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A Study on Satisfaction of Dental Implant Patients

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A STUDY ON SATISFACTION OF DENTAL IMPLANT PATIENTS

by

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ABSTRACT

The implant has been around for half a century. It started in Sweden in the 1960s and is now being actively practiced all over the world. It is important to investigate what constitutes a standard for a consumer of medical services in selecting a dentist to receive implants. A great number of dentists and research organizations have published research papers on theory and techniques of implants as well as their strengths and weaknesses. However, researches on reality and satisfaction rate of patients are still very rare.

The purpose of this study was to identify how to improve satisfaction of patients on whom implant operation was operated and to create constant added values for hospital management. Patient satisfaction of dental implant including patient's satisfaction with the operation, duration of implant operation, and the cost of implant operation were investigated. This study also examined the management aspects such as dental clinic choice motivation of implant operation patients, media and factors affecting choosing dental clinics, and obtaining routes of implant information. To identify perception and status of patients who visit dental clinics and hospitals in Seoul, patients were asked to participate in answering the survey questionnaires.

The majority of patients with dental implant treatment (42.4%) answered that they first learned about dental implant 'from dentist during dental treatment', however the majority of patients without dental implant treatment (62.0%) answered that they first learned about dental implant from 'mass media'. In order to effectively promote dental

implants, it is necessary to introduce the implants actively during dental treatment. In addition, mass media promotion may not be very effective in leading patients to receive implant treatment.

When patients choose a dentist or dental clinic, they considered factors in the following order; career and experience of dentist, introduction of acquaintances, regular dentist, proximity to home, moderate dental treatment cost, convenience of traffic and parking, advertisements or internet searching, and others. Therefore, to successfully attract dental implants, it is important to actively promote the dentist's career or experience. In addition, it has been confirmed that lowering the cost of treatment is not the most important factor in determining a dentist. When patients select a dentist/dental clinic for dental implant surgery, they considered factors in the following order; dentist's career and implant surgery experience, cost of dental implant, referral by acquaintance or neighbor, regular dental clinic/dentist, convenient location and parking, dentist's educational background, dental clinic facilities, and others. The most important was the experience and experience of the dentist. Over 90% of patients with dental implant answered that they are satisfied on dental implant treatment. The degree of satisfaction with the implants was also very high, and thus promoting the patient's satisfaction with implant satisfaction may not be an effective method.

This study provided basic data for establishing a management strategy to increase the attractiveness of dental clinics and strengthen competitiveness.

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CHAPTER 1

INTRODUCTION

1.1 Background / need for research

It has been already 45 years since dental implant appeared. Since osseointegration-type implants that are being generally used in dental offices throughout the world today began in Sweden in the 1960s, and it began spreading throughout the world around the 1980s (Gaviria et al. 2014). Although history of dental implants is short, it was a method that was completely different from those that preceded it and therefore the interest in it began escalating. In particular, the interest in dental implants has exploded in Korea in the last several years. There is a rapid increase in all aspects of dental implants ranging from production and distribution of implants, dentists who practice implants, professional implant technicians, implant patients, etc (Shingu Kim 2006, 218). In Korea, the cost of implant treatment varies from 1 million won to 3 million won depending on the difference between the area and the clinic, and the complaints are high that the price of the implant is expensive. At the same time, depending on the medical institution, the materials and procedures used for the implant procedure and the medical charge are different so that the confusion of medical consumers is increasing (Kim et al. 2014; Shin et al. 2008). From 2016, the Korean national health insurance service has provided a 50% treatment cost of dental implant

over 65 years of age, however only two teeth per person are supported per lifetime (Ministry of Health & Welfare, 2016).

Patients' perception of implants has also changed a lot compared to the past. In the past, dental implants were perceived as expensive surgical operation and therefore people find it difficult to approach it. In addition, it was rare to find dental hospitals that performed implant surgery. However, with increase in education level of society, ease of finding available information about implants, e.g., through the Internet, reduction in cost of implant surgery and increasing price competition, more wide-spread use of implant operation not only in university hospitals but also local dental offices, etc., patients who needed implants found it easier than ever to receive implant surgery.

Due to such reasons, implant surgery increased rapidly and many dental hospitals began recognizing implant surgery as a profitable business. Accordingly, dental hospitals began competitively advertising and promoting implant surgery and making investments in necessary staff training, purchase of highly expensive equipment and hospital modeling to attract and accommodate implant patients. However, with the recent global economic crisis and Korean economy entering the period of fierce competition, just like any other areas of business in Korea society, competition is intensifying in medical industry as well and it has also changed the way patients perceive medical services as well. Moreover, as the medical industry is being transformed from an industry centered on supplier of medical practices to the one centered on consumer of medical practices, i.e., patients, the fact that is evidenced by improvement in patient rights and establishment of laws and systems to protect patients, the need for customer satisfaction in medical service is being discussed more and more (Haejeong Lee 2005).

In the United States where dental implants became more common much earlier than in Korea, researches on dental implants began independently from the case where dental implant was first developed by Professor Branemark of Sweden during the 1960s and applied to toothless patients. Bicon Dental Implants began their research work in 1968 as part of U.S. Army research project with the aim of "restoring each and every tooth using dental implant and developing dental implants where dentures can be fixed using adhesives". As a result, the company succeeded in commercializing dental implants for general public in the United States in 1985 for the first time. Today, dental implant is commonly practiced in the United States. From 1983 to 1987, the number of implant surgery has quadrupled (National Institute of Health Consensus Development Conference, Statement on Dental Implant, 1988). Also, between 1986 and 1990, it grew by 73%, a remarkable growth rate (Stillman 1993).

In 1992, more than 300,000 implants were done and the number is continuing to increase every year. It has achieved 175 million dollars in revenue and more than 90% of dentists are practicing implant surgery on a routine basis (Misch 1993).

Dental implant was introduced in Korea during the 1980s with only a very small minority of dentists practicing it. However, beginning in the late 1990s, there was a boom in dental implants as ample opportunities for general practitioners to learn the techniques through various seminars, learning from dentists with implant experiences, obtaining training by linking to dental implant organizations overseas, etc. As a result, in the 2000s, patients could receive dental implants not only at big hospitals but also local dental offices in their town. When dental implant bloomed in full scale beginning in the 2000s, it not only became a general procedure in dental practices but produced positive effects

for the industry as a result of the expanded market and enhanced income for dental practice, as it was an area that was completely different from the existing dentures method. However, whether such a boom will continue in the future is uncertain and the experts vary in their opinions.

Dentists generally agree that the dental implant market is no longer the "Blue Ocean". Some even lament that it has now become the "Rotten Ocean". At the center of such lamentations are declining revenues from dental implants as a boom in dental implants led to fierce competition with steep discount in consultation fees and excessive advertising; and appearance of patients who require post-treatment care due to poor recuperation sometimes accompanying medical lawsuits. In addition, due to recent world-wide recession, dental practices are undergoing prolonged financial problems. Moreover, while in the past patients tended to respond receptively to doctors, today they tended to be extra-careful when selecting an expensive treatment as they live in the age of flooding information, e.g., the Internet (Chiui Shinbo Newspaper 2008).

Under the circumstance, it is more important than ever to investigate what constitutes a standard for a consumer of medical services in selecting a dental office to receive implants. To this day, a great number of dentists and research organizations have published research papers on theory and techniques of implants as well as their strengths and weaknesses. However, researches on reality and satisfaction rate of patients are still very rare. To this day, more than 10,000 research papers have been published on theory and techniques of bone in-growth dental implants. However, only less than 2% of them dealt with patient satisfaction for dental implants (Young-hoe Yoon 2010).

It is important to conduct a survey on medical service consumers who may have to receive implant operation in the future or patients who have already received implant surgery in order to assess the level of their satisfaction or dissatisfaction after their surgery and make improvements on them. In fact, Mr. Shin Hoseong, a researcher at Korea Institute for Health and Social Welfares (KIHASA), published a paper titled "Survey Results on People's Awareness of Dental Implants" in December, 2008. He surveyed 1,051 people, with or without experience in dental implants, on their satisfaction of dental implants and what they consider as important when they receive implants. The result shows that 59.88% of implant patients were satisfied with the operation. To the question what they considered most important in selecting a hospital, people without experience in dental implants (874 people) said that they considered advertising and experience of the hospital director as most important (49.54%, ranked 1st) while people with implant experience (177 people) said a recommendation from a friend most important (32.2%, ranked 1st). (Shin Hoseong, 2008)

Tepper G. et al. conducted face-to-face interviews with 1,000 Austrians using full-time members of the Austrian Gallup Institute in order to find out where they get information about dental implants and how they felt about the cost. They were all above 14 years old and consisted of 521 females and 479 males. The result of the interview revealed that only 20% of them knew dental implants as an alternative solution to loss of tooth. For major ways of obtaining information about dental implants, 68% of them obtained information through dentists; 23% through media; and 22% from friends of acquaintances. Of all interviewees, 31% wanted to obtain more information about dental implants. In addition, among the people interviewed who received dental implants, 70%

of them thought the cost was too high. However, from the point of view of aesthetics, 82% of them thought they were satisfied and 90% expressed their satisfaction regarding functional aspects of dental implants as a replacement for teeth lost. Nevertheless, no interviewees felt satisfied about the cost.

The interview here provides important information for dentists who provide dental implants. People who received implants believed that implant cost was too high but were satisfied with the service it provided. Due to lack of information and knowledge about dental implants, there are many people who do not know that implants can be a solution to loss of tooth. Also, it appears that most people have blind perception that dental implant is too expensive. Such perception is a big hindrance for patients to go with implant operation. We can think of two solutions to solve these problems. First, there is a need to lower cost or obtaining implants. However, dentists are in diametrically opposite position regarding lowering the cost of operation, so there seems to be a limit. In addition to lowering implant cost, it is probably important to promote value of implant to patients. In particular, under the implant market environment of 2010 where emergence of "dumping dentists" and decline in profitability of implants make it difficult to lower cost further, promoting value and effectiveness of dental implants to patients is expected to be even more necessary. Second, there is a problem of effectively delivering information to patients about effectiveness of implants as a replacement of missing teeth. It seems necessary to increase awareness of implants through public media, magazines and pamphlets. (Tepper G, et al., 2003)

Siadat H. et al. conducted a research to test if there exists correlation between patient satisfaction and age, gender and past prosthetic history. Patient satisfaction under

edentulous state before implant in complete denture state and implant-retained overdenture state after implant was compared. There were eight types of assessment criteria (comfort, hygiene, retention, appearance, speech, mastication, and overall satisfaction). The total number of participants was 55 and they were patients who used implant-retained mandibular overdentures using implants from 1998 to 2004. A questionnaire was given to both male and female patients to evaluate their general satisfaction they experienced as they used implant prostheses.

The results show that there was a significant correlation between gender and comfort. ($p < 0.0001$) Patients who used one or more conventional dentures for a long time before implant surgery were satisfied with new implant dentures in terms of comfort and function. ($p < 0.01$) Also, the older they were, the more satisfied they were with new implant dentures in terms of aesthetic and comfort. Overall, for all patients, there was higher positive correlation in comfort satisfaction than aesthetic satisfaction. This research shows that the satisfaction of patients using the implant-retained mandibular overdentures is correlated to age, gender and past prosthetic history.

The reason the comfort and function satisfaction is low for patients who used one or more conventional dentures for a long time before implant surgery is probably because they were used to conventional dentures for a long period. The reason why there was negative correlation in aesthetic satisfaction for most patients was because, although implant-supported overdentures are functionally superior, it is aesthetically inferior to conventional dentures because of its complicated structure. (Siadat H, et al., 2008)

Schwartz-Arad D., et al. studied the stress a patient receives when he is informed about situations that could occur during dental implant surgery. The participants in this research consisted of 98 health patients scheduled to receive implant surgery. Just before implant surgery, 2 different audio tapes containing information about implant insertion were played to patients. After implant surgery, a questionnaire consisting of 21 questions was given to the patient. The analysis showed that the patient was placed under a significantly stressful situation before the implant surgery. Some patients experience extreme nervousness. It was revealed that, under such a situation, providing relevant information about surgery to patients just before implant insertion worsens patient's nervousness. No matter how good the information is, if it is not appropriate for the situation, it will end up backfiring. In conclusion, explaining to a patient about the potential side effects that could occur during implant surgery was not an appropriate method. It would be better to find a way to relax nervous patients. (Schwartz-Arad D, et al., 2007)

Zitzmann N.U. et al. studied patient satisfaction of removal implant overdentures using two or four implants to edentulous mandible patients. Questionnaire was given to 20 patients before implant, which was collected twice, 6 months and 36 months after implant. In both two implants-retained mandibular overdentures (IRET) and four implants-supported mandibular overdentures (ISUP), greater improvements were made in prostheses retention and pain reduction compared to complete dentures of edentulous patients. In long-term comparison of IRET and ISUP, IRET (two implants), in all aspects, except for chewing ability, and in psychological parameters in particular, patient satisfaction was higher. In ISUP (four implants), the number of implants was higher and

therefore stabilization was superior. This brought about improvement in prosthesis retention, chewing ability and pain reduction for a long term. However, from maintenance point of view, ISUP is not favored compared to two implants dentures or complete dentures because there is a problem of recalling at least once a year. There exist various variables to what types of dentures are best for a patient. (Zitzmann NU, et al., 2006).

Therefore, a research on the subject of patient satisfaction is necessary in order to understand patients as a doctor and as part of hospital administration.

1.2 RESEARCH GOALS

The purpose of this study was to identify how to improve satisfaction of patients receiving implant operations, and to create constant added values for hospital management. For this, along with overall patient satisfaction of implants, implant operation, duration of implant operation, and its cost, this study intends to do the research on the management aspects such as dental clinic choice motivation of implant operation patients, media and factors affecting choosing dental clinics, and obtaining routes of implant information.

Through the research as above Bartlett et al. reported that when the doctor recognized operation patient's perception and status, based on that, by increasing patient's satisfaction it was possible to induce them to continue to use clinic's medical

service, and by being brought into close relationship with clinics, patients had a tendency to follow doctor's orders and prescriptions and be willing to participate into medication process and to publicize their clinics (Bartlett, et al., 1984). However, even though there have been over 10,000 papers published with regard to mechanisms and procedures of dental implant, the papers regarding how much the dental implant service was satisfactory to the patients are no more than 2% out of the dental implant related papers (Yoon-Young Heo et al., 2010). Moreover, previous studies show that there is a wide gap between the patient's satisfaction with the previous researches and the current research case. Therefore, currently we need to examine for a research on satisfaction of implant patients.

Thus, this study aims to identify perception and status of patients who visit dental clinics and hospitals in Seoul by modifying and supplementing the survey questionnaires in use for previous studies and to do the research on methods of providing a more improved medical service by analyzing factors affecting patient's satisfaction.

There are various factors that affect satisfaction of patients. Standard for patient satisfaction varies across generations too. Today, dental implant has established itself as a common surgical operation at dental office and hospital. Accordingly, the aim of this paper is to discover how much contribution dental implant has made to oral health-related quality of life.

The ultimate goal of this research is to enhance quality of life for patients by offering them more improved medical services by analyzing factors that affect patient

satisfaction and understanding the reality of dental implants and how patients perceive dental implants.

- The purpose of this study is to investigate;
 - To evaluate the characteristics of patients who experienced dental implant therapy compared with patients who did not
 - To investigate the overall and specific satisfaction level of dental implant therapy in patients who visited dental hospital and clinics in Seoul, Korea
 - To analyze differences on perception of dental implant cost and influenced factors to choose a dentist between implant experience and non-experience patients who visited dental hospital and clinics in Seoul, Korea

CHAPTER 2

EXAMINATION OF EXISTING LITERATURES

2.1 THE NUMBER OF DENTAL CLINICS IN SOUTH KOREA

The number of dentists in Korea exceeded 15,000. A dentist per dental clinic has a population of 3,300 people in nationwide. The metropolitan area, Seoul, is already saturated and medical charges are falling (Seminar biz newspaper, 2016).

According to the Health Insurance Review and Assessment Service of South Korea, among the 15,477 dental clinics in nationwide, 4,583 were located in Seoul, 3,412 in Gyeonggi-do, 1,139 in Busan-si, 757 in Daegu-si, 749 in Gyeongsangnam-do, 748 in Incheon-si, 561 in Gyeongsangbuk-do, 520 in Gwangju-si, 481 in Daejeon-si, 479 in Jeonllabuk-do, 446 places in Chungcheongnam-do, 406 places in Jeollanam-do, 339 in Ulsan-si, 336 in Chungcheongbuk-do, 334 in Gangwon-do, 156 in Jeju-si, and 21 in Sejong-si, indicating that more than 57% of the total dentists are concentrated in the Seoul metropolitan area. A dentist per dental clinic has a population of 2,226 people in Seoul metropolitan area.

Especially in Seoul, the concentration of Gangnam-gu is very serious. Of the 4,583 dental clinics located in Seoul, 571 are located in Gangnam-gu, and the largest number of dental clinics in Seoul is in the densely populated area followed by Seocho-gu with 324 and Songpa-gu with 297. The number of people per dental clinic in each area

was 590 in Jung-gu, 977 in Jongno-gu, and 988 in Gangnam-gu, in contrast, 3,938 in Dobong-gu, 3,388 in Eunpyeong-gu and 3,263 in Nowon-gu.

The number of dentists in Seoul was 6,427. In Seoul, 825 dentists were active in Gangnam-gu with the largest number of dentists, followed by 449 in Seocho-gu and 390 in Songpa-gu.

The number of over 75 years of age who are the main target of dental implant treatment is 344,639 in Seoul, and Nowon-gu has the highest number of elderly people with 21,415 followed by Songpa-gu (18,672), Gangseo-gu (3,800) and Eunpyeong-gu (8,097).

2.2 EMERGENCE OF DENTAL IMPLANTS

In the past, when you lose two or more teeth, an adjacent tooth had to be pulled out in order to use healthy tooth as abutment. This caused so many problems such as changes in patient's occlusion, periodontal disease, cavities, psychological rejection, reduced length of life for natural teeth, etc. (Donghan Lee 2002, 10)

As a result, osseointegrated dental implant was introduced in order to solve problems associated with side effects and, in fact, dental practice faced a turning point as such osseointegrated dental implant was developed and progressed.

2.3 WHAT IS DENTAL IMPLANT?

Dental implant is a surgical procedure that implants a bio-friendly mounting device inside alveolar bones or jawbones to construct artificial tooth and allow them to function as natural teeth. However, dental implant is distinguished from implants used in orthopedics, etc. Dental implants must deal with many unfavorable conditions that other implants do not face: it must withstand strong and repeated masticatory force in order to enable chewing of foods; and it is not completely buried inside jawbones but penetrates gums and is exposed to inside of oral cavity, therefore always subject to external contamination. Accordingly, it not only requires compatibility with bone, periodontal and tissue structure but also mechanical and engineering strengths that can withstand biting force. The need for developing dental implants have emerged in order to respond such demands and underwent tremendous growth as Professor Branemark of Sweden during the 1960s introduced and established the idea of osseointegration (Donghan Lee 2002, 10).

2.4 EFFECTIVENESS OF DENTAL IMPLANTS

Emergence of dental implants was a turning point in dental practice. It overcame the limits of traditional dental surgical procedures to some extent. When osseointegration-type implant dentures were worn, compared to general dentures, there was a gradual but clear improvement in masticating efficiency and function and the evidence of clear recovery in oral function without much problem in threshold of

interocclusal detection (Lundqvist 1992). Average dentures can withstand 15~25 psi (pound per square inch) of biting power, which is about 1/5~1/4 of the biting power of natural teeth. In contrast, it has been reported that fully bone anchored dentures (Branemark denture) that uses 5~6 implants can maintain biting power that is similar to that of almost natural teeth and its masticating form and function are also similar to that of natural teeth as well (Haraldson 1983; Lundgren 1987).

Recently, dental implants are actively being used in orthodontics. In particular, in case of mini-implants, it is being used as an anchor so orthodontic treatment is done without anchor loss, which is another value of implants reported (Higuchi 1991).

In the past, functions of dental implants were regarded as important. Also, there have been many researches done on implants and osseointegration in order to improve long-term survival rate of implants. However, the recent trend is to emphasize the importance of soft tissues that envelope implants in order to increase long-term survival rate of implants in addition to issues in osseointegration of implants. It has been observed that there are histological, biochemical and micro-structural similarities between animals and humans in terms of the structure of periodontal soft tissues and soft tissues around implants. (Abrahamsson 1996)

Since Professor Branemark introduced dental implants to dentistry, the importance of dental implants as a field in dental treatment has been growing. While the initial goal of implants was to fulfill the basic roles of teeth to enhance osseointegration and dental implant functions, today demand for balance between adjacent remaining teeth and gums around implants is constantly increasing. This is becoming a particularly important issue in upper anterior teeth area. Accordingly, implant treatment, especial in

the area of aesthetics, growth and maintenance of hard and soft tissues have become a necessity (Seo-woung Kim 2007, 1). Beauty not only refers to pleasant psychological response to visual stimulation but also a technique called art. For an artistic work to receive good evaluation, it must satisfy five senses. However, when interpreting beauty, people define beauty according to what they recognize. There are various factors that contribute to satisfying patients. Ability of doctors, friendliness of staff members of hospital, beautiful interior, etc. However, most of all, patient satisfaction will be maximized when demand of patients is carefully considered and medical services that surpass their expectation are provided to them. It is important to analyze each and every element. However, clinical doctors must realize that it is very important to create overall harmony among various elements.

2.5 FUTURE OF IMPLANT

Although implants are being used widely across the world today, it is deficient in terms of being a perfect alternative to replace natural teeth. When bone quality is bad, it might take 6 to 12 months to manufacture prosthetics for implants. There is even a case when implant fixture falls out not long after implant prosthetics is completed. It is often the case a long period of applying masticating pressure causes upper implant structure to fall out or loose screws make implant shaky. It is difficult to give implant surgery to patients with severe diabetes or who are going through cancer treatment. With dental implants, since the nerve system of natural teeth is absent in dental implants, patients do not feel the biting pressure of masticating food as much. This implies that they will likely

masticate harder than when they use natural teeth. It increases the chance of causing periodontal damage to natural teeth. Although dental implant is clearly a revolutionary alternative to natural teeth when natural teeth are lost, there is a still room for much improvement. In order to improve on such imperfection, there are researches in progress throughout the world. Improvement in safety and success of implants will once again motivate dentists to actively perform dental implants.

It is expected that implants and bone implant materials that make osseointegration faster and bone quality harder will appear soon. According to Yonsei University Dental School and Korea University Graduate School of Clinical Dentistry, development of new implants is underway in Georgia University School of Dentistry to advance osseointegration period and solidify bone quality by applying bone cell-inducing/-forming catalyst rhBMP-2 to implant surface. Also, at Weintraub Implant Research Lab of UCLA School of Dentistry and Iowa University School of Dentistry, development of "customized implant" that uses the patient's DNA to perform surface treatment is in progress. Implants researches using DNA is underway not only in these labs but also at companies and research labs in Sweden, the country with advanced dental implant industry. Also, "Infuse", bone implant materials with outstanding performance, has been approved by US FDA and being sold in the United States. It has been reported that a Korean company also succeeded in developing a product similar to "Infuse" and launched the product in the market (Chiu Shinbo Newspaper 2008).

There is much room for improving performance of implants. If advanced implants and bone implant materials are developed and launched, experts generally agree that future prospective for implant is bright. If weaknesses of current implants can be

improved, it will help dentists to reduce a chance for implant failure and minimize possibility of medical lawsuits, so expectation is there for it to have positive impact on improving hospital finance.

2.6 EXAMPLES OF SURVEY ON IMPLANT SATISFACTION

2.6.1 SATISFACTION WITH IMPLANT TREATMENT IN COMPARISON WITH DENTAL TREATMENT

Timmerman et al. studied patients' satisfaction with mandibular implant-retained overdenture during the period from 1991 to 1993 using 110 edentulous patients. This study was conducted at the Department of Oral and Maxillofacial Surgery and Department of Special Dental Care and Maxillofacial Prosthodontics of the Ignatius Teaching Hospital in Breda, the Netherlands. Three types of mandibular implant retained-overdentures were provided to them, and satisfaction with each type of implant was measured and compared by applying a different type to each patient (Timmerman 2004).

Cune et al. applied three different types - magnet, bar clip, and ball socket - of implant retained overdenture to edentulous patients, and compared their satisfaction in comparison with that with conventional denture. First, two implants were placed onto the mandible of 18 edentulous patients. For the first three months of experiment, new conventional dentures without any attachment to the maxilla and mandible were provided and used. After 3 months, patients were selected at random, and implant-retained attachment overdentures were prepared only for the mandible and used. After another 3

months, the attachment was replaced with a different type. Patients' satisfaction was measured by marking on a visual analogue scale (VAS) (Cune 2006).

Grogono et al. sent questionnaires by mail to 95 patients treated at a university hospital for implant in order to compare their psychological attitude before and after implant treatment and to examine the effect of implant prostheses on their psychological attitude. The items surveyed through the study were eating, speaking, esthetics, maintenance, relationship, social life, employment, and overall dental health, and 61 of the questionnaires were answered and returned (64%). The participants used removable complete denture or partial denture before implant treatment, and the average period of using implant prostheses since implant treatment was 26 months (Grogono 1989).

Zitzmann et al. compared two or four implant overdentures with conventional complete denture in order to test which type of implant overdenture prostheses was more economic to edentulous patients. For comparison, 20 edentulous mandible patients who participated in the study were divided into 3 groups: implant-retained overdentures (two implants, IRET); implant-supported overdentures (four implants, ISUP); and complete dentures (control group, CDs). Cost effectiveness analysis was conducted through six months (Zitzmann 2005).

Siadat et al. conducted research to see whether patient's age, gender, and past prosthetic history were correlated with their satisfaction. Satisfaction was compared between complete denture in the edentulous state before implant treatment and implant-retained overdenture after implant treatment, and eight items were evaluated (comfort, hygiene, retention, appearance, speech, mastication, and overall satisfaction). In this

study, 55 male and female patients were surveyed about their general satisfaction with the use of implant prostheses (Siadat H 2008).

MacEntee et al. analyzed the economic cost and effect of implant prosthesis and conventional denture, and built a framework for the management of edentulous jaw. They compared the physiological and psychosocial costs and benefits of implant prosthesis and conventional denture in this framework (MacEntee MI 1998).

In the studies presented above, Timmerman et al., Cune et al., Grogono et al., and Zitzmann et al. reported that implant denture was more satisfactory because it gave higher satisfaction than conventional denture in general and in terms of pain reduction and chewing ability (Timmerman 2004; Cune 2006; Grogono 1989; Zitzmann 2005). In the same type of study, however, Siadat et al. and MacEntee et al. reported different results. That is, Siadat et al. reported that those who had used conventional denture preferred conventional denture to implant denture, and MacEntee et al. reported that satisfaction with implant denture was low due to cost, long period of making, maintenance and management, and aesthetic reasons (Siadat 2008; MacEntee 1998).

After all, these studies suggest that overall satisfaction with implant denture is high but there are things to be improved through exhaustive surveys of patients' satisfaction.

Pjetursson BE et. al conducted a survey on 104 patients who have been using implants for single crown or fixed partial dentures (FPDs) for the average of 10 years. They all received implant surgery from the Department of Periodontology and Fixed Prosthodontics at University Bern in Switzerland. Their average age was 59 and 214 implants were operated on them, with average lifetime length of 5 to 15 years. Patients

using single crown implant were 48% and the rest of them used implants from FPDs. Satisfaction level was divided into 5 grades (range: very satisfied to not at all satisfied) and was measured in 12 categories (function, comfort, phonetics, esthetics, oral hygiene, general satisfaction, costs, and preference for natural teeth or an implant-supported prosthesis). The results showed that most of 104 patients (>94%) responded "Very satisfied". Also, more than 2/3 of patients (72%) responded that they could not feel the difference between implant prosthesis and natural teeth. In particular, the patients showed the highest satisfaction in most basic function of implants--general function, chewing and comfort (97% very satisfied or satisfied). Also, when survival rate of implants for 10 years was measured, 93% of them were still maintaining normal functions. To the question "Are you going to recommend implant to other people?" 89% of the respondents said they would recommend it to acquaintances such as relatives and friends. In addition, even to the questions not related to cost, 87% of the patients responded that implant cost was reasonable, a result contrary to other researches. They also showed high level of satisfaction in oral hygiene (93%). Among them, 47% of them claimed that they have less bleeding in gingiva or mucoas around implants than in natural teeth when they brush their teeth. In conclusion, most of the patients who were using single or multiple implants over long a long period (from 5 to 15 years) felt satisfied about implants. Also, 94% of them were regularly visiting hospitals for implant check.

What is noticeable here is that, about 87% of the patients responded that the implant cost was reasonable. Given that university hospitals cost more than private hospital, it is an unexpected result. The research did not go into finding out the reasons why they thought the cost was reasonable. If a guess can be made, it could be that the

patients recognized the values for the cost because university dental clinics have various advantages over private clinics in terms of equipment, facility, brand awareness, reliability, services, etc. Based on this guess, private hospitals also should focus on finding ways to improve patient satisfaction so that they can receive fair return for quality services rather than seek low price to attract patients (Pjetursson BE, et al.,2005).

KIyak H.A. et al. conducted a survey on 39 patients who received implants in order to study psychological impacts osseointegrated dental implants have on patients. The research studied oral and psychological functioning problems as they use osseointegrated implants prostheses and extroversion, neuroticism, self-concept and body image patients experience during implant surgery. Participants were given 6 questionnaires from before phase 1 surgery to final recall appointment for the new prostheses. Final recall appointment was done from 12 to 18 months after phase 1 surgery. In the phase 1 surgery stage, the most common problem was related to eating. Interests on aesthetics were much less. After phase 2 surgery and implant prostheses are completed, all problems experienced during phase 1 surgery were revisited. The results show that there were significant improvements. Phase 1 surgery-related problems appeared much more negative than phase 2 surgery-related problems. Before receiving implant surgery, the biggest body image for almost all patients was negative vis-a-vis teeth. As patients used implant prostheses, there found significant improvements not only teeth but also on mouth, facial, and overall body image. Implant satisfaction scores increased with time. There is a need to find a way to reduce problems patients experience during phase 1 surgery stage according to the research results (Kiyak HA, et al.,1990).

Schropp L., et al. researched patient satisfaction on early vs. delayed placed dental implant. The goal of this research is to explore a patient's immediate response during implant surgical and prosthetic procedures and function, aesthetics and overall satisfaction about immediate single-tooth implant and delayed single-tooth implant. Single-tooth implant was planted in anterior or premolar region of 46 patients. 23 implants were planted using IM (Early immediate: IM: implant insertion within 10 days of tooth extraction) method and 23 implants were planted using DE (Delayed: implant insertion within 3 months of tooth extraction) method. Within 16~18 months of delivering IM implant restoration, questionnaires were collected from 41 patients. Analysis results showed that IM group's satisfaction on implant restoration was significantly higher than that of DE group. (96 vs 93; $p < 0.02$). There were no significant difference between both groups in terms of assessment of implant surgery procedure. While IM method implant surgery is complicated and difficult to operate, DE type implant surgery is simple. About 25% of patients experienced unpleasantness during prosthetic procedures and they pointed out impression taking as a reason. Implant prosthesis impression process goes through much more complex process compared to natural teeth prosthesis impression process. Use of abutment screw driver could cause discomfort to patients. Nevertheless, in this research most patients showed high satisfaction without significant unpleasantness in IM and DE implant treatment process. (Schropp L, et al., 2004).

Harle T.M. et al. conducted a survey study on 46 female patients in order to explore changes in mental, psychological and social state of patients who received implants. The research results show that the patients who have successfully received

implants and are using implant-retained prosthesis effectively every day show much better characteristics not only in eating but also oral mechanical ability and signs and symptoms compared to pre-implant stage. Also, implant patients showed a good tendency in communication, psychological functioning, self-care and role performance. In addition, they showed clinically important improvement in terms of physical, psychological functioning after implant therapy. It is often heard from old patients who received implant surgery that they feel much younger (Harle TJ, et al.,1993).

Maxillary anterior region is the area that is very difficult to apply implant treatment. Levi A., et al. studied the factors that influence patient satisfaction in maxillary anterior dental implant treatment. Five variables that are closely related to overall patient satisfaction--implant position, definitive restoration shape, appearance, effect on speech and chewing capacity--were surveyed. Among 123 people who received a questionnaire, only 78 responded. The conclusion was that practitioner responsible for implant treatment should consider multidimensional aspects related to patient satisfaction. In this research, aesthetics affect patient satisfaction the most in maxillary anterior implant prostheses. Aesthetics is a very subjective area. What is most important for both dentists and patients to achieve optimal results is communication. In particular, maxillary anterior region has treatment limitation in terms of aesthetics. In order to achieve the result a patient expects, there should be enough discussions on treatment limitation with a patient before implant restoration is provided. In conclusion, implant position, restoration shape, overall appearance, effect on speech, and chewing capacity in maxillary region is an important element that enhances patient satisfaction. However, obtaining understanding from a

patient for treatment limitation of maxillary region must first precede (Levi A, et al., 2003).

Narby B., et al. conducted a survey over 10 year period on a middle-aged and older Swedish population in order to find out changes in awareness of the public about implant treatment. First, in 1989, a questionnaire survey was conducted on three thousand residents of Orebro County, Sweden, to find out how much interest they have on implant-based prosthodontic treatment. The survey was conducted again on the same residents in 1999. 1665 subjects responded to both questionnaires. In the 1989 survey, only a few respondents expressed interest in implant treatment. However, in 1999, 92% of people who did not show interest in 1989 survey responded that they are interested in implant treatment. The barrier for those who had one or more teething missing or required implant treatment due to discomfort of complete dentures was the cost. The research shows that interest in implant treatment has increased significantly from 1989 to 1999. Increase in the number of implant providers and company brought about by dramatic change in public demand for implant treatment played an important role too. These providers and companies invested a significant amount of efforts in developing implants with superior quality and promoting them. Also, clinical researchers did a lot of work in developing surgical skills that are easier and can reduce pain for patients in shorter operation time. As a result, today, it has become possible to successfully implant bones that used to be difficult to implant in the early period. However, even now, in 2010, although the desire of patients for implant treatment has increased even more, they are still feeling the burden of cost (Narby B, et al., 2008).

Through the research as above Bartlett et al. reported that when the doctor recognized operation patient's perception and status, based on that, by increasing patient's satisfaction it was possible to induce them to continue to use clinic's medical service, and by being brought into close relationship with clinics, patients had a tendency to follow doctor's orders and prescriptions and be willing to participate into medication process and to publicize their clinics (Bartlett, et al., 1984). However, even though there have been over 10,000 papers published with regard to mechanisms and procedures of dental implant, the papers regarding how much the dental implant service was satisfactory to the patients are no more than 2% out of the dental implant related papers (Yoon-Young Heo et al., 2010).

2.6.2. RELATIONSHIP BETWEEN IMPLANT AND QUALITY OF LIFE

Packer et al. studied Parkinson's disease (PD) patients about how dental implant influenced their quality of oral health. They placed Astra-Tech implants in 9 PD patients and provided them with fixed or removable prostheses. The range of their ages was 54-77. The implants success rate among them was 85% in the maxilla and 81% in the mandible. The survey was conducted for 12 months from 3 months after the completion of implant prostheses (Packet 2009).

Cibirka et al. evaluated patients' prosthodontic rehabilitation while using complete denture before implant therapy and after implant therapy. They evaluated items related to the patients' subjective feelings such as function, comfort, esthetics, speech, self-image, and overall dental health. For this study, two scales on health-related quality

of life (HRQL) were developed to measure dental implant therapy. In this study, 26 patients received implant treatment for mandibular prosthesis and new maxillary denture. One dealing questionnaire asked about the patient's feeling with conventional complete denture before implant treatment, and the other one asked about the implant-treated patient's feeling after a year from the completion of prosthetic rehabilitation (Cibirka 1997).

Melas et al. surveyed 83 patients (The criteria for entering the study included the ability to speak English, age 18 years or over, and having dentures fabricated at St Bartholomew's and The Royal London School of Medicine and Dentistry during the past 10 years, but not in the last 6 months. There is no reference about rate of Men and Women) on how implant-stabilized overdentures influenced their daily living. The participants were classified according to gender, age of denture, and duration of edentulism, and were interviewed with a questionnaire about 'The Oral Impacts on Daily Performances' (Melas 2001).

Among the studies above, Packer et al. reported that dental implant was highly satisfactory in the patients' eating and overall satisfaction, and Cibirka et al. reported that dental implant was highly satisfactory in terms of comfort, esthetics, speech, self-image, and oral dental health. In particular, Melas et al. reported that patients felt comfortable in their daily living and less difficult in eating a wide range of food items (Packet 2009; Cibirka 1997; Melas 2001). These studies show that dental implant can improve the patients' quality of life markedly.

2.6.3 RELATIONSHIP BETWEEN PATIENTS' PSYCHOLOGICAL STATE AND SATISFACTION

Abu Hantash et al. studied psychological impact related to implant patients' oral health-related quality of life. For this study, they conducted a survey with 50 patients (22 men and 22 women, aged between 22 and 71 years, mean age 43.22 years) who were partially edentulous or in need of dental implant therapy (This article didn't have an enough trust. Because this article didn't explain about the tooth situation of patients detailed). Two questionnaires – The Dental Impact on Daily Living (DIDL) and the Neuroticism Extraversion Openness Five-Factor Inventory (NEO-FFI) – were used, one for a survey before implant treatment and the other for a survey in 2~3 months after the end of implant prosthodontic rehabilitation therapy (Abu Hantash 2006).

Schwartz-Arad et al. studied patients' stress that they had when they were given information about possible situations during the procedure in dental implant surgery setting. The participants of this study were 98 healthy patients who were planned to have implant surgery. Two different audio tapes containing adequate information about implant insertion were played to them just before implant surgery. Then, a questionnaire consisting of 21 questions was provided after the implant surgery (Schwartz-Arad 2007).

Sondell et al. experimented on how dentist-patient verbal communication dimensions affected patients' satisfaction. Patients and dentists were controlled according to age and gender, and satisfaction was measured in two ways: one for the single visit (satisfaction with care), and the other for the overall result (satisfaction with treatment outcome). Sixty-one participants of this study were assigned to 15 dentists. The mean

length of prosthesis treatment was 20 months, and the treatment process was monitored through inquiry. At the end of each session of treatment, the conversation between the patient and the dentist was recorded (Sondell 2002).

Abu Hantash et al. reported that patients' personality traits were closely correlated with their satisfaction, and Schwartz-Arad et al. and Sondell et al. reported that communication between the patient and the dentist at implant surgery had a significant effect on the patient's stress and satisfaction. These studies show that patients' satisfaction is related to their individual psychological state, and that attention should be paid not only to treatment but also to appropriate communication with patients according to their psychological state (Abu Hantash 2006; Schwartz-Arad 2007; Sondell 2002).

2.6.4 RELATIONSHIP BETWEEN HEALTH EDUCATION AND SATISFACTION WITH IMPLANT

Seon-jeong Moon et al. surveyed the relationship between dental implant patients' oral hygiene management behavior and their satisfaction. The survey was conducted from January 7 to June 30 in 2014, and collected data were analyzed using SAS (ver 9.2). The participants of the survey were implant patients at six dental hospitals and clinics in Daegu, Busan, and Jinju, and 266 questionnaires were analyzed as valid data. The questionnaire used in the study consisted of 6 questions on the subject's general characteristics, 3 on the use of dental implant prosthesis, 3 on how to manage dental implant prosthesis, 4 on follow-up behavior, 3 on the use of oral hygiene supplies, 5 on discomfort from the use of prosthesis using a 5-point Likert scale, and 12 on satisfaction

with the use of prosthesis. In the 5-point Likert scale, the lowest point was 1 and the highest one was 5. In addition, research assistants given prior education by the researcher interviewed the participants individually (Seon-jeong Moon 2015).

Ji-hyeon Jeon et al. studied implant patients' maintenance and management behavior according to their experience in tooth brushing education.

They sampled through random sampling 250 implant patients who visited one of four dental clinics in the Daejeon area during the period from April 1 to October 1, 2012, and surveyed them using a self-report questionnaire about general characteristics (gender, age, occupation, academic qualification, income, marital status, reason for dental extraction, and operative procedure), experience in tooth brushing education, and implant tooth follow-up (Ji-hyeon Jeon 2013). Seon-jeong Moon et al. and Ji-hyeon Jeon et al. reported that patients' adequate education about oral hygiene management including prosthesis management increased the implant survival rate, which, in turn, raised the patients' satisfaction.

Moreover, Crews et al. pointed out that dentists should encourage their patients to quit smoking for a higher success rate of dental implant. This shows that adequate health education on oral management can improve not only the implant survival rate but also the patients' satisfaction (Seon-jeong Moon 2015; Ji-hyeon Jeon 2013; Crews 1999).

2.6.5 RELATIONSHIP BETWEEN SATISFACTION WITH IMPLANT AND DENTAL SERVICE MANAGEMENT

Hye-jeong Lee et al. conducted “A Study on Implant Treatment Patients’ Satisfaction with Dental Care Services.” With 107 patients who had received implant treatment, they conducted a questionnaire survey about their age, occupation, income, duration of treatment, period after treatment, reason for visit, use of dental care facilities, etc. (Hye-jeong Lee 2005).

Ji-hyeon Jeon et al. studied the relationship between dental implant patients’ satisfaction with the quality of medical service, value satisfaction, and intention to reuse. The survey was conducted with 320 implant patients who visited one of four dental clinics in the Daejeon area for about 4 months from December 2013 to March 2014, and the subjects were sampled at random by the surveyor and they answered a self-report questionnaire, which asked 19 questions on the quality of medical service and about intention to reuse (Ji-hyeon Jeon 2004).

Min-sook Cho et al. analyzed factors influencing dental implant patients’ satisfaction and intention to reuse using a structural equation model. They surveyed 250 patients who received implant treatment at one of six dental hospitals and clinics in Busan, Changwon, and Gimhae during the period from July 1 to July 30, 2012, and used 209 of them as valid data. The questionnaire consisted of questions on dentist’s technical expertise, paramedical staff’s technical expertise, reasonableness of medical fee, convenience of procedure, patient’s satisfaction, and intention to reuse. Each question

was answered on a 5-point scale from 'Not at all' (1) to 'Absolutely yes' (5), and a total of 35 questions were asked (Min-sook Cho 2013).

Both Ji-hyeon Jeon et al. and Min-sook Cho et al. reported that dentist's expertise, specialized equipment, etc. had a significant effect on satisfaction with implant and reuse, and were closely correlated with the quality of medical service (Ji-hyeon Jeon 2004; Min-sook Cho 2013). This is significantly related with the report of Hye-jeong Lee et al. that patients' selection of implant treatment hospital was determined more by acquaintances' recommendation (56%) than by advertisement (1.9%) (Hye-jeong Lee 2005). Because patients' selection of implant dental hospital was largely made by acquaintance who experienced high-quality medical services, the intention to reuse implant by patients whose satisfaction is high influences new patients' intention to use implant. From this, we may infer that implant patient's satisfaction may have a high effect on dental service management.

CHAPTER 3

METHODOLOGY

3.1 OBJECTIVE

The purpose of this study was to identify approaches to improve satisfaction of patients receiving dental implants, and help hospital management to provide added value for their dental implant services. Thus, this study aimed to identify perception and status of patients who visit dental clinics and hospitals in Seoul by modifying and supplementing the survey questionnaires in use for previous studies and to do the research on methods of providing a more improved medical service by analyzing factors affecting patient's satisfaction.

The specific goals of this study were as follows: first, to evaluate the characteristics of patients who experienced dental implant therapy compared with patients who did not. Second, to investigate the overall and specific satisfaction level of dental implant therapy in patients who visited dental hospital and clinics in Seoul, Korea. Last, to analyze differences on perception of dental implant cost and influenced factors to choose a dentist between implant experience and non-experience patients who visited dental hospital and clinics in Seoul, Korea.

3.2 SUBJECTS

The subjects of this study were 200 consenting patients who were sampled at random from 6 dental hospitals and clinics in Seoul throughout over three months from April to June in 2017. The participants were divided into those who had experienced implant treatment in the past and those who experience implant treatment for the first time, and differences between the two groups were examined for their satisfaction with implants, their recognition of implants, and their satisfaction with the dental hospital where they have received treatment.

3.3 TOOLS

This study was conducted through a questionnaire survey. For the survey, the researcher visited each of the selected dental hospitals and clinics in person, and conduct personal interviews with the participants. In each interview, the researcher filled the questionnaire based on the participant's answers. The questionnaires used to assess the implant patients' satisfaction with implants, recognition of implants, and satisfaction with the dental hospital where they have received treatment.

In order to design the questionnaires for this study, questionnaires used in previous studies on satisfaction with implants, motives for implant treatments, and the future of implants, etc. were collected. They were analyzed and revised partially, and based on them, questionnaires were designed for this study.

3.4 CONTENTS

Two types of questionnaire were used in this study, one for patients who have experienced implant treatment in the past, and the other for those who experience implant treatment for the first time.

Both of the two questionnaires asked demographic characteristics such as gender, year of birth, household income, joy category, area of residence, and whether to smoke and the level of smoking. In addition, they asked treatment-related details such as whether to have a favorite dental hospital or clinic, reasons for choosing a dental hospital or clinic for treatment, recent history of dental visits, and satisfaction with the dental hospital or clinic that they have visited now.

In addition to these common questions, the questionnaire for patients who have experienced implant treatment in the past asked about their satisfaction with implant treatment. Specifically, thus, it contained questions on the time of implant treatment, the number of implants, evaluation of implant treatment that they have received, changes made by implant treatment, dissatisfaction with the implant treatment that they have received, cost of implant treatment, understanding of implant treatment and follow-up management, etc.

The questionnaire for patients who experience implant treatment for the first time asked about their opinions on implants. Specifically, thus, it contained questions on whether they have experienced implant-related consultation, reasons for hesitation when implant treatment was recommended, and their opinions on the life and cost of implants, etc.

3.5 ANALYSIS METHODS

Data collected as above were analyzed using SPSS 21.0 (SPSS Inc., Chicago, IL, USA) with regard to differences between patients with previous experiences in implants and those without, differences among those with previous experiences, and differences among those without. Independent t-test was used to compare the mean of two groups and chi square test was conducted to analyze the difference in categorical variables. Statistical significance was determined to be statistically significant when p value was less than 0.05.

CHAPTER 4

RESULTS

4.1 DESCRIPTIVE RESULTS

Descriptive characteristics of patients who participated in survey were summarized in Table 4.1. The study sample included 186 survey respondents. Patients who have experienced implant treatment were 86 (46.2%) and patients who have no implant treatment were 100 (53.8%).

Among 186 patients who participated in survey, 43.5% were male. Among 86 patients who have experienced implant treatment, 58.1% were male. However, 31.0% of patients without implant treatment were male. There were statistically significant differences in sex distribution between patients with dental implant treatment and patients without dental implant treatment ($p < 0.001$). The proportion of men who underwent dental implant surgery is significantly higher than that of women. It would be explained by the difference in smoking rates between men and women in Korea. The rate of male smokers in Korea is the second highest in OECD countries and the second lowest in women (OECD report, 2006). The oral hygiene condition of a man could be in a worse environment than a woman, and the frequency of extraction due to periodontal disease is relatively high (Kocher et al. 2005).

The average age of the survey respondents was 50.2 ± 15.1 . The average age of patients who have experienced implant treatment and without implant treatment were 57.8 ± 14.9 and 43.7 ± 11.9 , respectively. There was a significant difference in average age between patients with dental implant treatment and patients without dental implant treatment ($p < 0.001$).

Over 50% of patients with dental implant treatment were over 60 years old whereas 47% of patients without dental implant treatment were less than 40 years old.

Four groups were generated according to yearly family income and there was no significant difference in income between patients with dental implant treatment and patients without dental implant treatment ($p = 0.423$). Patients who participated in survey were office worker (13.2%), technician (8.2%), professional occupation (24.7%), public servant (4.4%), service occupation (13.2%), self-employed (4.9%), and homemaker (16.5%). There was no difference in job between patients with dental implant treatment and patients without dental implant treatment ($p = 0.050$). Region where patients live were Seoul (71.9%), Gyeonggi (21.1%), and other (7.0%). There was no difference in region between patients with dental implant treatment and patients without dental implant treatment ($p = 0.694$). In terms of smoking, 72.5% of participants were none smoker. Patients who smoke 1-5, 6-20, over 20 cigarettes per day were 7.1%, 15.9%, and 4.4%, respectively. There was no difference in cigarettes per day between patients with dental implant treatment and patients without dental implant treatment ($p = 0.205$).

4.2 QUESTIONS REGARDING THE USE OF DENTAL SERVICES

Table 4.2 summarized the use of dental services of patients who participated in survey. Of 186 respondents, 72.6% of survey respondents had a regular dentist. Eighty percent of patients who have experienced dental implant and 66% of patients without dental implant had a regular dentist. This was not statistically different. Patients without dental implant treatment were more likely to recently visit dentists than patients with dental implant. More non-experienced patients visited the dentist within 1 year compared with patients with dental implant.

The patients with dental implant answered positively to the question of whether to keep a current dentist. Over 50% of patients with dental implant answered ‘absolutely’ whereas 28.3% of patients without dental implant answered ‘absolutely’.

The routes first learned about dental implant treatment were appeared in the order of mass media (47.6%), from dentist during dental treatment (29.7%), recommendation of others (14.6%), internet search (4.9%), and others (3.2%). There were statistically significant differences in the routes first learned about dental implant treatment between patients with dental implant treatment and patients without dental implant treatment ($p < 0.001$). The majority of patients with dental implant treatment (42.4%) answered ‘from dentist during dental treatment’, however the majority of patients without dental implant treatment (62.0%) answered that they first learned about dental implant from ‘mass media’.

Of the patients who received implant treatment, 26 (30.6%) were the first to learn about dental implants via mass media. Looking at the characteristics of these patients, 17

(65.4%) were male and 9 (34.6%) were female. In addition, their age distribution was that less than 40 were 7 (26.9%), 40s were 5 (19.2%), 50s were 6 (23.1%) and over 60 years old were 8 (30.8%). Among the patients without implant treatment, 62 (62.0%) were the first to learn about dental implants via mass media. The characteristics of these patients in detail were shown that 18 (29.0%) were men and 44 (71.0%) were women. In addition, their age distribution was that less than 40 were 38 (61.3%), 40s were 12 (19.4%), 50s were 8 (12.9%), and over 60 years old were 4 (6.5%).

The reason to hesitate the most in making the decision to undergo dental implant surgery was shown in the order of financial matters (51.9%), fear of surgery (20.2%), lack of confidence in implant (17.5%), and never hesitated (10.4%). About 12% of patients with dental implant answered 'lack of confidence in implant' whereas 22.2% of patients without dental implant answered 'lack of confidence in implant'. The percentage who answered 'never hesitated' was higher in patients with dental implant (15.5%) compared with that of patients without dental implant (6.1%).

4.3 THE MOST INFLUENCED FACTORS TO CHOOSE A DENTIST OR DENTAL CLINIC

In order to investigate the most important factors to choose a dentist, multiple response analysis was performed (Table 4.3). When patients choose a dentist or dental clinic, they answered to consider factors in the following order; career and experience of dentist, introduction of acquaintances, regular dentist, proximity to home, moderate dental treatment cost, convenience of traffic and parking, advertisements or internet

searching, and others. There was no difference in the rank of important factors to choose a dentist or dental clinic between patients with dental implant and patients without dental implant.

Table 4.1 Patient characteristics

		Total (N=186)	With dental implant (N=86)	Without dental implant (N=100)	P
Sex	Male	81 (43.5%)	50 (58.1%)	31 (31.0%)	<0.001
	Female	105 (56.5%)	36 (41.9%)	69 (69.0%)	
Age (year, mean±S.D)		50.2 ± 15.1	57.8 ± 14.9	43.7 ± 11.9	<0.001
Age group	Less than 40	64 (34.4%)	17 (19.8%)	47 (47.0%)	<0.001
	40~49	32 (17.2%)	8 (9.3%)	24 (24.0%)	
	50~59	34 (18.3%)	17 (19.8%)	17 (17.0%)	
	Over 60	56 (30.1%)	44 (51.2%)	12 (12.0%)	
Income	Less than KRW 30 million	79 (45.1%)	35 (43.2%)	44 (46.8%)	0.423
	KRW 30~50 million	45 (25.7%)	23 (28.4%)	22 (23.4%)	
	KRW 50~70 million	32 (18.3%)	17 (21.0%)	15 (16.0%)	
	over KRW 70 million	19 (10.9%)	6 (7.4%)	13 (13.8%)	
Job	Office worker	24 (13.2%)	10 (12.2%)	14 (14.0%)	0.050
	Technician	15 (8.2%)	7 (8.5%)	8 (8.0%)	
	Professional occupation	45 (24.7%)	16 (19.5%)	29 (29.0%)	
	Public servant	8 (4.4%)	5 (6.1%)	3 (3.0%)	
	Service occupation	24 (13.2%)	6 (7.3%)	18 (18.0%)	
	Self-employed	9 (4.9%)	7 (8.5%)	2 (2.0%)	
	Homemaker	30 (16.5%)	14 (17.1%)	16 (16.0%)	
	Others	27 (14.8%)	17 (20.7%)	10 (10.0%)	
Region	Seoul	133 (71.9%)	62 (72.9%)	71 (71.0%)	0.694
	Gyeonggi	39 (21.1%)	16 (18.8%)	23 (23.0%)	
	Others region	13 (7.0%)	7 (8.2%)	6 (6.0%)	
Smoking per day	None	132 (72.5%)	56 (68.3%)	76 (76.0%)	0.205
	1~5 cigarettes	13 (7.1%)	4 (4.9%)	9 (9.0%)	
	6~20 cigarettes	29 (15.9%)	17 (20.7%)	12 (12.0%)	
	Over 20 cigarettes	8 (4.4%)	5 (6.1%)	3 (3.0%)	

Table 4.2 Questions regarding the use of dental services

	Total (N=186)	With dental implant (N=86)	Without dental implant (N=100)	p
A regular dentist				
Yes	130 (72.6%)	64 (80.0%)	66 (66.7%)	0.069
No	49 (27.4%)	16 (20.0%)	33 (33.3%)	
Last visit to a dentist				
Less than 6 months ago	123 (67.2%)	49 (59.0%)	74 (74.0%)	0.011
6 months to 1 year ago	29 (15.8%)	19 (22.9%)	10 (10.0%)	
1~3 years ago	21 (11.5%)	13 (15.7%)	8 (8.0%)	
More than 3 years ago	10 (5.5%)	2 (2.4%)	8 (8.0%)	
Willingness to keep a current dentist				
Absolutely	71 (39.0%)	43 (51.8%)	28 (28.3%)	
Yes, if possible	91 (50.0%)	34 (41.0%)	57 (57.6%)	
I am not sure	20 (11.0%)	6 (7.2%)	14 (14.1%)	
Probably not	0 (0.0%)	0 (0.0%)	0 (0.0%)	
Never	0 (0.0%)	0 (0.0%)	0 (0.0%)	
First learn about dental implants				
Mass media	88 (47.6%)	26 (30.6%)	62 (62.0%)	<0.001
Internet search	9 (4.9%)	2 (2.4%)	7 (7.0%)	
Recommendation of others	27 (14.6%)	19 (22.4%)	8 (8.0%)	
From dentist during dental treatment	55 (29.7%)	36 (42.4%)	19 (19.0%)	
Others	6 (3.2%)	2 (2.4%)	4 (4.0%)	
Hesitate the most in making the decision to undergo dental implant surgery				
Financial matters	95 (51.9%)	46 (54.8%)	49 (49.5%)	
Fear of surgery	37 (20.2%)	15 (17.9%)	22 (22.2%)	
Lack of confidence in implant	32 (17.5%)	10 (11.9%)	22 (22.2%)	
I never hesitated	19 (10.4%)	13 (15.5%)	6 (6.1%)	
Others	0 (0.0%)	0 (0.0%)	0 (0.0%)	

Table 4.3. Questions regarding the most influenced factors to choose a dentist or dental clinic

	Total (N=186)				With dental implant (N=86)				Without dental implant (N=100)			
	1st	2nd	3rd	Scores (rank)	1st	2nd	3rd	Scores (rank)	1st	2nd	3rd	Scores (rank)
Career and experience of dentist	74	35	24	316 (1)	3 3	14	11	138 (1)	41	21	13	178 (1)
Introduction of acquaintances	51	39	11	242 (2)	2 6	13	5	109 (2)	25	26	6	133 (2)
Advertisements or Internet searching	1	4	6	17 (7)	0	1	3	5 (7)	1	3	3	12 (7)
Regular dentist	34	39	27	207 (3)	1 6	21	13	103 (3)	18	18	14	104 (3)
Proximity to home	15	23	32	123 (4)	3	11	16	47 (4)	12	12	16	76 (4)
Moderate dental treatment cost	6	20	45	103 (5)	3	8	17	42 (5)	3	12	28	61 (5)
Convenience of traffic and parking	1	10	21	44 (6)	1	6	7	22 (6)	0	4	14	22 (6)
Others	1	0	2	5 (8)	1	0	1	4 (8)	0	0	1	1 (8)

4.4 THE REASONS TO KEEP CURRENT DENTIST OR DENTAL CLINIC

Multiple response analysis was performed to investigate the reasons to stick to current dentist or dental clinic (Table 4.4). Patients selected the reasons to maintain the current dentist or dental clinic in the following order; because I trust the dentist, because it is my regular dental clinic, because of kind staff, because of proximity to home, because I am afraid of visiting other dental clinics, because of moderate dental treatment cost, because I like the dental facilities, and because I like the parking facilities. Two groups, patients with and without dental implant, showed similar pattern with total patients.

4.5 THE REASONS NOT TO KEEP CURRENT DENTIST OR DENTAL CLINIC

Multiple response analysis was conducted to examine the reasons not to stick to current dentist or dental clinic (Table 4.5). Patients chose the reasons not to maintain the current dentist or dental clinic in the following order; because I don't trust the dentist, because of high dental treatment cost, because of great distance, because of unkind staff, because of old dental facilities, and others. There was no major difference in the rank of reasons not to maintain the current dentist between two groups, patients with and without dental implant. Therefore, trust in the dentist and costs of treatment were critical factors to make a decision not to use current dentist or dental clinic.

Table 4.4 Questions regarding the reasons to keep current dentist or dental clinic

	Total (N=186)				With dental implant (N=86)				Without dental implant (N=100)			
	1st	2nd	3rd	Scores (rank)	1st	2nd	3rd	Scores (rank)	1st	2nd	3rd	Scores (rank)
Because I trust the dentist	122	27	14	434 (1)	58	12	4	202 (1)	64	15	10	232 (1)
Because it is my regular dental clinic	27	46	37	210 (2)	13	25	19	108 (2)	14	21	18	102 (2)
Because of kind staff	11	57	35	182 (3)	4	25	24	86 (3)	7	32	11	96 (3)
Because I like the dental facilities	1	6	17	32 (7)	1	0	7	10 (7)	0	6	10	22 (7)
Because I am afraid of visiting other dental clinics	5	7	18	47 (5)	1	4	8	19 (6)	4	3	10	28 (6)
Because of proximity to home	11	16	27	92 (4)	4	5	8	30 (4)	7	11	19	62 (4)
Because of moderate dental treatment cost	4	10	12	44 (6)	2	6	3	21 (5)	2	4	9	23 (5)
Because I like the parking facilities	0	2	7	11 (8)	0	1	3	5 (8)	0	1	4	6 (8)

Table 4.5 The reasons not to keep current dentist or dental clinic

	Total (N=186)				With dental implant (N=86)				Without dental implant (N=100)			
	1st	2nd	3rd	Scores (rank)	1st	2nd	3rd	Scores (rank)	1st	2nd	3rd	Scores (rank)
Because I don't trust the dentist	60	12	15	219 (1)	25	4	6	89 (1)	35	8	9	130 (1)
Because of unkind staff	3	24	16	73 (4)	1	7	4	21 (4)	2	17	12	52 (4)
Because of old dental facilities	8	9	13	55 (5)	1	3	4	13 (6)	7	6	9	42 (5)
Because of great distance	14	26	24	118 (3)	6	12	13	55 (3)	8	14	11	63 (3)
Because of high dental treatment cost	22	22	22	132 (2)	12	11	9	67 (2)	10	11	13	65 (2)
Others	7	3	4	31 (6)	3	2	2	15 (5)	4	1	2	16 (6)

4.6 CRITERIA TO CHOOSE A DENTIST/DENTAL CLINIC FOR DENTAL IMPLANT SURGERY

To investigate the important factors to choose a dentist/dental clinic for dental implant surgery, multiple response analysis was used (Table 4.6). When patients select a dentist/dental clinic for dental implant surgery, they answered to consider factors in the following order; dentist's career and implant surgery experience, cost of dental implant, referral by acquaintance or neighbor, regular dental clinic/dentist, convenient location and parking, dentist's educational background, dental clinic facilities, and others. There

was no considerable difference in the rank of criteria to choose a dentist/dental clinic for dental implant surgery between two groups, patients with and without dental implant. Therefore, dentist's career and implant surgery experience and costs of dental implant were important factors when patients select a dentist/dental clinic for dental implant surgery.

Table 4.6 Criteria to choose a dentist/dental clinic for dental implant surgery

	Total (N=186)				With dental implant (N=86)				Without dental implant (N=100)			
	1 st	2 nd	3 rd	Scores (rank)	1 st	2 nd d	3 rd	Scores (rank)	1 st	2 nd	3 rd	Scores (rank)
Dentist's educational background	11	10	8	61 (6)	7	2	5	30 (6)	4	8	3	31 (6)
Dentist's career and implant surgery experience	11 3	34	15	422 (1)	43	22	7	180 (1)	70	12	8	242 (1)
Convenient location and parking	6	12	24	66 (5)	4	7	14	40 (5)	2	5	10	26 (5)
Referral by acquaintance or neighbor	18	38	17	147 (3)	11	14	8	69 (3)	7	24	9	78 (3)
Cost of dental implant	18	54	47	209 (2)	8	18	18	78 (2)	10	36	29	131 (2)
Dental clinic facilities	1	9	32	53 (7)	1	3	13	22 (7)	0	6	19	31 (6)
Regular dental clinic/dentist	17	17	27	112 (4)	10	12	10	64 (4)	7	5	17	48 (4)
Others	0	0	1	1 (8)	0	0	1	1 (8)	0	0	0	0 (8)

4.7 QUESTIONS ABOUT EXPERIENCE OF DENTAL IMPLANT TREATMENT

Patients who experience dental implant treatment were asked about their experience of dental implant (Table 4.7). Twenty nine percent of patients with dental implant answered that they underwent the surgery less than 6 months, 34.5% of patients answered within 6 to 12 months, 22.6% of patients answered within 1-3 years, 9.5% of patients answered within 3-5 years, and 4.8% of patients answered that they underwent the surgery over 5 years ago.

Patients who experience dental implant treatment were asked the number of dental implants they had. Over 30% of patients with dental implant answered they had one dental implant and 26% of patients with dental implant answered they had two dental implant. The greatest number of people (43.5%) answered they had 3 and more dental implant.

Patients who experience dental implant treatment were asked where they got dental implant surgery. Over 60% of patients answered that they got dental implant surgery at dental implant clinic and 33.3% of patients said that they got dental implant surgery at dentist in their neighborhood.

Patients who experience dental implant treatment were asked where they want to get the dental implant surgery next time. Over 70% of patients answered that they want to get dental implant surgery at dental implant clinic for the next time and 25.0% of patients said that they want to get dental implant surgery at dentist in their neighborhood for the next time.

Table 4.7 Experience of dental implant treatment

	N (%)
When did you undergo dental implant surgery?	
- I underwent the surgery less than 6 months(still)	24 (28.6%)
- 6~12 months ago	29 (34.5%)
- 1~3 years ago	19 (22.6%)
- 3~5 years ago	8 (9.5%)
- Over 5 years ago	4 (4.8%)
How many dental implants did you get?	
- 1	26 (30.6%)
- 2	22 (25.9%)
- 3 or more	37 (43.5%)
Where did you get the dental implant surgery?	
- Dental implant clinic	51 (60.7%)
- Dentist in my neighborhood	28 (33.3%)
- University hospital	1 (1.2%)
- General hospital	1 (1.2%)
- Others	3 (3.6%)
Where do you want to get the dental implant surgery next time?	
- Dental implant clinic	59 (70.2%)
- Dentist in my neighborhood	21 (25.0%)
- University hospital	0 (0.0%)
- General hospital	1 (1.2%)
- Others	3 (3.6%)

Patients who experience dental implant treatment were asked about treatment duration of dental implant. Less than 7% of patients answered that their treatment was

done less than 3 months. The most people (51.4%) answered that their treatment was done between three and six months. Twenty-two percent of patients answered that it took more than nine months.

Next, patients with dental implant were asked about their impression of the total time taken for dental implants. About 20% of patients answered that treatment duration was met their expectation. However, about 50% of patients with dental implant answered that treatment duration was long (too long, 14.6%; long, 32.9%).

Patients with dental implant were asked about information they heard before implant treatment. Fifty-seven percent of patients answered that they got explanation about name of brand. Seven percent of patients were received the explanation of type of material to be added. Over fifteen percent of patients were given the explanation of expected side effects and post-operative recovery period. Projected life of the dental implant was explained to about 17% of patients.

Patients with dental implant were also asked whether they have a good understanding of the explanation about the follow-up maintenance required for a dental implant. About 97% of patients with dental implant answered that they understood the need of follow-up maintenance.

Cost of dental implant was investigated. Fifty-six percent of patients with dental implant paid from KRW 2 million to 4 million for dental implant. About 30% of patients answered that they paid over KRW 8.01 million for dental implant.

Table 4.7 Experience of dental implant treatment (continued)

	N (%)
Treatment duration of the dental implant	
- less than 3 months	5 (6.8%)
- 3~6 months	38 (51.4%)
- 6~9 months	15 (20.3%)
- more than 9 months	16 (21.6%)
Impression of the total time taken for dental implants	
- Too long	12 (14.6%)
- Long	27 (32.9%)
- Moderate	25 (30.5%)
- Meets my expectation	17 (20.7%)
- Exceeds my expectation	1 (1.2%)
Were you given any explanation about the following topics by a medical organization prior to the dental implant surgery?	
- Name of brand	41 (57.7%)
- Type of material to be added	5 (7.0%)
- Expected side effects and post-operative recovery period	11 (15.5%)
- Letter of consent before the surgery	2 (2.8%)
- Projected life of the dental implant	12 (16.9%)
Do you have a good understanding of the explanation about the follow-up maintenance required for a dental implant?	
- I understand clearly	14 (18.2%)
- I understand most things	36 (46.8%)
- I understand some things	25 (32.5%)
- I do not have a clear understanding	2 (2.6%)
- I do not understand anything	0 (0.0%)
How much did you spend on dental implant?	
- less than KRW 2 million	19 (23.8%)
- KRW 2.01~4 million	26 (32.5%)
- KRW 4.01~6 million	7 (8.8%)
- KRW 6.01~8 million	5 (6.2%)
- Over KRW 8.01 million	23 (28.8%)

4.8 SATISFACTION OF DENTAL IMPLANT TREATMENT

Satisfaction of dental implant treatment was examined in patients who experience dental implant treatment (Table 4.8). Patients were asked about their overall satisfaction of dental implant treatment. Over 90% of patients with dental implant answered that they are satisfied on dental implant treatment (very satisfied, 50.0%; satisfied, 42.9%).

Comparisons of overall satisfaction of dental implant treatment by between age groups and gender were shown in Table 4.9. There was no significant difference in the satisfaction level between the groups of 50 and over ($p=0.478$). There was no significant difference in overall satisfaction of dental implant treatment according to gender ($p=0.352$).

In order to investigate the satisfaction of the implants, the degree of satisfaction with the items was also examined. About 73% of patients with implant treatment replied that their chewing function was improved (improved very much, 47.3%; improved slightly, 25.7%). Twenty-three percent of patients with implant surgery answered that they do not recognize changes in their chewing function. About 4% of patients with implant surgery answered that their chewing ability decreased after implant treatment.

About 50% of patients with implant treatment replied that social activities and interpersonal relationship were improved (improved very much, 32.0%; improved slightly, 17.3%). Forty-nine percent of patients with implant surgery answered that they do not recognize changes in social activities and interpersonal relationship. About 1% of patients with implant surgery answered that their social activities and interpersonal relationship were worsen after implant treatment.

In terms of psychological stability, about 64% of patients with implant treatment positively answered (improved very much, 46.7%; improved slightly, 17.3%). Thirty-three percent of patients with implant surgery answered that their psychological stability was not changed by dental implant surgery. About 3% of patients with implant surgery answered that their psychological stability was worsen after implant treatment.

Majority of patient with implant treatment (58.9%) answered that there is no changes in their pronunciation. About 40% of patients with implant treatment noticed positive changes on pronunciation (improved very much, 26.0%; improved slightly, 13.7%). Only 1% of patients with implant surgery answered that their pronunciation was worsen after implant treatment.

4.9 AWARENESS OF IMPLANT LIFETIME AND COST

Patients were asked about the durability of implants and the appropriate prices. The results are shown in Table 4.10. Patients had various opinions about implant life. About 20% of patients answered that they expect about 10 years lifetime of dental implant. Seventeen percent of patient expected that dental implants last permanently. There were 22.5% of patients who were not sure about the durability of implants. There was no difference in the perceived sustainability of dental implant between patients with dental implant and patients without dental implant. Less percentage of patients with dental implant treatment (12.3%) expected permanent lifetime of dental implant than that of patients without dental implant (21.6%).

In terms of the optimal cost of implant treatment, most patients (76.1%) answered that they were more expensive than expected, and only one said that they were cheaper

than expected. Percentage of patients who answered that the price of implant treatment was reasonable was different between two groups, 14.6% of the people who received the implant treatment and only 7.1% of those who did not receive the implant treatment answered that the price was reasonable.

Patients were asked about the reasonable cost of domestic implant for dental implant surgery. About 60% of patients answered that the reasonable price was less than KRW 1 million, 18.9% answered from KRW 1 million to KRW 1.2 million, 17.2% answered from KRW 1.2 million to KRW 1.5 million, and 5.9% answered from KRW 1.5 million to KRW 2.0 million. There was no major difference in reasonable cost for dental implant surgery using domestic implant between two groups, patients with and without dental implant.

Similarly, patients were asked about the reasonable cost of imported implant for dental implant surgery. Sixty-three percent of patients answered that the reasonable price was less than KRW 1.8 million, 21.5% answered from KRW 1.8 million to KRW 2.0 million, 9.7% answered from KRW 2.0 million to KRW 2.3 million, and 5.4% answered from KRW 2.3 million to KRW 2.5 million. Patient with/without dental implant treatment had similar answers for the reasonable cost for dental implant surgery using imported implant.

4.10 QUESTIONS THAT WERE GIVEN TO PATIENTS WITHOUT DENTAL IMPLANT TREATMENT

Patients without dental implant were asked whether they ever consulted a dentist about undergoing implant surgery (Table 4.11). About 25% of patients without dental implant answered that they had consulted about undergoing implant surgery.

The cost of dental implant was asked to patients without dental implant. The largest number of patients without dental implant (45.4%) answered between KRW 1.5 and 2 million. Over 30% of patients without dental implant answered between KRW 1 and 1.5 million.

Patients without dental implant were asked whether they quit smoking if you undergo dental implant surgery. About a half of smokers replied that they will quit or cut down on the number of cigarettes.

4.11 COMPARISON OF SATISFACTION AND COST OF DENTAL IMPLANT SURGERY BEFORE AND AFTER 2014

Since 2014, the national health insurance service has started to provide support for dental implants for 65 years of age or older. In order to compare satisfaction with this support, the satisfaction level of patients who visited the dentist before and after 2014 and the cost of implant were compared (Table 4.12). As a result, there were two patients who visited the dentist since 2014. There was no significant difference in satisfaction before and after 2014 ($p = 0.341$). Implant costs were also not significantly different between dental visits before and after 2014 ($p = 0.241$).

Table 4.8 Satisfaction of dental implant treatment

		N (%)
Overall satisfaction of dental implant treatment	- Very satisfied	42 (50.0%)
	- Satisfied	36 (42.9%)
	- Just ok	6 (7.1%)
	- Slightly regret	0 (0.0%)
	- Greatly regret	0 (0.0%)
Changes in chewing function	- Worse than before	3 (4.1%)
	- No particular difference	17 (23.0%)
	- Improved slightly	19 (25.7%)
Effect on social activities and interpersonal relationship	- Improved very much	35 (47.3%)
	- Worse than before	1 (1.3%)
	- No particular difference	37 (49.3%)
	- Improved slightly	13 (17.3%)
Psychological stability	- Improved very much	24 (32.0%)
	- Worse than before	2 (2.7%)
	- No particular difference	25 (33.3%)
	- Improved slightly	13 (17.3%)
Pronunciation (speech)	- Improved very much	35 (46.7%)
	- Worse than before	1 (1.4%)
	- No particular difference	43 (58.9%)
	- Improved slightly	10 (13.7%)
Impressed changes after dental implant surgery	- Improved very much	19 (26.0%)
	- Chewing power improved	56 (74.7%)
	- Feel more stable psychologically	13 (17.3%)
	- Pronounce words more comfortably	0 (0.0%)
	- More confident in my social activities/relationships	5 (6.7%)
The greatest disappointment with the dental implant surgery	- Others	1 (1.3%)
	- Cost of implant	42 (63.6%)
	- Side effects of surgery	2 (3.0%)
	- Dislocation of dental prosthesis	2 (3.0%)
	- Maintenance	15 (22.7%)
- Others	5 (7.6%)	

Table 4.9 Satisfaction of dental implant treatment by age group and gender

		Overall satisfaction of dental implant treatment			
		Very satisfied	Satisfied	Just ok	Total
Age group	Less than 50	11 (45.8%)	10 (41.7%)	3 (12.5%)	24 (100%)
	Over 50	31 (51.7%)	26 (43.3%)	3 (5%)	60 (100%)
Gender	Male	22 (45.8%)	21 (43.8%)	5 (10.4%)	48 (100%)
	Female	20 (55.6%)	15 (41.7%)	1 (2.8%)	36 (100%)

Table 4.10 Awareness of implant lifetime and cost

	Total	With dental implant	Without dental implant	p
	(N=186)	(N=86)	(N=100)	
Perceived sustainability of dental implant				0.489
- About 10 years	38 (21.3%)	19 (23.5%)	19 (19.6%)	
- 10~15 years	40 (22.5%)	20 (24.7%)	20 (20.6%)	
- Over 15 years	29 (16.3%)	15 (18.5%)	14 (14.4%)	
- Permanent	31 (17.4%)	10 (12.3%)	21 (21.6%)	
- I am not sure	40 (22.5%)	17 (21.0%)	23 (23.7%)	
Appropriateness of dental implant costs				
- Appropriate	19 (10.6%)	12 (14.6%)	7 (7.1%)	
- Higher than expected	137 (76.1%)	68 (82.9%)	69 (70.4%)	
- Lower than expected	1 (0.6%)	1 (1.2%)	0 (0.0%)	
- I am not sure	23 (12.8%)	1 (1.2%)	22 (22.4%)	
Reasonable cost for dental implant surgery (Domestic implant)				
- less than KRW 1 million	97 (57.4%)	44 (57.9%)	53 (57.0%)	
- KRW 1~1.2 million	32 (18.9%)	15 (19.7%)	17 (18.3%)	
- KRW 1.2~1.5 million	29 (17.2%)	9 (11.8%)	20 (21.5%)	
- KRW 1.5~2 million	10 (5.9%)	7 (9.2%)	3 (3.2%)	
- Over KRW 2 million	1 (0.6%)	1 (1.3%)	0 (0.0%)	
Reasonable cost for dental implant surgery (Imported implant)				
- less than KRW 1.8 million	59 (63.4%)	25 (64.1%)	34 (63.0%)	
- KRW 1.8~2.0 million	20 (21.5%)	8 (20.5%)	12 (22.2%)	
- KRW 2.0~2.3 million	9 (9.7%)	5 (12.8%)	4 (7.4%)	
- KRW 2.3~2.5 million	5 (5.4%)	1 (2.6%)	4 (7.4%)	
- KRW 2.5 million	0 (0.0%)	0 (0.0%)	0 (0.0%)	

Table 4.11 Questions that were given to patients without dental implant treatment

	N (%)
Have you ever consulted a dentist about undergoing implant surgery?	
- Yes	25 (25.5%)
- No	73 (74.5%)
What is the cost of a dental implant, as far as you know?	
- less than KRW 1 million	9 (9.3%)
- KRW 1.01~1.5 million	30 (30.9%)
- KRW 1.51~2 million	44 (45.4%)
- KRW 2.01~2.5 million	11 (11.3%)
- Over KRW 2.51 million	3 (3.1%)
Will you quit smoking if you undergo dental implant surgery?	
- I will quit smoking	7 (7.2%)
- I will cut down on the number of cigarettes that I smoke	10 (10.3%)
- I will not quit smoking	4 (4.1%)
- I am not sure	7 (7.2%)
- I am a non-smoker	69 (71.1%)

Table 4.12 Comparison of satisfaction and cost of dental implant surgery before and after 2014

		Last visit to a dentist		
		Prior to 2014	Post 2014	Total
Overall satisfaction of dental implant treatment	Very satisfied	38 (47.5%)	2 (100%)	40 (48.8%)
	Satisfied	36 (45%)	0 (0%)	36 (43.9%)
	Just ok	6 (7.5%)	0 (0%)	6 (7.3%)
	Slightly regret	0 (0.0%)	0 (0.0%)	0 (0.0%)
	Greatly regret	0 (0.0%)	0 (0.0%)	0 (0.0%)
	Total	80 (100%)	2 (100%)	82 (100%)
Cost of dental implant	Less than KRW 2 million	19 (25%)	0 (0%)	19 (24.4%)
	KRW 2.01~4 million	25 (32.9%)	0 (0%)	25 (32.1%)
	KRW 4.01~6 million	6 (7.9%)	1 (50%)	7 (9%)
	KRW 6.01~8 million	5 (6.6%)	0 (0%)	5 (6.4%)
	Over KRW 8.01 million	21 (27.6%)	1 (50%)	22 (28.2%)
	Total	76 (100%)	2 (100%)	78 (100%)

CHAPTER 5

DISCUSSION

The purpose of this study is to analyze the satisfaction of patients with or without dental implant treatment to draw conclusions which are helpful for dental hospital management. Patient satisfaction of dental implant including patient's operation satisfaction, the duration of implant operation, and the cost of implant operation were investigated. This study also examined the management aspects such as dental clinic choice motivation of implant operation patients, media and factors affecting choosing dental clinics, and obtaining routes of implant information. The difference between this study and the other studies is that the question about the dental implant surgery was examined by the experience of the implant. It is possible to compare and analyze the information about the implant between the experienced and non-experienced.

In order to analyze information about promotional and marketing activities on dental implants, the routes first learned about dental implant treatment were investigated. The routes first learned about dental implant treatment were appeared in the order of mass media (47.6%), from dentist during dental treatment (29.7%), recommendation of others (14.6%), internet search (4.9%), and others (3.2%). There were statistically significant differences in the routes first learned about dental implant treatment between patients with dental implant treatment and patients without dental implant treatment ($p < 0.001$). In this study, the majority of patients with dental implant treatment (42.4%) answered 'from

dentist during dental treatment’, however the majority of patients without dental implant treatment (62.0%) answered that they first learned about dental implant from ‘mass media’.

Stapathy et al. (2011) demonstrated that most patients (45%) in eastern India learned about dental implants from their dentists followed by print and electronic media. Kaurani et al. (2010) also showed that 55.2% of Indian people got information about dental implant treatment from their dentist when they visit a dental clinic. However, media plays an important role in educating patients about dental implants in other countries. Studies by Berge (2000), Best (1993), and Zimmer et al. (1992) reported media to be the main source to get information about dental implant surgery. Zimmer et al. (1992) showed the results of a survey in the USA that only 17% of 120 participants obtained information about implants first from dentists, with media and friends (77%) playing much more important roles. The reason that the route for acquiring information about implants differs between studies might be because the availability of information in the region where the information is collected was different. In other words, in areas where the internet and TV are less popular, there is less chance of getting information, so it is likely that the dentist would be the first to hear about the implant. In South Korea, the media such as the Internet is well developed, however, higher percentage of patients experienced the implant got information about dental implant treatment from their dentist. Therefore, to effectively promote dental implants, it is necessary to introduce the implants actively during dental treatment. In addition, mass media promotion may not be very effective in leading patients to receive implant treatment.

When patients choose a dentist or dental clinic, they answered to consider factors in the following order; career and experience of dentist, introduction of acquaintances, regular dentist, proximity to home, moderate dental treatment cost, convenience of traffic and parking, advertisements or internet searching, and others. Therefore, to successfully attract dental implants, it is important to actively promote the dentist's career or experience. In addition, it has been confirmed that lowering the cost of treatment is not the most important factor in determining a dentist.

Similar results were observed when determining dentistry for implant surgery. When patients select a dentist/dental clinic for dental implant surgery, they answered to consider factors in the following order; dentist's career and implant surgery experience, cost of dental implant, referral by acquaintance or neighbor, regular dental clinic/dentist, convenient location and parking, dentist's educational background, dental clinic facilities, and others. The fact that an implant specialist has surgery is the most important factor in determining a dentist when a patient needs treatment. The results of this study were in line with other studies. Yao et al. (2017) showed that 95.7% of Chinese patients agreed with the statement that dental implants should be done by specialists or dentists trained specially for this. There were similar findings in Australia by Tepper et al. (2003) showing that 44% of survey participants thought implants should only be placed by specialists or specially trained dentists. Other studies have shown that patients who received surgery from an implant specialist were more satisfied with the patient. In the study by Derks et al. (2015), Swedish patients were asked their satisfaction about 6 years after implant therapy. They found that patients treated by specialist dentists reported

higher satisfaction of esthetic and chewing aspects compared with those of patients treated by general practitioners.

While prices were not the most important factor when patients decided on an implant dentist, most patients (76.1%) answered that they were more expensive than expected, and only one said that they were cheaper than expected. Percentage of patients who answered that the price of implant treatment was reasonable was different between two groups, 14.6% of the people who received the implant treatment and only 7.1% of those who did not receive the implant treatment answered that the price was reasonable. Therefore, patients without dental implants may have a preconceived idea that the price of implants is expensive. However, implant treatment seemed to have improved understanding of cost.

According to the study by Derks et al. (2015), more than 80% of Swedish patients who received dental implant surgery considered that the therapy was worth the cost and they would consider implant therapy again in the same circumstances. In Sweden, a federal financial support is provided for dental care of adult population. From 2003, out-of-pocket expenditure for patients ≥ 65 years of age was limited to about \$1000, regardless of the extent of the implant therapy. Patients < 65 years need to pay about half of the actual costs themselves. Higher percentage of Swedish patients may consider the cost of implants to be reasonable, as national insurance provides economic support for all generations.

Pjetursson et al. (2005) investigated the patients' perception of implant therapy 5-15 years after implant treatment. They also found that the vast majority of patients (92%) indicated complete fulfilment of the treatment. Simonis et al. (2010) evaluated long-term

implant survival and the patient level of satisfaction 10-16 years after dental implants. In terms of function, 78.26% answered that their crown/bridge functions very well, and they can chew on it very well. Over ninety-one percentage of patients were satisfied with the aesthetic results. Derks et al. (2015) investigated patient-reported outcomes following implant restorative therapy in randomly selected Swedish patients. They revealed that 93.6% of all patients were satisfied with the overall results and 93.9% were satisfied with the esthetic results. In this study, over 90% of patients with dental implant answered that they are satisfied on dental implant treatment. The degree of satisfaction with the implants was also very high, and thus it is confirmed that the patient satisfaction for the dental implant is very high in Korea.

In South Korea, from 65 years of age or older, the national health insurance service supports a 50% treatment cost of dental implant in 2014, however only two teeth per person are supported per lifetime (Ministry of Health & Welfare, 2016). On average, health insurance coverage is between 1.2 million and 1.25 million won and out-of-pocket expenditure for patient is about 600,000 to 625,000 won. The cost of dental implant is differentiated into three types depending on the implant surface coating materials; resorbable blast media (RBM) surface, sandblast large-grit acid-etching (SLA), or hydroxyapatite (HA) coating. In recent years, the demand for dental implants for the elderly has increased due to the increase in the elderly population. It is required that the national health insurance services maintain or increase the cost to be paid to the dental implant, thereby benefiting the elderly population.

In general, the cost of implants in Korea is between 1 million and 3 million won (Kim et al. 2014; Shin et al. 2008). In recent years, the number of low-cost dental

implants (1 to 1.2 million won) has been increasing, and more number of patients tend to seek low-cost implants. In this study, about 75% of patients answered that the reasonable price is less than 1.2 million. As found in results of survey, patients who need dental implant surgery think that the cost of dental implants is high. From the viewpoint of the practicing physician, it is considered that the cost of the low-cost dental implants (1 to 1.2 million) will be greatly restricted in improving the implant service, especially if the price is uniformly determined regardless of the difficulty of operation. Therefore, consideration should be given to the additional cost of surgery, which is beyond the average procedure and the cost according to the patient's oral condition.

The purpose of this study was to analyze the satisfaction of patients after implantation and the factors that are important for dental implant selection. This study provided basic data for establishing a management strategy to increase the attractiveness of dental clinics and strengthen competitiveness. In summary, introducing implants actively during dental treatment was the most effective to lead patients to receive implant treatment rather than advertise through mass media. It has been confirmed that lowering the cost of treatment is not the most important factor in determining a dentist. Moreover, higher percentage of patient who received dental implant surgery compared with those without dental implant experience thought that the cost of dental implant was reasonable. The average age of patient experienced dental implant was 57.8 ± 14.9 and significantly higher than those who has not received dental implant (43.7 ± 11.9). It is suggested that the Korean national health insurance service intensify the cost to be paid to the dental implant, thereby benefiting the elderly population. This study confirmed that the patient satisfaction for the dental implant was over 90% in Korea.

Although mass media were not the most effective means of promoting implants, 30.6% of the implant patients in the study initially learned about implants through mass media. Currently, large hospitals and franchise dental clinics in Korea are advertising through mass media. It is expensive for private dentists to advertise through mass media and they cannot afford hiring marketing professionals. This study suggests that the collaboration of individual dentists and the formation of a dentist association in the jurisdictional area can be a way to advertise the expertise of the implant treatment because it can secure financing for advertising through mass media.

The implications of this study for future dentists are as follows. First, since the most important consideration in choosing a dentist was career and experience of dentist, dentists should be involved in self-development and career management even after becoming a dentist. It is necessary to build up experience of implant treatment effectively and appeal to patients effectively. Second, it should be able to give credibility to patient. Patients consider reliability rather than cost of treatment when choosing a dentist. Therefore, it is more effective to increase the attractiveness of the dentist by increasing the reliability of the dentist by giving credibility to the patient rather than appealing through advertisement using through mass media or low cost.

The limitation of this study was that participants were selected from a limited area, Seoul. The number of patients was small. The expectation of the patient and the expectation of the dentist may differ. In this study, influence of the cost of the dental implant treatment, the patient's oral condition, and the difference on difficulties of dental implant surgery were not considered when satisfaction level of dental implant treatment was analyzed. Future follow-up studies should be continued to overcome the limitations.

REFERENCES

- Abrahamsson, I., Berglundh, T., Wennström, J., & Lindhe, J. (1996). The peri- implant hard and soft tissues at different implant systems. A comparative study in the dog. *Clinical oral implants research*, 7(3), 212-219.
- Bartlett, E. E., Grayson, M., Barker, R., Levine, D. M., Golden, A., & Libber, S. (1984). The effects of physician communications skills on patient satisfaction; recall, and adherence. *Journal of chronic diseases*, 37(9-10), 755-764.
- Best, H. A. (1993). Awareness and needs of dental implants by patients in New South Wales. *Australian prosthodontic journal*, 7, 9-12.
- Berge, T. I. (2000). Public awareness, information sources and evaluation of oral implant treatment in Norway. *Clinical oral implants research*, 11(5), 401-408.
- Chiui Shinbo Newspaper. (2008). Future Prospects for Implants. 14-15.
- Cho, M. S., Yoo, S. J., & Yang, D. H. (2013). Associated factors which influence satisfaction of dental implant patients and intention to revisit using structural equation model. *Journal of Korean society of Dental Hygiene*, 13(2), 221-230.
- Crews, K. M., Cobb, G. W., Seago, D., & Williams, N. (1999). Tobacco and dental implants. *General dentistry*, 47(5), 484-488.
- Cune, M. S., Van Kampen, F. M., & Van Der Bilt, A. (2006). Patient satisfaction with different types of implant-retained overdentures in the edentate mandible. *Nederlands tijdschrift voor tandheelkunde*, 113(10), 401-407.
- Derks, J., Håkansson, J., Wennström, J. L., Klinge, B., & Berglundh, T. (2015). Patient-reported outcomes of dental implant therapy in a large randomly selected sample. *Clinical oral implants research*, 26(5), 586-591.
- Gaviria, L., Salcido, J. P., Guda, T., & Ong, J. L. (2014). Current trends in dental implants. *Journal of the Korean Association of Oral and Maxillofacial Surgeons*, 40(2), 50-60.
- Grogono, A. L., Lancaster, D. M., & Finger, I. M. (1989). Dental implants: a survey of patients' attitudes. *The Journal of prosthetic dentistry*, 62(5), 573-576.

- Haraldson, T. (1983). Comparisons of chewing patterns in patients with bridges supported on osseointegrated implants and subjects with natural dentitions. *Acta Odontologica Scandinavica*, 41(4), 203-208.
- Heo, Y. Y., Heo, S. J., Chang, M. W., & Park, J. M. (2008). The patients' satisfaction following implant treatment. *The Journal of Korean Academy of Prosthodontics*, 46(6), 569-576.
- Higuchi, K. W., & Slack, J. M. (1991). The use of titanium fixtures for intraoral anchorage to facilitate orthodontic tooth movement. *International Journal of Oral & Maxillofacial Implants*, 6(3), 338-344.
- Jeon, J. H., & Min, H. H. (2013). Study of maintenance behavior based on the experience of the tooth brushing instruction for implant patient. *Journal of Korean Society of Dental Hygiene*, 13(3), 403-410.
- Jeon, J. H., Min, H. H., & Kim, Y. S. (2014). Relationship between satisfaction of dental service, value quality, and reuse intention. *Journal of Korean society of Dental Hygiene*, 14(5), 765-773.
- Kaurani, P., & Kaurani, M. (2010). Awareness of dental implants as a treatment modality amongst people residing in Jaipur (Rajasthan). *Journal of Clinical and Diagnostic Research*, 4, 3622-3626.
- Kim, M. Y., Choi, H. N., & Shin, H. S. (2014). Dental implant bottom-up cost analysis. *Journal of Korean Academy of Prosthodontics*, 52(1), 18-26.
- Kim, Seo-woung and Sung-min Yaung. (2007). *Aesthetic Restoration using Implants*. Osstem Implant Co.
- Kim, Shingu. (2006). *Implant Guide Book*. Dental Publishing.
- Kocher, T., Schwahn, C., Gesch, D., Bernhardt, O., John, U., Meisel, P., & Bæ lum, V. (2005). Risk determinants of periodontal disease—an analysis of the Study of Health in Pomerania (SHIP 0). *Journal of clinical periodontology*, 32(1), 59-67.
- Lee, Dong-Han. (2002). *Ossointegrated Implant*. Shin Heung International.
- Lee, H. J. (2005). *A Study on the Satisfaction with the Dental Services of the Implant Treatment Patients Visiting the Dental Hospital*. Department of Hygienic Science The Graduate School, Catholic University of Daegu.
- Lundgren, D., Laurell, L., Falk, H., & Bergendal, T. (1987). Occlusal force pattern during mastication in dentitions with mandibular fixed partial dentures supported on osseointegrated implants. *The Journal of prosthetic dentistry*, 58(2), 197-203.

- Lundqvist, S., & Haraldson, T. (1992). Oral function in patients wearing fixed prosthesis on osseointegrated implants in the maxilla: 3- year follow- up study. *European Journal of Oral Sciences*, 100(5), 279-283.
- MacEntee, M. I., & Walton, J. N. (1998). The economics of complete dentures and implant-related services: a framework for analysis and preliminary outcomes. *The Journal of prosthetic dentistry*, 79(1), 24-30.
- Melas, F., Marcenes, W., & Wright, P. S. (2000). Oral health impact on daily performance in patients with implant-stabilized overdentures and patients with conventional complete dentures. *International Journal of Oral & Maxillofacial Implants*, 16(5), 700-712.
- Ministry of Health & Welfare: Plan for ageing society and population. (2016). Retrieved from http://www.mohw.go.kr/front_new/al/sal0301vw.jsp?PAR_MENU_ID=04&MENU_ID=0403&page=1&CONT_SEQ=330878 (September 22, 2017).
- Misch, C.E. (1993). *Contemporary Implant dentistry*. Mosby Co. 3-17.
- Moon, S. J., Kim, E. H., & Park, H. R. (2015). Study on the Correlation between Dental Implant Patients Oral Hygiene Behaviors and Satisfaction. *Journal of the Korea Academia-Industrial cooperation Society*, 16(1), 576-584.
- OECD (2006) OECD Health Data 2006 How Does Korea Compare. Retrieved from <http://www.oecd.org/health/health-systems/36959256.pdf> (September 22, 2017).
- Pjetursson, B. E., Karoussis, I., Bürgin, W., Brägger, U., & Lang, N. P. (2005). Patients' satisfaction following implant therapy. *Clinical oral implants research*, 16(2), 185-193.
- Ra'ed Omar, A. H., Mahmoud Khalid, A. O., & Ahed Mahmoud, A. W. (2006). Psychological impact on implant patients' oral health- related quality of life. *Clinical oral implants research*, 17(2), 116-123.
- Schwartz- Arad, D., Bar- Tal, Y., & Eli, I. (2007). Effect of stress on information processing in the dental implant surgery setting. *Clinical oral implants research*, 18(1), 9-12.
- Satpathy, A., Porwal, A., Bhattacharya, A., & Sahu, P. K. (2011). Patient awareness, acceptance and perceived cost of dental Implants as a treatment modality for replacement of missing teeth: A survey in Bhubaneswar and Cuttack. *International Journal of Public Health Dentistry*, 2(1), 1-7.
- Seminar biz newspaper. (2016). Retrieved from <http://www.seminarbiz.kr/news/articleView.html?idxno=3878> (September 22, 2017)

- Siadat, H., Alikhasi, M., Mirfazaelian, A., Geramipannah, F., & Zaery, F. (2008). Patient Satisfaction with Implant- Retained Mandibular Overdentures: A Retrospective Study. *Clinical implant dentistry and related research*, 10(2), 93-98.
- Shin, H.S., Oh, Y.H., Choi, H.N., & Park, E.M. (2008). Dental implant cost analysis. Korean Institute for Health and Social Affairs. Policy Rep 78, 1-79.
- Simonis, P., Dufour, T., & Tenenbaum, H. (2010). Long- term implant survival and success: a 10–16- year follow- up of non- submerged dental implants. *Clinical oral implants research*, 21(7), 772-777.
- Sondell, K., Söderfeldt, B., & Palmqvist, S. (2002). Dentist-patient communication and patient satisfaction in prosthetic dentistry. *International Journal of Prosthodontics*, 15(1), 28-37.
- Stillman, N., & Douglass, C. W. (1993). The developing market for dental implants. *The Journal of the American Dental Association*, 124(4), 5158-56.
- Tepper, G., Haas, R., Mailath, G., Teller, C., Zechner, W., Watzak, G., & Watzek, G. (2003). Representative marketing- oriented study on implants in the Austrian population. I. Level of information, sources of information and need for patient information. *Clinical oral implants research*, 14(5), 621-633.
- Yao, J., Li, M., Tang, H., Wang, P. L., Zhao, Y. X., McGrath, C., & Mattheos, N. (2017). What do patients expect from treatment with Dental Implants? Perceptions, expectations and misconceptions: a multicenter study. *Clinical oral implants research*, 28(3), 261-271.
- Zimmer, C. M., Zimmer, W. M., Williams, J., & Liesener, J. (1992). Public awareness and acceptance of dental implants. *International Journal of Oral & Maxillofacial Implants*, 7(2), 207-217.
- Zitzmann, N. U., & Marinello, C. P. (2005). Patient satisfaction with removable implant-supported prostheses in the edentulous mandible. *Schweizer Monatsschrift fur Zahnmedizin= Revue mensuelle suisse d'odonto-stomatologie= Rivista mensile svizzera di odontologia e stomatologia*, 116(3), 237-244.

APPENDIX A
QUESTIONS FOR QUESTIONNAIRE

*** Survey on the satisfaction of dental implant patients**
(Those with dental implant experience)

This survey aims to investigate the satisfaction of dental implant customers visiting a dentist or dental clinic. I assure you that the purpose of this survey is to collect data necessary for the University of South Carolina DrPH. Dissertation of O Jung-Su, President of Kunwa Dental Clinic, and any information that you provide will not be used for any purpose other than this research. You do not have to put your name on this questionnaire.

This questionnaire is composed of 32 questions (for those with dental implant experience) and takes about 15 to 20 minutes to finish. Please answer all the questions. I sincerely appreciate your participation in this survey.

April 2017

O Jung Su, President of Kunwa Dental Clinic

From O Jung Su, President of Kunwa Dental Clinic
Doctoral Course in Health Services Policy and Management at the
University of South Carolina, USA

※ The following questions concern personal information of respondents.

Please circle the number or put one check mark (✓) per answer that best applies to you or specify another answer if necessary.

1. What is your sex?

- ① Male ② Female

2. What is your date of birth?

___/___/___

month/day/year

3. What is the approximate total before tax income of you and your family?

- ① Less than KRW 30 million in annual wage
② Between KRW 30,010,000 and KRW 50,000,000 in annual wage
③ Between KRW 50,010,000 and KRW 70,000,000 in annual wage
④ Over KRW 70,010,000 in annual wage

4. What category does your occupation fall under among the following? Please select the one occupation that best applies to you.

- ① Office worker
② Technician
③ Professional occupation
④ Public servant
⑤ Service occupation
⑥ Self-employed
⑦ Homemaker
⑧ Other

5. Where do you reside?

- ① Seoul
② Gyeonggi Province
③ Other region

6. How many cigarettes do you smoke per day?

- ① None
- ② Between 1 and 5 cigarettes
- ③ Between 6 and 20 cigarettes
- ④ Over 20 cigarettes

※ The following questions concern the use of dental services.

7. Do you currently have a regular dentist?

- ① Yes ()
- ② No ()

8. What do you think most influenced your decision in choosing a dentist or dental clinic?

(Please select the three most important factors influencing your choice of dentist/dental clinic and rank them in the order of importance (from 1st to 3rd).

- | | | | |
|--|-----|----------|-------|
| ① Career and experience of dentist | () | ※Example | (2) |
| ② Introduction of acquaintances | () | | (3) |
| ③ Advertisements or Internet searching | () | | () |
| ④ Regular dentist | () | | (1) |
| ⑤ Proximity to home | () | | () |
| ⑥ Moderate dental treatment cost | () | | () |
| ⑦ Convenience of traffic and parking | () | | () |
| ⑧ Other _____ | () | | () |

9. When was your last visit to a dentist or dental clinic?

- ① Less than 6 months ago
- ② 6 months to 1 year ago
- ③ 1 year to 3 years ago
- ④ More than 3 years ago

10. Will you visit the same dentist or dental clinic next time?

- ① Absolutely
- ② Yes, if possible
- ③ I am not sure.
- ④ Probably not
- ⑤ Never

11. If you will visit the same dentist or dental clinic next time, why will you do so? (Please select the three most important reasons below and rank them in the order of importance (from 1st to 3rd).

- ① Because I trust the dentist ()
- ② Because it is my regular dental clinic ()
- ③ Because of kind staff ()
- ④ Because I like the dental facilities ()
- ⑤ Because I am afraid of visiting other dental clinics ()
- ⑥ Because of proximity to home ()
- ⑦ Because of moderate dental treatment cost ()
- ⑧ Because I like the parking facilities ()

12. If you are NOT going to visit the same dentist or dental clinic next time, why not? (Please select the three most important reasons below and rank them in the order of importance (from 1st to 3rd).

- ① Because I don't trust the dentist ()
- ② Because of unkind staff ()
- ③ Because of outdated dental facilities ()
- ④ Because of great distance from my home ()
- ⑤ Because of high dental treatment cost ()
- ⑥ Other _____ ()

13. How did you first learn about dental implants?

- ① Mass media (TV, magazines)
- ② Internet search
- ③ Recommendation of others
- ④ From dentist during dental treatment
- ⑤ Other

14. If you planned to undergo dental implant surgery, what were your criteria for choosing a dentist/dental clinic? (Please select the three most important reasons below and rank them in the order of importance (from 1st to 3rd).

- ① Dentist's education background ()
- ② Dentist's career and dental implant surgery experience ()
- ③ Convenient location and parking ()
- ④ Referral by acquaintance or neighbor ()
- ⑤ Cost of dental Implant ()
- ⑥ Dental clinic facilities ()

- ⑦ Regular dental clinic/dentist ()
- ⑧ Other _____ ()

15. What made you hesitate the most in making the decision to undergo dental implant surgery?

- ① Financial matters
- ② Fear of surgery
- ③ Lack of confidence in dental implants
- ④ I never hesitated.
- ⑥ Other

16. When did you undergo dental implant surgery?

- ① I underwent the surgery less than 6 months ago, and the treatment is still ongoing.
- ② 6 months to 1 year ago
- ③ 1 year to 3 years ago
- ④ 3 years to 5 years ago
- ⑤ Over 5 years ago

17. How many dental implants did you get?

- ① 1
- ② 2
- ③ 3 or more

18. Where did you get the dental implant surgery?

- ① Dental implant clinic
- ② Dentist in my neighborhood
- ③ University hospital
- ④ General hospital
- ⑤ Others

19. Where do you want to get the dental implant surgery next time?

- ① Dental implant clinic
- ② Dentist in my neighborhood
- ③ University hospital
- ④ General hospital
- ⑤ Others

20. Are you satisfied with the dental implant surgery?

- ① Yes, I am very satisfied.
- ② Yes, I am satisfied.
- ③ The results are just ok.
- ④ I slightly regret having undergone the dental implant surgery.
- ⑤ I greatly regret having undergone the dental implant surgery.

21. Describe the differences before and after the dental implant surgery.

1) Chewing function

- ① It became worse than before.
- ② No particular difference
- ③ It improved slightly.
- ④ It improved very much.

2) Effect on social activities and interpersonal relationship

- ① It became worse than before.
- ② No particular difference
- ③ It improved slightly.
- ④ It improved very much.

3) Psychological stability

- ① It became worse than before.
- ② No particular difference
- ③ It improved slightly.
- ④ It improved very much.

4) Pronunciation (speech)

- ① It became worse than before.
- ② No particular difference
- ③ It improved slightly.
- ④ It improved very much.

22. What change impressed you the most after dental implant surgery?

- ① I find my chewing power improved.
- ② I feel more stable psychologically.
- ③ I can pronounce words more comfortably.
- ④ I am more confident in my social activities and interpersonal relationship.

⑤ Other

23. What was the greatest disappointment with the dental implant surgery?

- ① Cost of implant
- ② Side effects of surgery
- ③ Dislocation of dental prosthesis
- ④ Maintenance
- ⑤ Others

24. How many months did it take to place the dental implants?

- ① Less than 3 months
- ② 3 to 6 months
- ③ 6 to 9 months
- ④ more than 9 months

25. What is your impression of the total time taken for dental implants?

- ① Too long
- ② Long
- ③ Moderate
- ④ Meets my expectation
- ⑤ Exceeds my expectation

26. Were you given any explanation about the following topics by a medical organization prior to the dental implant surgery?

- ① Name of brand
- ② Type of material to be added
- ③ Expected side effects and post operative recover period
- ④ Letter of consent before the surgery
- ⑤ Projected life of the dental implant

27. How long do you think a dental implant will last?

- ① About 10 years
- ② From 10 to 15 years
- ③ Over 15 years
- ④ Permanent
- ⑤ I am not sure

28. Do you have a good understanding of the explanation about the follow-up maintenance required for a dental implant?

- ① I understand clearly.
- ② I understand most things related to follow-up maintenance.
- ③ I understand some things related to follow-up maintenance.
- ④ I don't have a clear understanding of follow-up maintenance.
- ⑤ I don't understand anything related to follow-up maintenance.

29. How much did you spend on dental implant?

- ① Less than KRW 2,000,000
- ② Between KRW 2,010,000 and 4,000,000
- ③ Between KRW 4,010,000 and 6,000,000
- ④ Between KRW 6,010,000 and 8,000,000
- ⑤ Over KRW 8,000,000

30. What do you think of the cost of dental implant surgery?

- ① Appropriate
- ② Higher than expected
- ③ Lower than expected
- ④ I am not sure

31. What do you think is the most reasonable cost for dental implant surgery (per implant)?

- | Domestic implant | Imported implant |
|------------------------------|------------------------------|
| ① Less than KRW 1,000,000 | ① Less than KRW 1,800,000 |
| ② KRW 1,010,000 to 1,200,000 | ② KRW 1,810,000 to 2,000,000 |
| ③ KRW 1,210,000 to 1,500,000 | ③ KRW 2,01,000 to 2,300,000 |
| ④ KRW 1,510,000 to 2,000,000 | ④ KRW 2,310,000 to 2,500,000 |
| ⑤ Over KRW 2,010,000 | ⑤ Over KRW 2,510,000 |

32. Who will pay for the cost of your dental implant surgery? (Who paid for the cost of your dental implant surgery that you underwent?)

- ① I will pay (paid)
- ② My spouse will pay (paid)
- ③ My parents will pay (paid)
- ④ My private insurance coverage will pay (paid)

⑤ I will get (got) support from my company

※ Thank you very much for your answers to this questionnaire. Again, I assure you that the information that you have provided will not be used for any purpose other than research. If you have any questions about this questionnaire or dental implants, feel free to contact Kunwa Dental Clinic (02-877-3237) anytime. Thank you.

*** Survey on the satisfaction of dental implant patients**

(Those without dental implant experience)

This survey aims to investigate the satisfaction of dental implant customers visiting a dentist or dental clinic. I assure you that the purpose of this survey is to collect data necessary for the University of South Carolina DrPH. Dissertation of O Jung-Su, President of Kunwa Dental Clinic, and any information that you provide will not be used for any purpose other than this research. You do not have to put your name on this questionnaire.

This questionnaire is composed of 23 questions (for those without dental implant experience) and takes about 15 to 20 minutes to finish. Please answer all the questions. I sincerely appreciate your participation in this survey.

April 2017

O Jung-Su, President of Kunwa Dental Clinic

**From O Jung-su, President of Kunwa Dental Clinic
Doctoral Course in Health Services Policy and Management at the
University of South Carolina, USA**

※ The following questions concern personal information of respondents.

Please circle the number or put one check mark (✓) per answer that best applies to you or specify another answer if necessary.

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- ① Male ② Female

2. What is your date of birth?

___/___/___

month/day/year

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③ Between KRW 50,010,000 and KRW 70,000,000 in annual wage
④ Over KRW 70,010,000 in annual wage

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③ Professional occupation
④ Public servant
⑤ Service occupation
⑥ Self-employed
⑦ Homemaker
⑧ Other

5. Where do you reside?

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② Gyeonggi Province
③ Other region

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④ Over 20 cigarettes

※ The following questions concern the use of dental services

7. Do you currently have a regular dentist?

① Yes () ② No ()

8. What do you think most influenced your decision in choosing a dentist or dental clinic?

(Please select the three most important factors influencing your choice of dentist/dental clinic and rank them in the order of importance (from 1st to 3rd).

① Career and experience of dentist () ※Example (2)

② Introduction of acquaintances () (3)

③ Advertisements or Internet searching () ()

④ Regular dentist () (1)

⑤ Proximity to home () ()

⑥ Moderate dental treatment cost () ()

⑦ Convenience of traffic and parking () ()

⑧ Other _____ () ()

9. When was your last visit to a dentist or dental clinic?

① Less than 6 months ago ② 6 months to 1 year ago

③ 1 year to 3 years ago . ④ More than 3 years ago

10. Will you visit the same dentist or dental clinic next time?

① Absolutely ② Yes, if possible

③ I am not sure. ④ Probably not

⑤ Never

11. If you will visit the same dentist or dental clinic next time, why will you do so? (Please select the three most important reasons below and rank them in the order of importance (from 1st to 3rd).

① Because I trust the dentist ()

② Because it is my regular dental clinic ()

③ Because of kind staff ()

④ Because I like the dental facilities ()

⑤ Because I am afraid of visiting other dental clinics ()

- ⑥ Because of proximity to home ()
- ⑦ Because of moderate dental treatment cost ()
- ⑧ Because I like the parking facilities ()

12. If you are NOT going to visit the same dentist or dental clinic next time, why not? (Please select the three most important reasons below and rank them in the order of importance (from 1st to 3rd).

- ① Because I don't trust the dentist ()
- ② Because of unkind staff ()
- ③ Because of old dental facilities ()
- ④ Because of great distance ()
- ⑤ Because of high dental treatment cost ()
- ⑥ Other _____ ()

13. How did you first learn about dental implants?

- ① Mass media (TV, magazines)
- ② Internet search
- ③ Recommendation of others
- ④ From dentist during dental treatment
- ⑤ Other

14. If you undergo the implant, what are your criteria for choosing a dentist/dental clinic? (Please select the three most important reasons below and rank them in the order of importance (from 1st to 3rd).

- ① Dentist's educational background ()
- ② Dentist's career and implant surgery experience ()
- ③ Convenient location and parking ()
- ④ Referral by acquaintance or neighbor ()
- ⑤ Cost of dental implant ()
- ⑥ Dental clinic facilities ()
- ⑦ Regular dental clinic/dentist ()
- ⑧ Other _____ ()

15. What makes you hesitate the most in making a decision on dental implant surgery?

- ① Financial matters
- ② Fear of surgery

- ③ Lack of confidence in implant
- ④ I never hesitated.
- ⑥ Other

16. Have you ever consulted a dentist about undergoing implant surgery?

- ① Yes () ② No ()

17. What makes you hesitate when your dentist recommends dental implant surgery?

(Please select the three most important reasons below and rank them in the order of importance (from 1st to 3rd).

- ① The surgery has never been recommended to me ()
- ② Cost of implant ()
- ③ Fear of side effects ()
- ④ Long treatment period ()
- ⑤ Fear of surgery ()
- ⑥ Lack of confidence in dental implants ()
- ⑦ Other _____ ()

18. How long do you think a dental implant will last?

- ① About 10 years
- ② From 10 to 15 years
- ③ Over 15 years
- ④ Permanent
- ⑤ I am not sure

19. What is the cost of a dental implant, as far as you know?

- ① Less than KRW 1,000,000 ② KRW 1,010,000 to 1,50,000
- ③ KRW 1,510,000 to 2,000,000 ④ KRW 2,010,000 to 2,500,000
- ⑤ Over KRW 2,510,000

20. What do you think of the cost of dental implant surgery?

- ① Appropriate
- ② Too high
- ③ Too low
- ④ I am not sure

21. What do you think is the most reasonable cost for dental implant surgery (per implant)?

- | Domestic implant | Imported implant |
|------------------------------|------------------------------|
| ① Less than KRW 1,000,000 | ① Less than KRW 1,800,000 |
| ② KRW 1,010,000 to 1,200,000 | ② KRW 1,810,000 to 2,000,000 |
| ③ KRW 1,210,000 to 1,500,000 | ③ KRW 2,01,000 to 2,300,000 |
| ④ KRW 1,510,000 to 2,000,000 | ④ KRW 2,310,000 to 2,500,000 |
| ⑤ Over KRW 2,010,000 | ⑤ Over KRW 2,510,000 |

22. Who will pay for the cost of your dental implant surgery?

- ① I will pay
- ② My spouse will pay
- ③ My parents will pay
- ④ My private insurance coverage will pay
- ⑤ I will get support from my company

23. Will you quit smoking if you undergo dental implant surgery?

- ① I will quit smoking.
- ② I will cut down on the number of cigarettes that I smoke.
- ③ I will not quit smoking.
- ④ I am not sure.
- ⑤ I am a non-smoker.

※ Thank you very much for your answers to this questionnaire. Again, I assure you that the information that you have provided will not be used for any purpose other than this research. If you have any questions about this questionnaire or dental implants, contact Kunwa Dental Clinic (02-877-3237) anytime. Thank you.