Patient Education in Dental Setting

Periodontal Disease and its Relation to Systemic Conditions and Patient Habits

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Abstract

The purpose of this project was to increase awareness of staff and educate patients of Family Dental Care clinics to the connection between oral and systemic disease by including education in every patient visit. The project started by incorporation of patient education as part of the clinic protocol. There was a uniform and equal educational pattern throughout the clinic that addressed all patients equally and used printed materials. A sample of 203 patients were educated through face-to-face sessions. The age, sex and medical history of patients were recorded along with the patient’s degree of knowledge regarding the oral-systemic connection. The results of the project found that the majority of patients were female and many were smokers. Seventy four percent of patients interviewed had never heard of the oral-body connection, which revealed considerable lack of awareness in the addressed population. Meeting with patients also discovered their willingness to learn about oral-systemic health connection and their encouragement to spread the information to benefit others. This project revealed the importance of educating patients and the rewarding sense obtained when patients appreciate it. The long-term goal would be to repeat this project to involve education of the larger population in Minneapolis/St. Paul.
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Patient Education in Dental Setting

**Problem Statement**

Family Dental Care clinic in South Minneapolis is part of People’s Center Health Services (PCHS), a well-established Federally Qualified Health Care Center (FQHC). The mission of the center is to provide "high quality medical and dental care to all with a special focus on the needs of economically disadvantaged and socially disenfranchised persons" (PCHS, 2012, para. 2). PCHS 2011 records show that 90% of its patients are from households with income 200% of the federal poverty level or lower, 28% have no insurance and 59% are under state insurance programs (PCHS, 2012). Moreover, according to the PCHS (2012) report 70% of patients are from "communities of color" mainly Somalis and 56% require an interpreter to complete their visit, in contrast to only 20-27% in other community clinics within the twin cities.

Based on this information and information collected from the dental clinic, a considerable lack of awareness regarding oral health, hygiene and periodontal disease had been detected in Family Dental Care patients. Moreover, a majority of patients experience chronic conditions and habits as revealed from their medical histories, which further deteriorate their periodontal health. Based on the patients background, social status, poor oral health awareness and lack of oral health education resources at Family Dental Care, there was a need to increase patient education in the clinic.

“Patient education is a significant component of modern healthcare” (Jones & Bartlett Learning, n. d., p.4). Patient education is divided into two main components; clinical patient education and health education. Clinical patient education is achieved through patient learning and understanding of the clinical process and interventions to enable the patient to comprehend and decide for his treatment process. Health education mainly focuses on prevention and health
promotion and involves groups or communities rather than individuals (Jones & Bartlett Learning, n. d.). In this project, clinical patient education and health education were carried out using educational materials and personally meeting with patients. This represented a simple and feasible method to show patients the importance of periodontal health for the overall health and wellbeing. Frequency was achieved by introducing oral health education in all areas of the dental office including waiting areas, hygiene, and operating rooms. This promoted oral health education at Family Dental Care and encouraged distinct patient services at the dental office.

**Project Goals and Objectives**

The primary goal of this project was to increase patient and staff awareness of the oral-systemic connection and reduce the risks and complications from periodontal disease. Education included the introduction of patients to the oral-body connection and familiarization of the relation between periodontal disease and other disease conditions. The second objective was to incorporate patient education as part of every patient’s hygiene appointment. The third objective was to reinforce the message throughout the clinic setting by making it available and accessible. The fourth objective was to increase the knowledge of dental hygienists to the oral-body connection and encourage them to educate patients in every visit.

**Literature Review**

Patient education is the foundation to long-term health improvement (Jernigan, 2009). Patient education benefits patients, providers, insurance companies, and the community. Patient education improves understanding of oral health topics and at the same time it prevents complications and the consequences of untreated oral disease conditions (Jernigan, 2009). Moreover, patient education establishes stronger relations between the provider and the patient.
by showing care and concern about the patient. This promotes dental public health within the community.

Patient education within any healthcare field can be in the form of talking with the patients, using printed materials, using video/DVD, using internet sources, using informed consent or using allied health staff (American Academy of Ophthalmology [AAO], 2012). Educating patients by talking with them has shown to be the most effective method, since it ensures quality rather than quantity (AAO, 2012). At the same time, patients are given the opportunity to ask questions and interact with the provider which helps build provider patient relationship and build trust between them. Many surveys revealed patients are more satisfied when a provider spends more time with them and communicates everything to them in person (AAO, 2012). However, other studies show patients forget about 40% of what they are told during a visit, which is why printed materials are important to send home with patients to be a reference later (AAO, 2012). The project aimed at following these two methods of patient education: talking with the patients and providing printed materials.

Periodontal disease is one of the most prevalent conditions among the U.S adult population (Eke & Genco, 2007). According to the Centers for Disease Control and Prevention (CDC) reports and surveillance, 34% of the American adults ages 30 and older suffer from periodontal disease and 13% suffer from its severe form (Eke & Genco, 2007). The oral-systemic health connection has been the focus of health care professionals lately, which lead to the development of the American Academy for Oral Systemic Health (AAOSH, 2010) dedicated to the relationship of oral and systemic health. Over the past 10 years, case control studies and cross sectional studies have suggested periodontitis is a risk factor for certain systemic conditions. These studies suggest a bidirectional relationship between periodontal disease and
systemic conditions (Fowler, Breault, & Cuenin, 2001). This periodontal-systemic relation requires patient education, frequent professional evaluation and consistent educational reinforcement by health care providers (Mealey, 2006). Enforcing patient education and informing patients of the bidirectional relation also prevents periodontal complications related to patient disease condition and reflects a good provider-patient relationship (Mealey, 2006).

Periodontal disease, commonly referred to as gum disease, refers to one of two conditions; gingivitis or periodontitis (American Academy of Periodontology [AAP], 2011). Gingivitis is the mildest, reversible form of gum disease, characterized by redness, inflammation and easy bleeding of the gums (AAP, 2011). Gingivitis mainly results from poor oral hygiene that causes plaque accumulation. However, there are several factors that also contribute to gingivitis, such as diabetes, smoking, aging, genetic predisposition, systemic diseases and conditions, stress, inadequate nutrition, puberty, hormonal fluctuations, pregnancy, substance abuse, HIV infection, and certain medication use (AAP, 2011).

Periodontitis is the irreversible more destructive form of periodontal disease that involves the supporting tooth structure (AAP, 2011). Periodontitis can develop from untreated gingivitis or other risk factors. There are four main types of periodontitis; aggressive periodontitis, necrotizing periodontitis, chronic periodontitis and periodontitis as a manifestation of systemic conditions such as diabetes, heart disease and respiratory diseases (AAP, 2011). Periodontitis commonly requires more extensive professional treatment and surgery is needed in some cases along with home oral care.

Over the past years, researchers have tried to identify the relation between periodontal disease and various systemic conditions (AAP, 2011). The connection key was first attributed to the presence of bacteria; however, later studies showed that the possible connection between
Periodontal disease and other systemic conditions is more likely an inflammatory response (AAP, 2011). Examples of these diseases are diabetes, cardiovascular disease, and certain respiratory conditions.

**Periodontal Disease and Cardiovascular Disease**

Observational studies have determined that people with periodontal disease (PD) have a higher risk of developing cardiovascular disease (National Institute of Dental and Craniofacial Research [NIDCR], 2011). There have been no clinical trials to assure this link; however, researchers suggest three possible theories behind the connection (NIDCR, 2011). A first theory suggests oral bacteria from periodontal disease enter the blood stream and affect the heart by forming clots in the coronary arteries. Vascular infection by periodontal pathogens is referred to as the direct mechanism responsible for the PD and atherosclerotic vascular disease relation (ASVD) (Lockhart et al., 2012). ASVD are diseases that affect the heart and the blood vessels; Ischemic heart disease, cerebrovascular diseases, and diseases of arteries, arterioles, and capillaries (Lockhart et al., 2012). The observational study by Lockhart et al. (2012) performed a literature review on the relation between PD and Cardiovascular disease from multiple databases during the period from 1950 to 2011. Their results support an association between periodontal disease (PD) and ASVD of known confounders. They do not, however, support a causative relationship (Lockhart et al., 2012).

Another observational study by Desvarieux et al. (2005) found that people with greater bacterial loads in their mouths, particularly four main types of periodontal bacteria (Actinobacillus actinomycetemcomitans, Porphyromonas gingivalis, Tannerella forsythia, and Treponema denticola), had thicker carotid arteries. This theory arises from the concept known as focal infection theory in which bacteria from the mouth are swallowed, pass through the
bloodstream, affecting the heart and other organs. This concept is generally accepted in medicine and by the public (Desvarieux et al., 2005). However, the question remains, which came first, the periodontal disease bacteria or carotid thickening? The answer requires future testing, follow up, and observation (Desvarieux et al., 2005). A similar study was carried out by Desvarieux et al. (2010) to investigate the link between PD bacteria and hypertension. The results found evidence of a direct relation between subgingival periodontal bacteria and prevalence of both systolic and diastolic hypertension (Desvarieux et al., 2010).

A second theory that inflammation from PD can contribute to inflammation of carotid arteries. Beck et al. (2005) found the antibody produced in response to periodontal bacteria was associated with coronary heart disease. Inflammatory response from periodontal disease was found to increase production of serum C-Reactive protein, a well-known risk factor for cardiovascular disease (Slade, Offenbacher, Beck, Heiss, & Pankow, 2000). Lockhart et al. (2012) also suggest systemic inflammation is an indirect link between PD and ASVD. A third theory suggests periodontal disease can exacerbate an existing heart condition such as rheumatic heart disease, which is why some patients require antibiotics before dental treatment (NIDCR, 2011).

**Periodontal Disease and Diabetes**

Many investigators, such as Fowler et al. (2001), Ide, Hoshuyama, Wilson, Takahashi, and Higashi (2011), Mealey (2006), Monea, Mezei, and Monea (2012), and Serrano, Perez, and Sabogal (2012), suggest the relationship between periodontal disease and diabetes is bidirectional. Diabetes is known to make people more liable to infection and periodontal disease is one of these infections (NIDCR, 2011). The relation is strong enough to the point where periodontal disease was recently referred to as the sixth complication of diabetes (Das,
Upadhyaya, Ramachandra, & Jithendra, 2011). A case control study carried out in India found that Type 2 diabetic patients have more destructive periodontal disease which was measured using the CPI index (Das et al., 2011). Moreover, diabetic patients require more complex periodontal treatment needs (Das et al., 2011). Another 7-year study in Japan (Ide et al., 2010) revealed a strong association between the degree of periodontitis and diabetes; however, it did not find a link between periodontitis and incident diabetes.

Furthermore, the degree of periodontal destruction caused by diabetes was examined in a recent study by Monea et al. (2012) investigating histological changes that occur to periodontal tissue in diabetic patients, particularly those with Type 2 diabetes. Diabetic patients had more aggressive periodontal destruction in the form of: significant inflammation, degeneration of papilla, fiber destruction and tissue fibrosis (Monea et al., 2012). The investigators concluded that diabetes mellitus has an independent effect on periodontal tissue (Monea et al., 2012).

Diabetes is known to affect the extent of tooth loss in individuals, which is attributed to their periodontal status (Costa et al., 2012). A 5-year follow up study indicated the degree of glycemic control was related to the progression of periodontitis and degree of tooth loss (Costa et al., 2012). Diabetic individuals with poor glycemic control showed poor periodontal status and a greater number of missing teeth over the 5-year period.

The other direction of the periodontal disease-diabetes connection suggests controlling periodontal disease affects glycemic control in diabetics (NIDCR, 2011). Taylor (2007) carried out a randomized clinical trial (RCT) pilot, sponsored by the NIDCR, to determine the effect of treating periodontal disease on glycemic control in patients with Type 2 diabetes. The results were that there was considerable clinical and epidemiological evidence that periodontal treatment using mechanical periodontal therapy and oral systemic antibiotics had a positive
effect on glycemic control in patients with Type 2 diabetes (Taylor, 2007). However, another study by Serrano, Perez and Sabogal (2012) found periodontal therapy mainly improved the clinical condition of diabetic patients, but the effect on glycemic control was not significant and requires further proof and investigation. Therefore, further testing is required in this area, but meanwhile there could be a cautious approach towards the periodontal-diabetic connection.

**Periodontal Disease and Smoking**

Tobacco mix contains more than 4,800 chemicals, of which, about 70 are known to be carcinogenic (American Dental Hygiene Association [ADHA], 2010). According to the AAP (2011), tobacco is one of the most significant risk factors in the development and progression of periodontal disease. The ADHA also states smokers who smoke less than half a pack a day are three times more likely to develop periodontitis than non-smokers, and those who smoke more than a pack and a half a day are six times more at risk (ADHA, 2010). Pipe smoking is found to be as harmful to periodontal health as cigarette smoking (AAP, 2011). Smokeless tobacco can lead to gum recession, chewing tobacco can lead to mucosal change and contributes to oral cancer (AAP, 2011).

Smoking is known to cause calculus buildup around the teeth, increase bacterial load, cause gum recession, deep pockets and eventually bone loss and loss of supporting structures (AAP, 2011). A Gautam et al., (2011) studied 400 males, 200 smokers and 200 non smokers randomly selected in India to assess periodontal conditions using the CPI index and patient questionnaires. The authors found smokers had deeper pockets and less bleeding than non smokers. Moreover, the results support other studies regarding the negative effect of smoking on the regenerative capacity of periodontal tissue, which is significant in bone grafting and guided tissue regeneration, as well as, the success of dental implants (Gautam et al., 2011). Ankola,
Nagesh, Tangade and Hegde, (2007) found a direct association between cigarette smoking and periodontal status among adults with special focus on increase rate of tooth loss among smokers.

A Japanese study (Hanoika et al., 2000) determined the difference between oxygen sufficiency in the gums of smokers and non-smokers with periodontal disease. These results found smokers have functional impairment in their gingival microcirculation, which might be attributed to the constriction of blood vessels caused from tobacco chemicals (Hanoika et al., 2000). These results explain the decreased periodontal bleeding among smokers (Gautam et al., 2011). The results also support the relation between smoking and decrease success of periodontal therapy and other regenerative techniques (Gautam et al., 2011). Moreover, the histological effect of smoking was confirmed by Kumar and Faizuddin (2011) who examined the blood vessel density and the epithelial structure of periodontal tissue. The results were that smokers had less vascular density and increase epithelial thickness with narrower lumens, which affects the blood flow and regenerative capacity of periodontal tissue (Kumar & Faizuddin, 2011).

In addition to periodontal involvement, smoking affects oral health in other ways such as causing mouth sores, oral cancer, bad breath, stained teeth, loss of taste, and facial wrinkling (AAP, 2011). Therefore, periodontal and oral health can be greatly affected by smoking and educating the public of the connection is of great importance.

**Periodontal Disease and Pregnancy**

Pregnancy has been bi-directionally linked to pregnancy and can affect oral health and in particular periodontal health and at the same time periodontal disease can affect the normal path of pregnancy and the health of newborns (AAP, 2011). Fluctuating hormonal levels during pregnancy, particularly estrogen and progesterone, can affect the gingival tissue through the gingival receptors (Rai, Kaur, & Kharb, 2009). Although the exact mechanism is unknown,
researchers suggest these hormonal changes result in an exaggerated inflammatory response of the gingival tissue to plaque along with increased vascularity, immune system alterations and/or changes in connective tissue metabolism. This causes what is known as pregnancy gingivitis. Pregnancy gingivitis can be localized or generalized and is manifested as swollen gums which tend to bleed on brushing (Rai, et al., 2009). It commonly becomes apparent late in the second month and reaches its peak by the eighth month of pregnancy.

Huck, Tenenbaum, and Davideau (2011) point out hormonal fluctuation during pregnancy alters the composition of the oral biofilm and leads to the selective growth of pathogens, which is referred to by several other studies. This alteration aggravates gingival inflammation and contributes to periodontal disease in pregnant women (Huck et al., 2011).

Periodontitis, is found to be a statistically significant risk factor for premature delivery and low birth weight babies (Rai et al., 2009). Since the mid 90’s, studies have investigated the association of periodontal disease with preterm and/or low birth weight (PLBW) babies. One study found mothers with periodontal disease were seven times more likely to have a preterm or low birth weight baby (Rai et al., 2009). Another study (Rai et al., 2009) found premature, low birth weight babies were 11 times more likely to occur in women whose periodontal condition worsened during pregnancy.

In addition, a 5-year prospective study (Offenbacher et al., 2001) was done to determine whether periodontal disease during pregnancy contributes to premature babies and growth restrictions. The protocol included a full mouth examination at 26 weeks gestational age and 48 hours postpartum to evaluate periodontal status during and after pregnancy. The results revealed maternal periodontal disease was a significant contributor for preterm labor, low birth weight and low weight for gestational age (Offenbacher et al., 2001)
The exact cause for premature labor is unknown, but some investigators suggest bacterial infection from periodontal disease results in activation of cell-mediated immunity and the production of substances known as cytokines. Labor is induced by the increase in levels of these cytokines reach the uterus through the blood stream (Rai, et al., 2009). Huck et al. (2011) reviewed multiple recent studies that linked preterm birth to periodontal disease and developed three main hypothesis regarding the cause for preterm birth: (a) bacterial spreading (b) inflammatory products dissemination, and (c) role of feto-maternal immune response against oral pathogens (Huck et al., 2011).

Interventional studies have been carried out on a large number of pregnant women and several case control studies were evaluated to determine the effect of periodontal treatment on pregnancy outcomes (Huck et al., 2011). The results are controversial; however, the examiners recommend periodontal treatment and maintenance of oral hygiene during pregnancy to avoid risk of preterm birth or fetal abnormalities. They also recommend the cooperation between dentists and obstetricians to diagnose and treat periodontal conditions early and educate pregnant women to possible risk factors (Huck et al., 2011).

**Periodontal Disease and Osteoporosis**

Osteoporosis is a global health problem affecting postmenopausal women (Gera, 2002). Recently, studies have attempted to identify the link between periodontal disease and osteoporosis. It has been indicated that total body calcium levels and bone density are closely associated with mandibular bone density (Gera, 2002). In addition, edentulism has been linked to systemic osteoporosis in several studies that show tooth loss is more likely in patients with osteoporosis (Gera, 2002). Because both periodontal disease and osteoporosis are bone destructive, it has been suggested osteoporosis acts as a risk factor for the progression of
periodontal disease and bone loss (Koduganti, Gorti, Reedy & Sandeep, 2009). One of the first studies to address this relationship was done by Kribbs, Smith, and Chestnut (1983) on osteoporotic women and suggested a link between osteoporosis and mandibular bone density. From all studies reviewed by Koduganti et al. (2009), they conclude systemic bone mineral density is directly related to oral bone mineral density, which is directly associated to alveolar bone loss, and subsequently tooth loss.

**Summary**

Based on the literature review, it can be concluded that the relation between periodontal disease and systemic conditions requires further research. Nevertheless, it is important to educate patients on this association and inform them that maintaining oral health is important. The systemic disease periodontal connection also suggests that dentists should play an important role in the detection and identification of critical systemic conditions (Koduganti et al., 2009). Early identification of periodontal risk factors can help eliminate disease complications and in turn reduce further systemic complications. With the identification of the oral-systemic connections, there must be cooperation and coordination between dentists and physicians in order to address these issues precisely and ensure the health of the public.

**Practicum Design, Methods and Implementation**

The project provided patient education and implemented patient education program at Family Dental Care (FDC). The design was based on information collected from meetings, investigations and research to produce tailored interventions that would achieve the program goals and objectives.

Family Dental Care clinic is part of a well-established community health center, People’s Center Health Services (PCHS), which serves a great portion of the economically disadvantaged
and socially disfranchised people within the community (PCHS, 2012). This reflects FDC’s patients’ degree of knowledge and dental awareness that was noted and observed during the project. This lack of oral health awareness was further complicated by the lack of sufficient appointment time, also observed during this project.

The methods were based on the clinic set up for hygiene appointments. Due to liability concerns, discussion of the patients medical condition specifically and addressing patients based on medical conditions was omitted. Instead, patients were approached equally and all patients were educated. This ensured every patient benefited from the project regardless of medical condition.

**Patient Education at Family Dental Care**

Family Dental Care staff and hygienists were provided with the educational material offered during the program and were given the resources for ordering more as needed. Hygienists were provided with the originals of all the printed materials. They were also informed they should keep the posters up in operating rooms even after the program to ensure continuation of patient education at FDC. Other patient education methods were suggested to management such as videos and televisions in waiting areas. It was also suggested to translate and develop other methods to communicate with culturally different patients for cultural competency and to make those patients feel valued. Family Dental Care management was encouraged to maintain the educational process in the clinic and ensure the long-term implementation.
Hygienist Education

Hygienists were educated individually, by meeting with each at the beginning of the program. Education included explaining the oral-systemic connection and explaining the importance of patient education. The brochures and flyers were used as supporting information for hygienist education. Hygienists were provided with additional resources for information about the oral-systemic connection. Relevant information from AAOSH, its website, and membership was made available as well. One hygienist actually joined the AAOSH during the program. Hygienists were encouraged to perform a brief patient education session at every patient visit and during the last week of the program, hygienists were asked to educate patients and explain the oral-systemic connection to patients ensure their ability and efficiency in delivering information to patients. In addition, this demonstrated to hygienists that patient education is simple and easy and should become routine at every patient visit.

Patient Education

Patient education was through educational material which part was personally designed such as the posters and flyers or obtained from the National Institute of Dental and Craniofacial Research- National Institutes of Health (NIDCR-NIH) and the ADHA such as the brochures and pamphlets, as well as personal meetings with patients.

There were two waiting areas in the clinic, both waiting areas offered the following materials:

1. Periodontal health and disease brochures
2. Diabetes dental tips flyers
3. Periodontal disease- heart connection flyer
4. Periodontal disease- smoking flyer
5. Some life saving tips flyer regarding smoking and periodontal health
6. Pregnancy and periodontal disease flyer

Posters were placed in hygiene rooms to explain the relation between periodontal disease and heart; periodontal disease and diabetes; and periodontal disease and smoking. Patient education was performed in face-to-face sessions with patients in the operating rooms, during hygiene appointments at the beginning, or at the end of an appointment or while patients waiting for a dentist. This varied from one patient to another, depending on a hygienist’s schedule and availability. Hygienists also informed patient of the meeting before hand and decided when the best time was so education could be done. Before the meeting, the patients’ age, sex and medical history were recorded (see table 1). At the beginning of the meeting after a brief introduction of myself and the aim of the program, patients were asked if they have ever heard of the mouth-body connection. The answer was recorded (see table 1). If the answer was yes, patients were asked what they have heard. If the answer was no, a brief introduction was given and further details regarding specific periodontal-disease connection was provided based on patient's preference. Otherwise, the periodontal-heart connection, periodontal-diabetes connection, periodontal-smoking connection, periodontal-pregnancy connection and periodontal-osteoporosis connection were explained to the patient in brief.

In cases where patients had one of the medical conditions, (pregnant, smoker or diabetic), specific attention was focused on the relationship, and still the patient was informed briefly about the rest. In cases where patients had not been to the dentist in several years and had stated that they were not familiar with periodontal disease, an introduction to periodontal disease was given and the periodontal disease brochure was given to the patient.

As a conclusion, all patients were advised to maintain their oral health and come in for regular dental visits to promote oral health and wellbeing. Patients were also encouraged to
spread the information to friends or family members who might have one of the mentioned systemic conditions. At the end of the meeting, patients were offered brochures and flyers based on their condition or their preference.

Because the majority of the patients participating in the program were females, the pregnancy and osteoporosis links were discussed predominantly and received a great deal of attention. Parents and guardians who accompanied children or relatives were also included in the educational process because it was convenient to educate them during a child’s appointment. In this case, there was more time and more information could be delivered to parents.

For Somali patients, education was carried out in Arabic or translation was facilitated by an interpreter or a Somali hygienist, who was one of the three hygienists at the clinic. At the end of the patient education session, patients were given the opportunity to ask questions and were given the freedom to take as many educational materials as they need to give to friends or families.

**Practicum Results and Findings**

Throughout April and May 2012, 203 patients at FDC were seen and educated in this project. Based on information collected from the participating patients and records, a majority of the patients (69%) were women who came in for hygiene appointments. Specifically, more than half the women seen were in the age group of 18-34. When patients were asked whether they had ever heard of the mouth-body connection, 74% of women and men had never heard of a link or connection before, with a greater percentage of men stating they had never heard of the connection. Twenty one percent of all patients reported they had heard “a little” about oral-systemic disease connection. The majority of patients stated they heard of the heart connection and only 5% were aware of the oral-body connection. Only one diabetic patient stated she was
aware of the relation between periodontal disease and diabetes, but she was not sure of the reason or explanation behind this connection. Only one pregnant woman stated her physician has mentioned to her something regarding pregnancy gingivitis. Several patients stated they had a family member or friend who has one of the discussed medical conditions and they would like to take brochures to educate them.

Regarding the medical history of patients who were educated, 36% of the patients seen were smokers, 26% were diabetic and/or hypertensive and 8% were pregnant. The remaining patients reported to be relatively healthy. Even though the percentage of pregnant women was considerably small (8%), almost all the women were educated on the periodontal disease – pregnancy link, with special focus on younger women, or those who reported they had pregnant friends or family members. The periodontal-disease osteoporosis link was explained in more detail to older women.

Most of the patients showed great interest in the topic of oral-systemic connection and were willing to learn more. At the end of the educational session, and after answering their questions, most patients commented they agreed with these theories from a logical standpoint. Many of the younger patients also showed interest in spreading the information to friends and families.

**Discussion**

Family Dental Care seeks to satisfy the dental needs of economically disadvantaged people within the community of South Minneapolis. Accordingly, the educational and social level of FDC patients reflects the findings and results formulated. The percentage of patients (74%) who had never heard of oral-body connection reflects the lack of patient education regarding oral health and lack of awareness regarding the importance of oral health. Education
and awareness are the basis for dental public health. Therefore, there is a deficiency in establishing the proper foundation for dental public health within the community. The percentage of smokers (36%) also indicates the need for focusing on the effects of smoking on oral health. It also suggests dental providers must have a role in encouraging smoking cessation and this might require cooperation with other specialties.

The larger percentage of women (69%) and their greater awareness regarding oral health topics, confirms the reports released by the CDC (2012) which found women are more likely to care for their oral health and visit a dentist than men, especially in the age group 18-34. Women represent a major influential source in their communities and they seem to care about their health and wellbeing. Approaching women in terms of oral health and how it affects appearance and overall health can result in a positive outcome, especially with women's influence at home and in communities.

The willingness of FDC patients to learn about oral health and its relation to overall health is promising and should encourage the continuation of patient education at the clinic. This project also encouraged the management team to consider other methods for patient education. This is how dental providers can guide patients by providing them with the knowledge and information they need to lead a healthy life.

**Limitations and Recommendations**

Patient education is commonly more effective when the information is revealed by the provider (AAO, 2012). The first limitation in this project was due to the short appointment lengths; this limited the number of patients educated. The length of hygiene appointments was only 30 minutes for the first visit, including radiographs and exam. Then patients came back for a second 30 to 40 minute appointment for cleaning. This made patient education in hygiene
appointments challenging. By the time one of the hygiene patients were educated another patient with a different hygienist might be done with a visit and so a patient was missed. However, this should not represent a problem for patient education at FDC over the long-term because patient education would be carried out by each hygienist rather than by one person. This would ensure all patients receive oral health education as part of a visit. The second limitation was the high volume of patients who failed to come to appointments.

The third limitation was in the organizational resources, because FDC is part of a Federally Qualified HealthCare Center (FQHC). This limited the implementation of more advanced methods for patient education such as videos/DVD in waiting areas and education through Internet sources. Internet patient education and communication requires paperless clinic database and requires GDC patients all have access to the Internet, which was not the case.

The fourth limitation was language and cultural barriers. A large number of FDC patients are Somali, talking with patients required an interpreter, who often did not have enough time for an educational session. Patient education also required the acceptance of the patient to listen and learn from the educational material provided. Printed materials would have been more effective if they had been translated into Arabic. This limitation was partially avoided by scheduling Somali patients with the Somali hygienist, which reduced language and cultural barriers.

The recommendation to improve patient education at FDC is to increase the length of the hygiene appointments to provide enough time for education. To increase focus on patient education in waiting areas and operatories through videos which are an effective and attractive method for many patients and are preferred more than written materials at many times (AAO, 2012). This may require some financial resources, but over the long run encourages effective patient education.
**Conclusion**

Oral health is an important contributor to overall health and wellbeing. Patient education to the oral-systemic connection is the guide to promote public oral health (AAOSH, 2010). The establishment of the AAOSH organization is a promising step to support health professionals and guide them to the standards of services and public awareness required regarding the oral-systemic health connection (AAOSH, 2010). Patient education is the responsibility of healthcare professionals obligated to inform patients of the health risks and needs. Patient education is as important as patient treatment because disease prevention is as critical as its cure. There are several approaches to patient education. Every healthcare setting should allocate resources and abilities to determine a suitable patient education method for its target population.

The goals and objectives of this project aimed at benefiting the student as well as the organization. The practicum student identified and evaluated community needs, prioritized issues, managed available resources, learned to work in a specific timeframe, and was given the opportunity to implement the learned concepts and knowledge as well as develop managerial and communication skills.

The long-term goal is to achieve public health through the cooperation between all fields of healthcare including dental and medical fields in particular. The aim is to close the gap between different health professions, especially after recent researches and studies show the significant connections (AAOSH, 2010). Patient education is the shield to protect and strengthen the public to achieve desired public health standards.
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