenced the participants for the implant treatment were also covered in this section.

The last part included eight questions pertaining to the patient's dental health during the last six months. Their experience with regard to enjoying food, pronouncing words, sleep, smile, emotional status, enjoying social contact with others and in carrying out their social role were all assessed in this section.

Statistical analysis

Frequency analysis of the data collected was done using Statistical Package for Social Sciences (SPSS) version #21 (SPSS, Chicago, Illinois, USA). Descriptive statistics and Chi-square test was used for statistical analysis of the responses considering a P-value of <0.05 as the cut-off level for significance.

Results

The total questionnaires distributed were 150 out of which, 106 were filled and completed by 106 number of participants with a response rate

of 70.66%. Equal number of male (48.1%) and female (51.9%) participants agreed to participate in the study. Majority of the participants were married (82%), non-smokers (90%) and graduates (46%). Almost all the patients either self-contacted (53%) for the implant therapy or referred by the dentists (42%). More than half of the patients (55%) were in need of more than 1 implant and (45%) needed at least 1 implant. According to the participant's majority of them had fair knowledge about the implant therapy (Table 1).

Responses to the questions related to the participant's knowledge and information about the implant therapy are presented in Table 2. Two

thirds of the participants got their first information about implant therapy from their dentists and they had someone in their social circle who received implant treatment. Noticeably only one participant reported to receive a negative feedback otherwise for the majority (68.9%) the feedback received was positive. Verbal communication by the dentists (85.8%) was the major source of information provided about the treatment options (72.6%) including dental implant therapy for the patients. Internet (12.3 %) was the next source of getting information by the participants.

According to the responses related to the past dental treatment and patients past experience

Table 1 - Demographic information and social background of the participants.

| Variables | | Male No. (%) | Female No. (%) | Total |
|-----------------------------------|-------------------------|--------------|----------------|-------|
| Gender | | 51 (48.1) | 55 (51.9) | 106 |
| Mean age | | 46 | 43 | |
| Marital status | Married | 45 (42.45) | 42 (39.62) | 87 |
| | Single | 6 (5.66) | 10 (9.43) | 16 |
| | Widow | 0 (0) | 1 (0.94) | 1 |
| | Widower | 0 (0) | 2 (1.88) | 2 |
| Education | Element. | 0 (0) | 3 (2.83) | 3 |
| | Secondary | 2 (1.88) | 9 (8.49) | 11 |
| | Higher Secondary | 5 (4.71) | 7 (6.60) | 12 |
| | Graduate | 21 (19.81) | 28 (26.41) | 49 |
| | Post Graduate | 20 (18.86) | 5 (4.71) | 25 |
| | Other | 3 (2.83) | 3 (2.83) | 6 |
| Do you smoke? | Yes | 11 (10.37) | 0 (0) | 11 |
| | No | 40 (37.73) | 55 (51.88) | 95 |
| | Former smoker, given up | 0 (0) | 0 (0) | 0 |
| | Other | 0 (0) | 0 (0) | 0 |
| How did you get appointment? | Contacted self | 24 (22.64) | 32 (30.18) | 56 |
| | Referred | 24 (22.64) | 21 (19.81) | 45 |
| | Other | 3 (2.83) | 2 (1.88) | 5 |
| Do you need one or more Implants? | One | 12 (11.32) | 11 (10.37) | 23 |
| | More than one | 29 (27.35) | 29 (27.35) | 58 |
| | Don't know | 10 (9.43) | 15 (14.15) | 25 |
| Knowledge about Implant treatment | A little | 16 (15.09) | 24 (22.64) | 40 |
| | Medium | 31 (29.24) | 27 (25.47) | 58 |
| | Much | 4 (3.77) | 4 (3.77) | 8 |

Table 2 - Participants knowledge and information about the dental implant therapy.

| Questions | Measure | Response (%) | Chi square P value |
|--|-------------------------------------|--------------|-----------------------|
| Reason you lost the teeth | Injury/Accident | 5 (4.7) | 0.000 |
| | Periodontal/ gum Disease | 14 (13.2) | |
| | Conj. Tooth absence | 3 (2.8) | |
| | Caries/cavity | 75 (70.8) | |
| | Don't know | 9 (8.5) | |
| How were you first informed about Implants? | Dentist | 69 (65.1) | 0.000 |
| | Other dental Personnel | 1 (0.9) | |
| | News paper | 3 (2.8) | |
| | Internet | 6 (5.7) | |
| | TV/Radio | 1 (0.9) | |
| | Relatives | 13 (12.3) | |
| | Friends | 11 (10.4) | |
| | Other | 2 (1.9) | |
| Has anyone in your social circle treated with Implant? | Yes | 69 (65.1) | 0.000 |
| | No | 31 (29.2) | |
| | Don't know | 6 (5.7) | |
| Have you heard about experience of Implant? | Yes, Positive exp. | 73 (68.9) | 0.000 |
| | Yes, Negative exp. | 1 (0.9) | |
| | No | 32 (30.2) | |
| Has the dentist mentioned other ways? | Yes | 59 (55.7) | 0.244 |
| | No | 47 (44.3) | |
| Did your dentist give you information so you can choose treatment? | I was not in contact | 16 (15.1) | 0.000 |
| | My dentist not given me | 6 (5.7) | |
| | My dentist has given me | 84 (79.2) | |
| Where did you get the most useful information about implant treatment? | Dentist | 77 (72.6) | 0.000 |
| | Other dental Personnel | 4 (3.8) | |
| | News paper | 3 (2.8) | |
| | Internet | 13 (12.3) | |
| | TV/Radio | 0 (0) | |
| | Relatives | 4 (3.8) | |
| | Friends | 4 (3.8) | |
| | Other | 1 (0.9) | |
| How was the information conveyed? | Verbally | 91 (85.8) | 0.000 |
| | In writing | 2 (1.9) | |
| | Verbally and in writing | 4 (3.8) | |
| | No information | 6 (5.7) | |
| | Dentist recommended source of info. | 0 (0) | |
| | Other | 3 (2.8) | |

with the dentists (Table 3), majority of the patients regularly visited their dentists (75.5%) and their experience with the dental visit was pleasant.

Table 4 describes the participant's expectations regarding the dental implant therapy. Satisfactory chewing (37.7%) followed by longevity (27.4%) and improvement in esthetics (26.4%) were the main reasons for implant therapy patients, while cost of the treatment was not an issue for majority (53.8%) of the participants. The participant's responses of the time needed to complete the treatment ranged between 1 day and 1 year. However, most of them (38.7%) believed that treatment will be completed within 6

months. For 41.5% of the participants the implant therapy would last for 10 to 20 years while a third (33%) of the participants believed that the implant treatment will last for the rest of their life.

Patients self-reported oral and dental health problems and difficulties in speaking, cleaning, sleeping, smiling, emotionally, socially and during their work are presented in Figure 1. More than half of the participants (56%) claimed that they never faced any problems or difficulties during the last 6 months. The participants who faced problems every day, once or twice a week, once or twice a month and less than a month were 12%, 8%, 9% and 15% respectively.

Table 3 - Questions regarding past dental treatment and experience.

| Questions | Measure | Response (%) | Chi square P value |
|--|---------------------------------|--------------|--------------------|
| How often do you go for dental treatment? | Two or more times a year | 80 (75.5) | 0.000 |
| | Once a year | 16 (15.1) | |
| | Every two years | 4 (3.8) | |
| | Less often than every two years | 6 (5.7) | |
| If you have to go to dentist tomorrow, how do you feel? | Enjoyable exp. | 18 (17) | 0.000 |
| | Couldn't care one way or other | 58 (54.7) | |
| | A little uneasy | 17 (16) | |
| | Afraid, unpleasant and painful | 10 (9.4) | |
| | Very frightened | 3 (2.8) | |
| Waiting in dentist's waiting room, how do you feel? | Relaxed | 57 (53.8) | 0.000 |
| | A little uneasy | 28 (26.4) | |
| | Tense, nervous | 16 (15.1) | |
| | Frightened, anxious | 4 (3.8) | |
| | So anxious, sweat, sick | 1 (0.9) | |
| In dental chair, waiting for treatment, how do you feel? | Relaxed | 46 (43.4) | 0.000 |
| | A little uneasy | 31 (29.2) | |
| | Tense, nervous | 19 (17.9) | |
| | Frightened, anxious | 10 (9.4) | |
| | So anxious, sweat, sick | 0 (0) | |
| How do you feel when the dentist pick out the instruments? | Relaxed | 52 (49.1) | 0.000 |
| | A little uneasy | 31 (29.2) | |
| | Tense, nervous | 12 (11.3) | |
| | Frightened, anxious | 11 (10.4) | |
| | So anxious, sweat, sick | 0 (0) | |

Table 4 - Questions regarding expectations of the treatment result.

| Question | Measure | Response (%) | P value |
|---|--------------------------------|--------------|---------|
| Is the cost decisive or for your choice of treatment? | Yes | 57 (53.8) | .437 |
| | No | 49 (46.2) | |
| How do you believe the cleaning of implant will be compared to natural teeth? | Implant Requires more cleaning | 31 (29.2) | 0.000 |
| | As much or similar | 41 (38.7) | |
| | Implant require less cleaning | 9 (8.5) | |
| | I don't know | 25 (23.6) | |
| How long you can retain your implant? | Less than 10 years | 13 (12.3) | 0.000 |
| | 10 to 20 years | 44 (41.5) | |
| | 21 to 25 years | 9 (8.5) | |
| | More than 25 years | 5 (4.7) | |
| | The rest of my life | 35 (33) | |
| How long will be implant treatment from first examination to completion? | 1 day | 5 (4.7) | 0.000 |
| | 1 month | 19 (17.9) | |
| | 6 months | 41 (38.7) | |
| | 1 year | 27 (25.5) | |
| | other | 14 (13.2) | |
| What was the most decisive/critical factor for your choice of treatment? | Appearance/aesthetics | 28 (26.4) | 0.000 |
| | Satisfactory chewing/ function | 40 (37.7) | |
| | Longevity of the implant | 29 (27.4) | |
| | Treatment time | 0 (0) | |
| | Cost | 1 (0.9) | |
| | Cleaning | 2 (1.9) | |
| | Other | 6 (5.7) | |

Participants opinion regarding the functional and esthetic outcome of dental implants was well above average as presented in Figure 2. This also confirms that the patients had very high expectations from the dental implant therapy.

Discussion

The present study has assessed the knowledge on improving function and appearance with dental implant therapy of patients seeking dental implants at dental clinics of College of Den-

tistry, King Saud University. The assessment is based on the information collected via a custom designed self-administered questionnaire. The response rate of the questionnaire (71%) was found to be satisfactory. The questionnaire was custom designed, modified based on previous studies (10-13) keeping in view the objectives of the current study.

In Saudi Arabia, there is insufficient information on the attitudes of dental patients towards tooth replacement. Subsequently, the current study was an attempt to find out about the patient's knowledge and attitudes towards the teeth replacement option by using dental implants as a

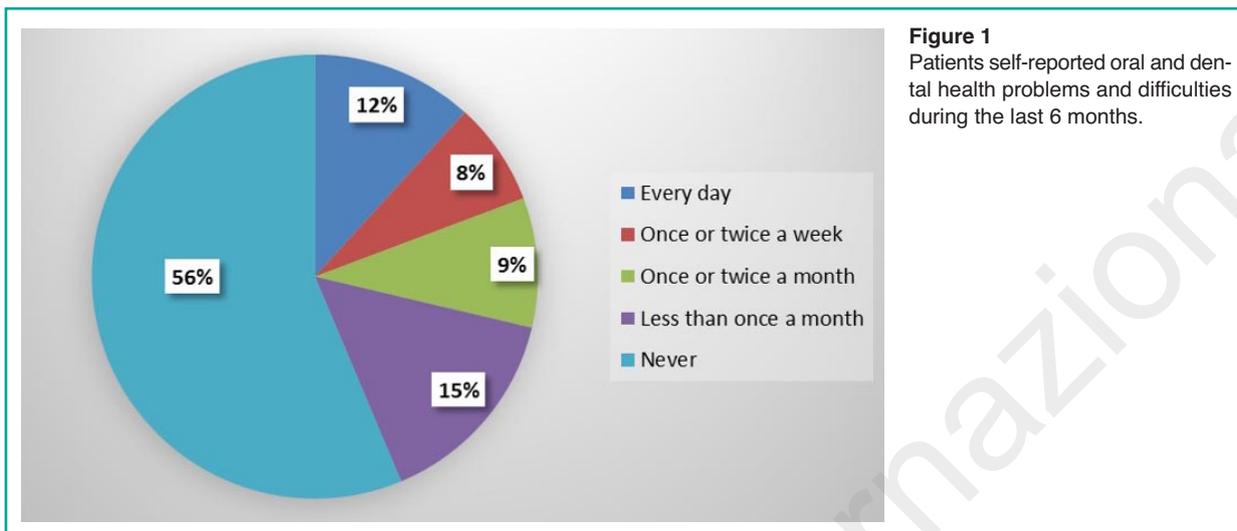


Figure 1
Patients self-reported oral and dental health problems and difficulties during the last 6 months.

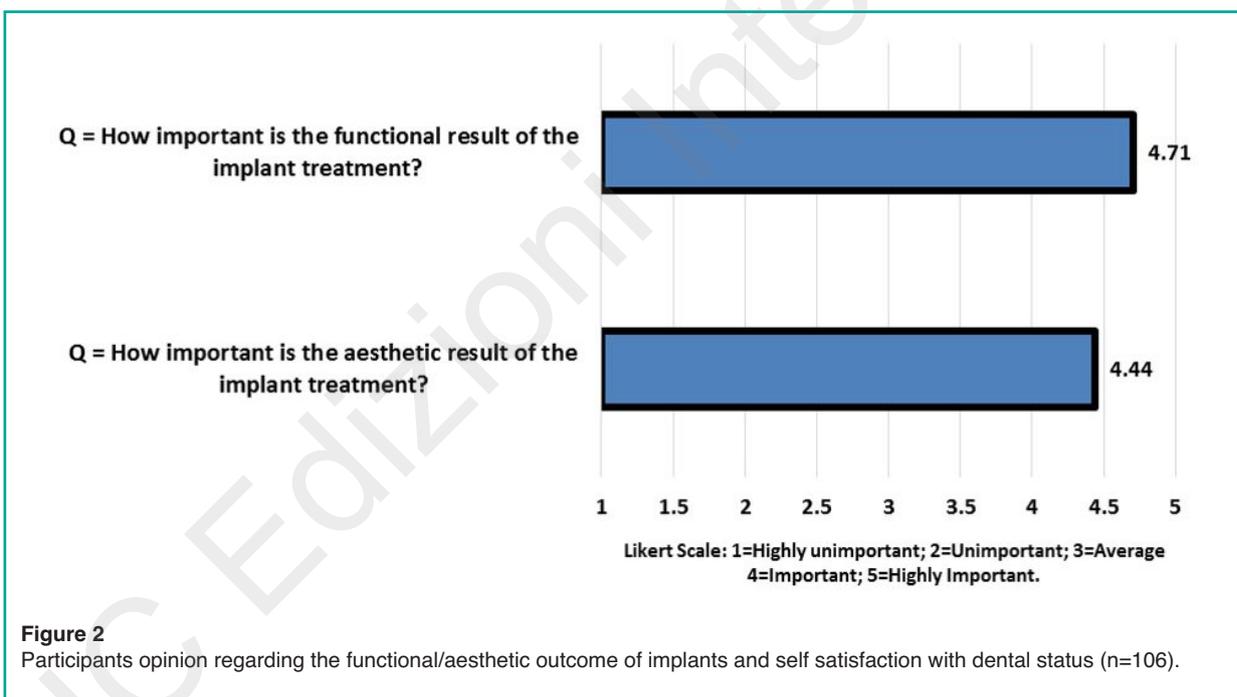


Figure 2
Participants opinion regarding the functional/aesthetic outcome of implants and self satisfaction with dental status (n=106).

treatment modality at the University Dental Hospital run by the College of Dentistry King Saud University, Riyadh. While dental implant procedure is primarily limited to specialists, the past decade has witnessed a change where in general dental practitioners are also volunteering to train and equip themselves with the art and science of dental implants. Although dental implants were reportedly used to treat edentulous patients as

early as 1971, it took almost two decades for implant dentistry to be included in dental school curricula worldwide (18).

The results of the current study should be applied cautiously as the patients recruited for the study were from urban area of Riyadh city. The opinions and knowledge of the population may differ and vary considerably from different regions especially from rural areas. Most of the

participants of the study were referred to the center from dentists who are distributed throughout the central region of Saudi Arabia. Another limitation of this study was that the exact nature of the prosthodontic treatment plan was not known. The common assumption was that all the patients were accepted as possible prosthodontic patients and candidates for dental implant therapy. However, it seems unlikely that this particular reason would influence the participant's knowledge and expectations regarding the dental implants.

In Saudi Arabia, dental implant treatment is made available by national health services for free or minimal charges to a limited number of patients with a long waiting list, causing most patients to seek treatment in the private sector. The dentists who are practicing dental implants are the main source of information regarding implant therapy for the patients seeking dental implant treatment. This has been reported in several studies and is evident from the results of the current study where 65% participants reported to have been educated about the dental implants by their dentists. The next common source of information for the participants were their friends 11% and relatives 13%. And surprisingly, and only 3% of the participants came to know about dental implants via television and internet respectively. This could be because of the differences in age of the participants, as for younger generation these days' internet is the main source of information (3). Regardless of the source, the information that the patients receive can vary in quality and reliability. These findings have similarity with some published research but some other researchers have reported lesser number of patients (17 to 36%) who were first introduced to implants by the dentists (3, 19-21).

The patient's expectations are quite high for a dental implant retained prosthesis in terms of function. These expectations are usually based on the feedback they receive from their dentists or family and friends who had past experience of undergoing dental implant therapy. This finding was evident from the results of the current study where around 37.7% of the participants reported

satisfactory function/chewing to be the primary reason for dental implant therapy. Patients seeking dental implants for improvement in the function was also reported in a study in Norwegian population by Simensen et al. (3) where for 46% of the patient's improvement in the function was the primary reason for undergoing dental implant therapy. Similar findings are reported by Kaptein et al. (4) and Rustemeyer et al. (19) in their studies.

Some other important reasons for choosing dental implant therapy are appearance and longevity. According to responses by the participants, 26.4 and 27.4% of them reported esthetics and longevity predicted with dental implants were the decisive factors for dental implant therapy. Similar findings were reported in study where 20% of patients reported esthetics to be their primary reason for dental implants (3). Cost of the treatment was found not to be an important issue while considering dental implant therapy for the participants of this study. As only 1 patient reported it to be a decisive factor during the selection of the treatment. This finding is however contradicting to the findings of other studies where a for a high percentage of patient's cost is an issue (3, 8, 14, 15). The reasons for this finding could be the provision of the free or minimal charges for dental implants in the clinics of the hospital where the study was conducted.

This study indicated many patients believe that dental implants need care and hygiene equal (38.7%) or even more (29.2%) than natural teeth. Most of the participants (41.5%) believed that implants can last for 10 to 20 years and also the treatment completion will take around 6 months (38.7%). Thirty-three% of the participants believed that this mode of treatment will last for the rest of their life. Majority of the participants expected the functional and esthetic outcome of the dental implants to be highly important. These results indicate that expectations of Saudi patients were very high from dental implant therapy. This finding is similar to a study in Turkish patients' (33%) by Özçakır Tomruk et al. (22) and these expectations were higher than Japanese (28%), German (7%) and Austrian population (24%) (19, 20, 23). The patients

should be informed properly about the implant therapy. Unrealistic expectations regarding implant life and possibility of implants failure in case of compromised patients should be thoroughly explained to the patients before commencement of the treatment to prevent future issues and misunderstandings.

This current survey was conducted in a limited group of participants in an urban populations. Studies are needed to be conducted on a larger scale to evaluate the level of awareness about dental implant therapy and also to increase its awareness in Saudi Arabia. The patient's self-awareness about this treatment modality is of substantial value in choosing and establishing treatment demands. Appropriate knowledge of diagnostic and therapeutic options with dental implant therapy is, therefore, mandatory for each and every patient.

Conclusions

Within the limitations of the study it can be concluded:

- participants had moderate awareness about dental implants
- chewing/function and appearance/esthetics were found to be the primary reasons for seeking dental implant therapy
- expectations of the patients from the dental implant therapy were high
- awareness amongst patients regarding the dental implant therapy shall be increased and this will help in eliminating any negative image of the procedure that may have been caused due to lack of adequate information
- as this survey was conducted in a limited group of people, further studies are needed to be conducted amongst a larger group of people.

Acknowledgements

The Authors are thankful to Dr. Ahmad Saidan and Mr. Ranan Kamalan for their help in data

collection and Mr. Nassr Maflehi for his help in the statistical analysis. The research project was approved by the ethical committee of College of Dentistry Research Center (Registration number FR 0300). The Authors are grateful to Deanship of Scientific Research at King Saud University for funding through Vice Deanship of Scientific Research Chairs. Written informed consent was obtained from all individual participants included in the study.

References

1. Walia K, Belludi SA, Kulkarni P, Darak P, Swamy S. A Comparative and a Qualitative Analysis of Patient's Motivations, Expectations and Satisfaction with Dental Implants. *J Clin Diagn Res.* 2016 Apr;10(4):ZC23-6. doi: 10.7860/JCDR/2016/17004.7538. Epub 2016 Apr 1.
2. Al-Dwairi ZN, El Masoud BM, Al-Afifi SA, Borzabadi-Farahani A, Lynch E. Awareness, attitude, and expectations toward dental implants among removable prostheses wearers. *J Prosthodont.* 2014 Apr;23(3):192-197. doi: 10.1111/jopr.12095. Epub 2013 Oct 7.
3. Simensen AN, Bøe OE, Berg E, Leknes KN. Patient Knowledge and Expectations Prior to Receiving Implant-Supported Restorations. *Int J Oral Maxillofac Implants.* 2015 Jan-Feb;30(1):41-47. doi: 10.11607/jomi.3511.
4. Kaptein ML, Hoogstraten J, Putter de C, Blijdorp PA. Dental Implants in the Atrophic Maxilla: Measurements of Patient's satisfaction and Treatment Experience. *Clin Oral Impl Res.* 1998;9: 321-326.
5. AlDosari AA. Oral rehabilitation of a case of Papillon-Lefevre syndrome with dental implants. *Saudi Med J.* 2013;34(4):424-427.
6. Khosya B, Devaraj CG. Awareness of Dental Implants as a Treatment Modality Among People Visiting Mahatma Gandhi Dental College & Hospital, Jaipur. *NJMR.* 2015;5(1):61-63.
7. Koldslund OC, Scheie AA, Aass AM. Prevalence of peri-implantitis related to severity of the disease with different degrees of bone loss. *J Periodontol.* 2010;81: 231-238.
8. Brägger U, Krenander P, Lang NP. Economic aspects of single-tooth replacement. *Clin Oral Implants Res.* 2005;16:335-341.
9. Alcagawa Y, Rachi Y, Matsumoto T, Tsuru H. Attitudes of removable denture patients toward dental implants. *The Journal of Prosthetic Dentistry.* 1988;60(3):362-364.
10. Esfahani OF, Moosaali F. Awareness and knowledge of

- patients toward dental implants as an option in replacing missing teeth: A survey in Kerman, Iran. *J Periodontal Implant Dent.* 2016;8(2):43-48.
11. Tomruk CO, Özkurt-Kayahan Z, Şençift K. Patients' knowledge and awareness of dental implants in a Turkish subpopulation. *J Adv Prosthodont.* 2014;6:133-137.
 12. Gbadebo OS, Lawal FB, Sulaiman AO, Ajayi DM. Dental implant as an option for tooth replacement: The awareness of patients at a tertiary hospital in a developing country. *Contemporary Clinical Dentistry.* 2014;5(3):302-306.
 13. Peeran SA, Al Sanabani F, AL-Makramani BMA, Elamin EI. Dental prosthetic status and treatment needs of adult population in Jizan, Saudi Arabia: A survey report. *Eur J Dent.* 2016;10:459-463.
 14. AL Amri R, Saker S. Dental Implants Therapy: 'A Cross-Sectional Study of Patients' Knowledge and Awareness'. *British Journal of Medicine & Medical Research.* 2017;19(6):1-9.
 15. Al Garni B, Pani S. C, Al Maaz A, et al. Factors affecting the willingness to pay for implants: A study of patients in Riyadh, Saudi Arabia. *Dental Research Journal.* 2012;9(6):719-724.
 16. Pjetursson BE, Karoussis I, Burgin W, Bragger U, Lang NP. Patients' satisfaction following implant therapy a 10-year prospective cohort study. *Clin Oral Impl Res.* 2005;16:185-193.
 17. Eli I, Arad DS, Baht R, Tuvim HB. Effect of anxiety on the experience of pain in implant insertion. *Clin Oral Impl Res.* 2003;14:115-118.
 18. Alkindi M, Ramalingam S, Sulieman S, Al-Johany SS, et al. Undergraduate Implant Dentistry Education in Saudi Arabian Universities. *Journal of International Oral Health.* 2016;8(6):720-772.
 19. Rustemeyer J, Bremerich A. Patients' knowledge and expectations regarding dental implants: Assessment by questionnaire. *Int J Oral Maxillofac Surg.* 2007; 36:814-817.
 20. 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.
 21. Zimmer CM, Zimmer WM, Williams J, Liesener J. Public awareness and acceptance of dental implants. *Int J Oral Maxillofac Implants.* 1992;7:228-232.
 22. Özçakır Tomruk C, Özkurt-Kayahan Z, Şençift K. Patients' knowledge and awareness of dental implants in a Turkish subpopulation. *The Journal of Advanced Prosthodontics.* 2014;6(2):133-137. doi:10.4047/jap.2014.6.2.133.
 23. Akagawa Y, Okane H, Kondo N, Tsuga K, Tsuru H. Comparative evaluation of chewing function with removable partial dentures and fixed prostheses supported by the single-crystal sapphire implant in the Kennedy Class II partially edentulous mandible. *Int J Oral Maxillofac Implants.* 1989;4:205-210.

Correspondence to:

Dr. Syed Rashid Habib
Associate Professor

Department of Prosthetic Dental Sciences,
College of Dentistry, King Saud University,
P. O. Box 60169, King Abdullah Road,
Riyadh, 11545, Saudi Arabia.

Phone: 966-1-467 7325;

Office: 966-1-467 7230; Fax: 966-1-467 8548

E-mail: rashidhabib@hotmail.com; syhabib@ksu.edu.sa