

Summer 1998

Oral Health Knowledge, Attitudes, and Behaviors of Qatari People

Najat Abdrabbo J. Saleh Al-Salahi
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**ORAL HEALTH KNOWLEDGE, ATTITUDES,
AND BEHAVIORS OF QATARI PEOPLE**

by

NAJAT ABDRABBO J. SALEH AL-SALAH
BSDH May 1993, King Saud University

A Thesis Submitted to the Faculty of
Old Dominion University
in Partial Fulfilment of the Requirements for the Degree of

MASTER OF SCIENCE

IN

DENTAL HYGIENE

OLD DOMINION UNIVERSITY
August 1998

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ABSTRACT

ORAL HEALTH KNOWLEDGE, ATTITUDES, AND BEHAVIORS OF QATARI PEOPLE

Najat Abdrabbo J. Saleh Al-Salahi
Old Dominion University, 1998
Director: Prof. Michele L. Darby

The purpose of this descriptive study was to determine the oral health knowledge, attitudes, and behaviors of Qatari people. The convenience sample consisted of 859 Qatari people between the ages of 18-72 from Hamad Medical Corporation- Dental Department, Public Dental Health Care Centres, University of Qatar, Police and Army Departments, governmental schools, a private dental clinic, and citizens. Participants were asked to complete a self-designed questionnaire titled *Oral Health Knowledge, Attitudes, and Behaviors of Qatari People*. Prior to the study, 20 Arab college students responded to the questionnaire in a test-retest procedure to establish instrument reliability. The content validity of the questionnaire was established by a panel of dental hygiene experts at Old Dominion University. Questionnaire data were analyzed using frequencies, percentages, the chi-square test of independence, and the analysis of residual test.

Findings revealed that 74.4% of the respondents visit a dental clinic for dental cleanings, but of this number, 62.2% did not receive any toothbrushing instructions; and 63.2% did not receive flossing instructions. Forty-eight point eight percent visit the dental hygienist or dentist when they experience pain and the majority (61.8%) brush more than once a day. Most of the respondents arrive late for dental care because of other

commitments. The majority of respondents willingly accepted oral hygiene instructions given at each dental visit, demonstrate their home care technique to the dentist or dental hygienist, cooperate in an oral hygiene evaluation of their mouths at each dental appointment, and return for professional teeth cleaning appointments if necessary. Almost half of the respondents (46.9%) feel embarrassed when told that their oral hygiene needs improvement, or when they (38.2%) need to learn oral hygiene techniques from a professional of the opposite gender.

Chi-square analysis revealed a statistically significant association among the demographic variables of either age, gender, level of education, or distance between their home and a dental clinic and the following items: the frequency of visiting the dental hygienist/dentist, toothbrushing frequency, the time spent each day cleaning the teeth, the reason for arriving late to the dental clinic, the reaction to oral hygiene instructions given at each dental hygiene appointment, the reaction when asked to demonstrate home care techniques at the dental clinic, the reaction when their oral hygiene is checked at each visit, the reaction when asked to return for several professional teeth cleaning appointments, and the embarrassment when told that oral hygiene needs improvement or when taught oral hygiene instructions. Results suggest an association between the demographic variables of age and level of education and the following items: accepting new oral hygiene concepts from dental hygienist/dentist, and following the hygienist's/dentist's instructions. In all, results suggest that the Qatari people surveyed have positive attitudes toward accepting oral healthcare, little knowledge of contemporary oral health concepts, and positive oral health behaviors.

To the man whom I love.

To the man who supported and encouraged me during these years.

To the man who willingly chose to live away from his family, friends, and country all these years just for me.

To the man who prays for me to succeed in my classes, and in this study.

To the man whom I love from the bottom of my heart, my appreciation and hopeful that Allah will reward him for the time he spends with me in the United States.

To my lovely father, I love you.

To my mother who managed family responsibility after my father came with me to the United States. I appreciate your help, patience, and support all these years. You deserve all the love in world.

In the memory of my best friend Aisha Al-Saad,
who had a bad accident in Saudi Arabia (1994)
on her way from Madina to Jeddah. May Allah accept
her, and place her in heaven.

ACKNOWLEDGMENTS

The researcher wishes to acknowledge the following individuals for their contributions and support in this study:

Prof. Michele Darby, Graduate Program and thesis director, School of Dental Hygiene, Old Dominion University, Norfolk, Virginia, for her time, support, continual encouragement, friendship, guidance, expertise, tireless efforts in guidance, judgement, constructive criticism, and love.

Deborah Bauman, Associate Professor and thesis member, for her time, expert knowledge, encouragement, and advice.

Lynn Tolle-Watts, Professor and thesis member, for her time, judgement, guidance throughout the study, and encouragement.

The researcher wishes to express sincere appreciation to the overseas individuals from the State of Qatar, who supported the author during the period of this study, e.g., collecting information, editing, obtaining information from different libraries, stapling and organizing the questionnaires before distributing, and assisting the researcher in data collection.

For the researcher's family:

Maryam Said J. Al-Salahi and Samia Abdrabbo J. Al-Salahi (Qatar University students), Zaid Abdrabbo J. Al-Salahi (QTEL senior staff), Hassan Abdulla Al-Salahi (Qatar University student).

Mona Abdulla H. Al-Salahi and Fatma Abdulla H. Al-Salahi (Ministry of Municipality staff), Shamma Said J. Al-Salahi, social worker at Al-Rayan Public Health Centre, and her husband Fadel Ali N. Al-Amri, a teacher at the Ministry of Education, and Ahmed Abdulla H. Al-Salahi, high school student.

Abdulla Abdrabbo J. Al-Salahi, school student; Muhammad, Fahad, Nasser, Rashid, Jobran, Zainab, Roqaya, school students, and Sulaiman Said Al-Salahi, Qatar University student. Deep thanks go to my aunt Aum-Sulamain.

To my parents, for their love, patience, and moral support throughout this challenging study.

For the researcher friends:

Thajba Abu-jasoom, PT, Ms (HMC), Dr. Hanan Awad Mujaly (training Family Practitioner-HMC), her husband Mr. Rashid Saad Mujaly, and Mona Al-Bakri (pharmacist at HMC).

Thanks go to my best Kuwaiti friends Safa Ali Abdul-Salam and her husband Fawzi Abu-Zuber, for scanning all my figures and tables and for their help in computer analysis.

The researcher would like to acknowledge the following individual:

For the G.C.C Folklore Centre, the researcher deeply thanks Mr. Hamad Hamdan Al-Muhanadi, Head of the Information Department, for his patience, mailing or faxing information, and efforts in gathering cultural information for this study.

For Primary Health Care, Dr. Saad Al-kuwari, B.CH., M.Sc., C.A.G.S., M.D.CH., M.Sc.D., D.Sc.D., Head of the Dental Department at the Public Health Centre, for providing his books, encouragement, and suggestions.

Thanks go to the Primary Health Care and Dr. Yousef Abu-Alfeen, Head of the Department, for permitting the distribution of the questionnaire.

Thanks goes to Dr. Abdul-Aziz Darwish, Head of the Rumailah Dental Department, and the dentists, dental assistants, security, and receptionist who assisted the

researcher in gathering the data for this study.

Deep thanks go to the following administrators of the Public Health Centres for their hospitality, help, and honesty in keeping the questionnaires for the investigator:

For Al-Muntazah Public Health Centre, Mr. Muhammad Muhammadi Al-Yami (administrator), all the social workers, and the receptionist.

For Al-Dafna Public Health Centre, Mr. Abdulla Al-Bin-Ali (administrator), and all the social workers.

For Aum-Guailina Public Health Centre, Ms. Salamh Al-Sulaity (social worker).

Researcher would like to thank the Cultural Attaché staff and Ministry of Education-foreign scholarship who funded my transportation to Qatar to collect the data.

Thanks goes to the copy centre at Hamad Medical Corporation for their help in photocopying the questionnaire, and to Qatar television for providing the film about Qatar used during the thesis defense.

Thank goes to all the Qatari people who participated in the study and others who expressed good wishes for the researcher's success. Also thanks goes to all Qatari people who returned their questionnaires to the dental department for the researcher.

From the United States:

Thank goes to my colleague, Joan Ellison, for her help when required during this study.

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CHAPTER I

INTRODUCTION

Oral hygiene behavior is culturally influenced. In the Middle East, for example, most Arabs prefer using their traditional teeth cleaning methods, supplemented by the customary western method involving the synthetic toothbrush and toothpaste. For centuries, Arabs have been using *miswak*, a particular type of wooden chewing stick that has antiseptic and antibacterial qualities (Qatar in perspective-Personal Communication, September 1997). Miswak also contains tannic acid that provides protection from periodontal disease and produces pleasant smelling oil that increases saliva production

For over 1000 years, Qatari people have used miswak as a natural tooth cleaning aid to freshen their breath, especially before prayer. The younger generation of Qatari people are aware of the importance of mouth cleaning. Some of them use commercial toothbrushes and toothpastes with and without miswak. However, some older Qatari people continue the traditional mouth cleaning methods while some younger people have started using miswak. Although many Qatari people use a toothbrush and toothpaste, they may view learning new toothbrushing techniques as unnecessary for their periodontal disease control, since they have their own methods.

In 1994, 10,124 periodontal records of Qatari dental patients were assessed and found to have at least one of the following: gingivitis, periodontal disease, and periodontal or periapical abscesses (HMC-Dental Department-Personal Communication, September 1997). Even though periodontal disease is a problem facing the Qatari population, only one dental hygienist is available to educate the whole population about preventive oral healthcare (HMC

Dental Department-Personal Communication, September 1997). Presently in Qatar, three to four dentists provide the preventive healthcare that was once provided by the one dental hygienist. Since a large percentage of Qatari people have periodontal disease, they need to improve their knowledge and contemporary oral hygiene behaviors to decrease the incidence of periodontal diseases. In addition, Qatari people need to develop positive attitudes toward the clinical role of the dental hygienist.

No research existed on the knowledge, attitudes, and behaviors of Qatari people toward contemporary preventive dental concepts. This research deficiency deters dental professionals from assessing and improving patients' oral health knowledge and self-care behaviors. This research is the first to measure the oral health knowledge, attitudes, and behaviors of Qatari people and provide a foundation for the development of effective oral health preventive strategies to educate these people.

Statement of the Problem

The purpose of this study was to determine the knowledge, attitudes, and behaviors of the Qatari people towards contemporary oral health concepts. The specific questions were:

1. What are the oral health behaviors of Qatari people?
 - a. What oral cleaning techniques are used by Qatari people?
 - b. What are the oral healthcare aids used by Qatari people?
 - c. Do Qatari people use mouthrinses?
 - d. Why do Qatari people arrive late to their dental hygiene appointments?
 - e. What is the reaction of Qatari people toward oral hygiene instructions given to them at the dental hygiene appointment?
 - f. What is the reaction of Qatari people if asked by a dental hygienist or dentist to

- demonstrate their homecare technique?
- g. What is the reaction of Qatari people when their oral hygiene status is checked at each dental or dental hygiene appointment?
 - h. What is the reaction of Qatari people if asked by the hygienist/dentist to return for multiple appointments to have their teeth professionally cleaned?
2. What are the attitudes of Qatari people toward oral health instructions delivered to them by an oral health provider of the opposite gender?
 - a. Do Qatari people value professional oral health instructions from the dental hygienist or dentist?
 - b. How important is the dental/ dental hygiene appointment to Qatari people?
 - c. Are Qatari people receptive to learning new oral homecare techniques?
 - d. How important is brushing and flossing to Qatari people?
 3. What is the general dental knowledge level of Qatari people?
 - a. How do Qatari people view gingival bleeding?
 - b. Do Qatari people know the primary etiologies for dental caries and periodontal disease?
 - c. How do Qatari people rate the health of their gingiva and teeth?

Significance of the Study

There are no studies focusing on the knowledge, attitudes, and behaviors of Qatari people toward contemporary oral health concepts presented by dental hygienists or dentists. Statistics show that Qatari people treated at the Hamad Medical Corporation-Dental Department, received care for a variety of dental problems (See Table 1) (HMC-Dental Department-Personal Communication, October 12, 1997). Based on these statistics, Qatari people need to be educated about periodontal diseases and self-care techniques to prevent

dental caries, gingivitis, periodontitis, and the need for future dental treatment. Persons seeking dental care annually in Qatar increased over the past years (See Table 2). This increase demonstrates the positive concern of the Qatari people regarding their personal dental health; however, patients continue to visit dental clinics with various levels of gingivitis and periodontitis (HMC-Dental Department-Personal Communication, October 12, 1997).

Table 1

Number of patients treated in Hamad Medical Corporation-Dental Department as of Oct 12, 1997 (HMC-Dental Department-Personal Communication Oct 12, 1997)

Dental procedures 1994	Number of patients
Simple extractions	6744
Fillings	22369
Endodontic treatment	12598
Periodontic treatment	10124
Prosthetic appliances	12118
Orthodontic treatment	14289
Paedodontic treatment	14531
Total	92773

Qatari people request appointments for restorative, prosthetic, dental surgery, and to a lesser extent, professional dental hygiene preventive care (See Table 1). Although some Qatari people seek professional scaling and extrinsic stain removal only before an important event such as a wedding, graduation, party, or travel out of the state, many are interested in regular preventive care and keep their appointments with the dental hygienist and/or dentist.

Plaque is a Latin word and most Qatari dental patients understand its meaning when a professional explains it in lay terms. However, Ainamo (1986) reported that the word "plaque" causes confusion in some cultures since it's not a word used in all languages. In the Qatari culture, people use the word "bacteria" instead of plaque. Gingivitis and periodontitis have different meanings in English, but similar meanings in Arabic, and this adds to the difficulty in

Table 2
Number of dental patients visits each year at the Hamad Medical Corporation (Personal Communication, October 12, 1997)

Number of Dental Patients Visits Each Year		
Year	Qatari	Non-Qatari
1994	51769	24301
1995	64772	27179
1996	71147	27506
Total	187688	78986

educating Qatari people about the etiology, prevention, and control of oral diseases and their prevention.

Although Qatari people are aware of dental calculus and bacterial plaque, some regard bacterial plaque as remaining food debris on their teeth. Because they cannot excuse their poor oral self-care behavior to the dental hygienist or dentist, they are embarrassed for a professional to see the oral cavity. Some Qatari people don't differentiate between bacterial plaque and dental calculus, but they know that calculus should be removed. In contrast, Gift (1986b) reported that in the United States, people are knowledgeable about bacterial plaque and how it leads to gum diseases, yet, like in Qatar, some still cannot differentiate between bacterial plaque and dental calculus. Ninety percent of the United States population believes that for periodontal disease prevention, a person must visit a dentist regularly and maintain good oral hygiene. (Nation Centre Study, 1985; Bakdash, 1986). The beliefs of Qatari people regarding their oral health behaviors could not be found in the literature.

Epidemiological research demonstrates that periodontal disease is prevalent all over the world, and that the progression and severity of periodontal disease increases with age (Barnes, 1984; Soderholm & Attstrom, 1984; Gjermo, Bellini, Santos, Jose & Jayme, 1984; Schaub, 1984; Christensen, Skougaard, & Stoltzek, 1984). Periodontal disease is prevalent because of

inadequate bacterial plaque control. Some older Qatari people tend to reject the contemporary plaque control methods such as toothbrushing, and refuse professional instruction even though self-care instructions are considered the foundation of treatment. Older people might refuse oral hygiene instructions, thinking that they are more experienced than the dental hygienist or dentist who wants to teach them contemporary oral self-care. From the researcher's point of view, some Qatari dental patients claim that they clean their teeth regularly using a better method than the one recommended by the professional, yet these patients still have preventable oral disease.

Qatari culture differs from the European, Australian, American, or Canadian cultures. Qatari people are more conservative, and usually men do not talk to women unless the woman is a sister, mother, aunt, fiancée, or wife. Therefore, culture may lead some Qatari people to become embarrassed when practicing oral hygiene instructions in front of a dentist or a dental hygienist of the opposite gender.

Some Qatari dental professionals request that patients be treated by oral health professionals of the same gender to improve patient compliance and comfort level (Qatari dentists-Personal Communication, May 1997). Some patients feel embarrassed when a professional of the opposite gender discovers periodontal diseases or dental caries. Qatari males may be embarrassed practicing oral hygiene in front of a female dental hygienist or dentist. Moreover, they may view toothbrushing and flossing as nonviable therapies for their problem, or that oral health instruction takes time away from the "valuable" professional therapy such as scaling, root planning, or restorative care.

Noncompliance with oral hygiene instructions results in plaque retention around teeth and hence oral diseases. To add to the problem, Qatari people may experience gingival

bleeding before, during, or after toothbrushing, so they minimize oral care to avoid bleeding.

Qatari people's knowledge of gingivitis, periodontitis, dental caries, and oral health behaviors and attitudes has not been documented. Thus, the significance of this study is to assess Qatari people in this area in order to develop public health policy and programs to improve the oral health of Qatari people and hence their quality of life.

Definition of Terms

The following terms are defined as:

1. STATE OF QATAR: Qatar is an independent sovereign Arab state, situated on the western shore of the Arabian Gulf. It borders the Saudi Arabian Gulf and United Arab Emirates in the south and Bahrain in the northwest. Qatar has a population of 500,000 (1995) in an approximate area of 11,437 km² (Qatar in Perspective, 1997).
2. HAMAD MEDICAL CORPORATION: a government corporation, located in Doha the capital of the state of Qatar, that maintains all medical and dental departments, and provides free healthcare to the citizens of Qatar.
3. MISWAK: a natural dental cleaning aid used in the Middle East, originating from a tree called the ARAK "*Salvador Persica*" that grows in Saudi Arabia, Sudan, southern Egypt, Chad, and eastern India (Arabnet-Personal Communication, 1997).
4. ATTITUDES: a mental position with regard to a fact or state; a feeling or emotion toward a fact or state. Attitudes will be measured using questions from the attitude section of the questionnaire titled *Oral Health Knowledge, Attitudes, and Behaviors of Qatari People* (See Appendices A and B).
5. ORAL HEALTH BEHAVIOR: the action carried out or practiced by an individual or group to prevent oral disease. Behavior will be measured using questions from the

behaviors section of the questionnaire titled *Oral Health Knowledge, Attitudes, and Behaviors of Qatari People* (See Appendices A and B).

6. ORAL HEALTH CONCEPTS: oral health principles and self-care strategies given to patients by dental hygienists and/or dentists to improve their oral hygiene and prevent oral disease.
7. COMPLIANCE: a person's "...performance or desire to perform what is expected of him/her" (Strack, 1980).
8. KNOWLEDGE: is the "...ultimate abstraction about conceptual abstractions. It has to do with what can be understood about complex behavior in complex situations" (Caviedes-Personal Communication, 1993). Knowledge will be measured using questions from the knowledge section of the questionnaire titled *Oral Health Knowledge, Attitudes, and Behaviors of Qatari People* (See Appendices A and B).

Assumptions

The following assumptions are made:

1. Qatari people from different areas in the State of Qatar will be honest and truthful in answering the self-designed questionnaire.
2. Subjects will follow the researcher's and research assistants' instructions for completing the questionnaire.
3. All the participants will return the questionnaire since it will be distributed personally by the researcher and research assistants.
4. Qatari people's attitudes toward contemporary oral hygiene concepts are positively related to their oral health knowledge and behaviors.
5. Fear of the unknown, embarrassment about their oral health, and limited experiences with

dental hygienists keep Qatari adults from seeking preventive oral healthcare.

Limitations

Several limitations affect the validity and reliability of this study follow:

1. The findings may only be generalized to Qatari people who have characteristics similar to those found in the sample. People 18 years of age or less are not represented in this study.
2. The questionnaire does not have established validity and reliability; therefore, content validity and test-retest reliability were established.
3. Some Qatari people may feel that the survey is unimportant and discard it, increasing the percentage of nonrespondents.
4. The sample of Qatari people was nonrandom; therefore, findings cannot be generalized to the entire population of 18-72.
5. The questionnaire was distributed in seven different settings and at different times of the day; therefore, situation-relevant variables may have affected the results.

Methodology

The purpose of this study was to determine the oral health knowledge, attitudes, and behaviors of Qatari people. All subjects were asked to respond to a self-designed questionnaire titled the *Oral Health Knowledge, Attitudes, and Behaviors of Qatari People* (See Appendices A and B). Letters were sent to the Director of Hamad Corporation, Head of the Primary Health Care, and the assistant academic dean of the University of Qatar requesting their permission to conduct the study in their facilities (See Appendices C-J).

A panel of experts at Old Dominion University established the content validity of the questionnaire. The sample included people from different areas in Qatar. Participation was voluntary and no one was obligated to participate. A cover letter was attached to the self-

designed questionnaire (See Appendices C and D). Data were analyzed using frequencies, percentage, the chi-square test of association, and the residual analysis test. Residual analysis test, which measures the discrepancies between the observed and expected values, was used when chi-square analysis showed a significant association between the variables. Data from the three main sections of the questionnaire determined the knowledge, attitudes, and behaviors of Qatari patients towards oral health concepts and typical oral health behaviors.

CHAPTER II

REVIEW OF THE LITERATURE

People worldwide have unique oral health attitudes. These attitudes may be related to past experience, education, hearsay, cultural beliefs, and/or psychological moods. This review of the literature discusses the general and oral health behaviors of Qatari people from a global perspective; patient compliance with oral health instructions; noncompliance in dental clients; psychological concepts and their application to oral hygiene instructions; effects of oral hygiene instructions on knowledge, attitudes, behaviors and fears; and client attitudes towards dental hygienists and the services they provide.

The General and Oral Health Behavior of Qatari People

Although there are numerous publications about Qatar as an oil producing country, little information is available about the lifestyles of Qatari people (Melikian, 1981). Qatar is a small Muslim state situated halfway along the West Coast of the Arabian Gulf. Qatar, an independent sovereign Arab State, has a population of 500,000 as of 1995 and area of 11,437 km² (Qatar in Perspective-Personal Communication, September 1997).

General Characteristics. The indigenous people of the state of Qatar are genuine Arabs. Since Qatar is part of the Middle East Arab countries, it shares the same cultural characteristics pervaded by "Islamic beliefs, traditions, and designs for behavior." It is a culture where actions are "dichotomized into the permitted and the forbidden, into shameful and those that are acceptable" (Melikian, 1981).

Qatari people are described as warmhearted and kind, hospitable toward guests, and willing to help those in need (Qatar in Perspective-Personal Communication, September 1997).

As Muslims, Qatari people developed their traditions and culture from Islam. According to Melikian (1981), "... Islam does not only spell out man's relationship with God but manifests itself in man's relationship to man - both kinsman and stranger, friend or foe, man or woman, Muslim and non-Muslim. What reinforces the religious picture is also the fact that the overwhelming majority of the expatriates are Muslims." Lemu and Heeren (1991) describe the Muslim man as the primary person who is morally and legally responsible for his family. Melikian (1981) also described the Qatari man as the one whose primary loyalty and responsibility is to his family; he defends its honor, and extends help and support to the members of the family, which include cousins, uncles, and aunts. All of these legal and moral obligations provide the family with support, courage, and security.

The Qatari family has been described as traditional, paternal, extended, endogamous, authoritarian, and occasionally polygamous (Melikian, 1981). Marriage is arranged by the parents (Melikian, 1981). "Sex outside the marriage is considered in Islamic law not only as a sin but as a crime which is punished under the law in the same way as theft or murder" (Lemu & Heeren, 1991). The relationship within the family is clearly defined by religion and tradition especially toward parents. Sons and daughters owe kindness, respect, and obedience to their parents. Melikian (1981) never discussed women and society while Lemu and Heeren (1991) mentioned that women are directed in the *Qur'an* to dress modestly in public in a modest type of dress "so as not to attract men."

Since Qatari people obtain their culture from their Islamic religion, western lifestyles that include the boyfriend/girlfriend dating system, mixed parties, dancing between men and women, and use of alcohol or drugs is forbidden. Qatari people focus their social life within the structure of family and close friends, or among separate groups of men and women (Lemu

& Heeren, 1991).

Behavior. Different cultures value different behaviors. For example, what is considered assertive behavior in Western culture, may be viewed as negative behavior according to eastern culture and values. Moreover, acceptable assertive behaviors differ within the same culture as well as between males and females (Al-khulaify, 1992). Al-khulaify (1992) conducted a study on the relationship between the assertive and changeable behavior among Qatari people. The purpose of her study was to determine the characteristics of assertive behavior for both males and females and the relationship between this behavior and some personality traits of the subjects. The sample contained 195 males and females students from the freshman and senior years at the University of Qatar. The subjects were divided into two groups. Group 1 included first year students between 17-30 years of age, and group 2 included fourth year students between 20 and 36 years of age. Al-khulaify concluded that assertive behavior differed between males and females in defining their rights and expressing positive feelings. Although a positive correlation existed between assertive behavior and adjustment, and assertive behavior and internal locus of control, a negative correlation was obtained between assertive behavior and depression, and assertive behavior and each dimension of depression except for social introversion (Al-khulaify, 1992).

Healthcare. Traditionally, health services are provided free of charge to residents of the state of Qatar (Al-kuwari, 1988). Non-Qatari residents pay a small fee for health services including hospital accommodation and prescribed medications. Al-kuwari (1988) mentioned that most (98%) of the dental patients were treated in the dental clinic. Regarding the number of dentists, Al-kuwari mentioned that in 1986 there were 75 dentists covering a population of 369,079 with a ratio of 1:5055.87. There were a few dental technicians, (the author didn't

mention how many there were), and no dental hygienists or programs designed to train and graduate professional dental hygienists. Al-kuwari developed a plan in his dissertation to graduate dental hygienists in two years, but no school has been initiated in the state of Qatar. Currently, the HMC-Dental Department includes 17 clinics in Rumailah with 24 dentists, and 13 clinics in the annex of the Dental Department in Um Al-Merqab with 12 dentists and one hygienist. In addition, a new building with 40 dental treatment areas is ready to serve the public (Dental Department-Personal Communication, May 3 1998). Out of 26 Public Health Centres, 18 have dental clinics staffed by approximately 40 dentists. There are approximately 32 private dental clinics and approximately 38 dentists working in private clinics (Al-Kuwari-Personal Communication, May 3 1998).

In 1993, the first Qatari dental hygienist graduated from the King Saud University, but one dental hygienist is inadequate (Personal Communication, May 3 1998) to cover a population of 500,000 (Qatar in Perspective-Personal Communication, September 1997). As of 1998, there were two dental hygienists in Qatar, one doing an internship, leaving, only one hygienist to educate the whole country. Programs are needed to educate and graduate qualified dental hygienists in Qatar.

Oral Healthcare. Arab people have used various methods including herbs to treat oral pain and clean teeth. Al-Saqiley (1993), Hanna (1989), and Musketeeer (1988) discussed the traditional Arab teeth cleaning methods, including fruits and herbs used to treat gingivitis and stomatitis.

Al-Saqiley (1993) asserts that eating fish, sour milk, sesame, fenugreek, acidic foods like vinegar and lemon, sweets, and drinking very cold or hot beverages weaken gingiva and teeth in both children and adults. To treat gingivitis and stomatitis, Al- Saqiley (1993)

recommended rinsing the mouth with water that had been used to cook lentils in order to reduce inflammation or irritation. Bent fleece soaked in hot oil (any oil), and applied to the gingiva is recommended to relieve pain.

Hanna (1989) advocated the treatment of gingivitis in children and adults with a mouth rinse of water, salt, and thyme. The concentration of thyme should be twice the amount of salt in the mixture. The free gingiva also can be rubbed with the mix two to three times a day, and the rubbing should be done until the tissue bleeds. The foundation of this practice is the belief that bleeding indicates the removal of inflammation and ulcers. Gingival swelling in children also is treated by applying certain herbs, such as *Hassan Yousef* and *Al-nelah*; however, no research could be found to substantiate their effectiveness. While *Hassan Yousef* is used on the gingiva to reduce gingivitis, *Al-nelah* and *kalebo* are mixed with water and applied to a baby's gingiva to reduce swelling associated with the eruption of primary teeth. Raisins are used for gingival swelling, as are pomegranate peels soaked in water.

Hanna (1989) also recommended methods to prevent tooth decay and maintain good oral hygiene. Human breast milk is believed to be a good preventive measure for dental caries, giving strength to the teeth. In the past, parents cleaned a baby's teeth by wiping them with a clean cloth, and discouraged children from eating a lot of sweets, cold foods, and drinks. Sometimes a mixture of ground charcoal with salt and water is used to clean adults' teeth. At a young age, children are taught to rinse their mouths with water to prevent the accumulation of bacterial plaque (Hanna, 1989). Older generations of Qatari people always recommended such behaviors.

In a study of Bahrainis' people, who hold similar value systems and cultural traditions as Qatari people, Musketeer (1988) found that 14% of mothers used pomegranate peel to treat

gingivitis because pomegranate peel is believed to reduce gingival diseases. Nine percent of the mothers used oil (author didn't mention what kind of oil), and 7.6% used salt water as a disinfectant and antibacterial agent to prevent ulcers and help stop bleeding after extraction (Musketeer, 1988).

In the Arab culture, miswak or chewing sticks from an Arak tree are commonly used alone or with a toothbrush for oral hygiene. Research on the effect of miswak on bacterial plaque has been sparse. Al-lafi and Ababneh (1995) attempted to determine if miswak is effective against bacteria and oral microbia. Miswak was chosen because it has a pleasant taste, relatively low cost and proven anti-plaque and positive oral hygiene properties. Although the study was done in Jordan, the miswak sticks were purchased in Saudi Arabia. The miswak was removed from the tree one month prior to the study, dried for two days at 25°C, then cut into small parts and made into a powder. Ten grams of miswak were added to 100ml of sterile distilled water, soaked for two days, then mixed for 10 minutes. A 5ml sample was stored at -20°C for two weeks before used. Seventy patients who visited the Queen Alia Military Hospital to be treated for dental abscess, periodontal abscess, gingivitis, periodontitis, superficial caries, and deep caries, were measured for salivary microorganisms; saliva samples were sent to a lab for assessing both aerobic and anaerobic bacteria (See Table 3).

Table 3

Swabs cultured to test both aerobic and anaerobic bacteria in patients treated in Queen Alia Military Hospital for different dental and gingival diseases (Al-lafi & Ababneh, 1995)

Diagnosis isolated	# of patients	Microorganisms
Periapical lesions	20	Staphylococcus aureus, Streptococcus-aerobic and anaerobic
Periodontitis	25	Aerobic Streptococcus, Capnocytophage, Actinomyces
Periodontal abscess	10	Staphylococcus aureus, Gram negative bacilli, Streptococcus
Deep layer caries	4	Bacillus species, Staphylococcus epidermis, Streptococcus brevis
Superficial	7	Streptococcus viridans group, Lactobacillus species
Gingivitis	4	Gram negative bacilli, Staphylococcus aureus

Three methods were used for testing the antibacterial quality of miswak: the Streaked Plate Method, the Ditch Plate Method, and the Tube Dilution Test for MIC (Al-lafi & Ababneh, 1995). The results demonstrated the antibacterial effects of miswak on various bacteria: *Staphylococcus aureus* and *streptococcus mutans* were the most sensitive; *Candida*, *Lactobacilli*, *Actinomyces*, and *Entero-bacteria* were found to be the most resistant. Gram stains and biochemical tests were used to identify specific oral bacteria (See Table 4).

Al-lafi and Ababneh (1995) mentioned that Asuqo and Montifiose (1977) showed that miswak sticks contained fluoride; however, the authors didn't mention the concentration of fluoride. The miswak sticks used for oral hygiene were found to inhibit some oral bacteria. The authors recommend the use of the miswak for personal home use and in dental health programs (Al-lafi & Ababneh, 1995).

Table 4

“Growth inhibition of different bacteria exposed to different concentrations of miswak” (Al-lafi & Ababneh, 1995)

Miswak (Arak) extract concentration	1%	5%	10%
Growth inhibition of bacterial species			
<i>Streptococcus mutans</i>	60%	70%	88%
<i>Streptococcus mitis</i>	50%	67%	83%
<i>Staphylococcus aureus</i>	88%	93%	96%
<i>Streptococcus salivaris</i>	30%	45%	67%
<i>Candida</i>	0 %	6 %	10%
<i>Lactobacilli</i>	0 %	5 %	8 %
<i>Entero-bacteria</i>	0 %	1 %	3 %
<i>Actinomyces</i>	0 %	0 %	2 %
<i>Anaerobic streptococcus</i>	48%	62%	79%

Oral Health Knowledge, Attitudes, and Behavior- a Global Perspective

A study by Douglas, Geoffrey, Henry, and Erkan (1990) examined the opinions of the Jordanian people regarding oral hygiene and dental care. In Jordan, the average family size is 6, and half of the population is under 12 years of age. Although surveys were conducted in

1962 by the Jordanian Interdepartmental Committee for National Defense, they only focused on the DMF index and the fluoride content of water. Therefore, Douglas et al designed a questionnaire to attain information on demographics, the dentition, frequency of brushing, and attitude toward dental health. Fifty third year college students served as interviewers for the survey. Each of the 50 students was required to interview at least 25 households from his or her respective neighborhoods. Eventually, information was obtained from approximately 2,000 people representing 300 households. Children two years of age were excluded from the study. Demographic results revealed that men made up 52.7% of the sample; about 24% of the participants had a college degree, 14% had no education, and almost 49% were school students. In the sample, 13.7% wore dentures and 38% had lost teeth mostly from extraction. Twenty-five percent had tooth pain, and 10.6 % regularly experienced gingival bleeding. Twenty-two percent didn't brush their teeth, but used toothpaste; 75% brushed five times a day without toothpaste. Seventy-five percent of subjects used miswak to cleanse their teeth. More educated individuals tended to brush more often. Fifty-eight percent of the people reported that they ate large amounts of sweets. Fifty percent of people in the study waited for pain before seeing a dentist. Seventy-four percent of the 62.4% of the people who had visited a dentist were satisfied with the treatment provided. Women exhibited a higher incidence of gingival disease, from 5.3% in childhood to 18.6% in later age. Men had a gingival disease rate of 3% in early life, to 13.1% in adolescence, to 7.8% in old age. Housewives had a high rate of gingivitis (14.7%), as did female teachers (21.3%) and various other female employees (23.3%). Of the retired males, 21.14% exhibited gingivitis, as did military workers (16.1%) and engineers (14.8%). Differences in the respondents' ages and their gingival disease prevalence are shown in Figure 1.

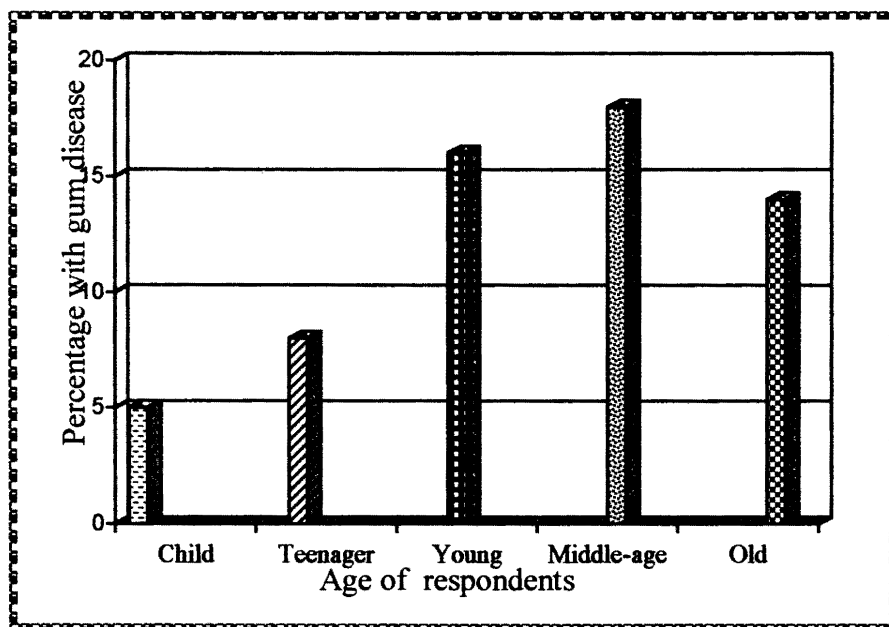


Figure 1: The relationship between the age of the respondent and gingival disease prevalence (Douglas et al, 1990)

The distance a person had to travel to the dental office was a definite risk factor in their frequency of gingival disease. If the nearest dental office was less than 5km from home, periodontal disease prevalence was 9.5%; 5-15km distance to the dental office was related to a 12.6% periodontal disease prevalence; and more than 15 km was related to a 15.8% periodontal disease rate. Douglas et al (1990) predicted that with the increasing Jordanian population and rising DMF index, dental problems would increase in the future.

Ture (1993) conducted a study in Oman on the population's attitude toward oral hygiene and dental healthcare. Fifty-three percent of the population comprised people under the age of 15. Currently, there are 120 dentists working in Oman, 60% of whom work in the private sector. As the dentist/population ratio is 1/17,000, almost 50% of dental treatment in government hospitals is comprised of extractions. In Oman, periodontal disease prevalence is at about 40%, and the caries rate is increasing due mainly to the "modern" diet. Ture's (1993) survey was done with the assistance of 135 Sultan Qaboos University students who received

instructions about the survey and basic oral hygiene. The students collected data in five categories; demographics, number of fillings, missing teeth, presence of pain or gum bleeding; oral hygiene and eating habits; and attitude toward dental treatment. Each student selected a sample of four households from his/her neighborhood, which yielded a total of 3,820 people interviewed from 531 households. Children under the age of three were not interviewed.

Ninety-five percent of the respondents in Ture's (1993) study were under 51 years of age. Fifty percent had college degrees, while 14% had no formal education. About 54% of the respondents were either high school or college students. Eighty-three percent of the respondents had a car; 90% had air conditioning; about 66% had telephones; and 42% lived within 5 km of a dentist. More than 90% said that they had experienced pain before going to a dentist. Many people at the time of the interview were suffering from dental pain (18%). About 51% had lost some teeth; and 3% were edentulous. Fifty-four percent had never been to a dentist, while the 37% who had seen a dentist did so for an extraction. Fifty-four percent brush once a day; 25% brush twice a day; and 13% never brush. Twenty-one percent of subjects had frequent or occasional bleeding of the gums (See Figure 2), in fact, 33% of

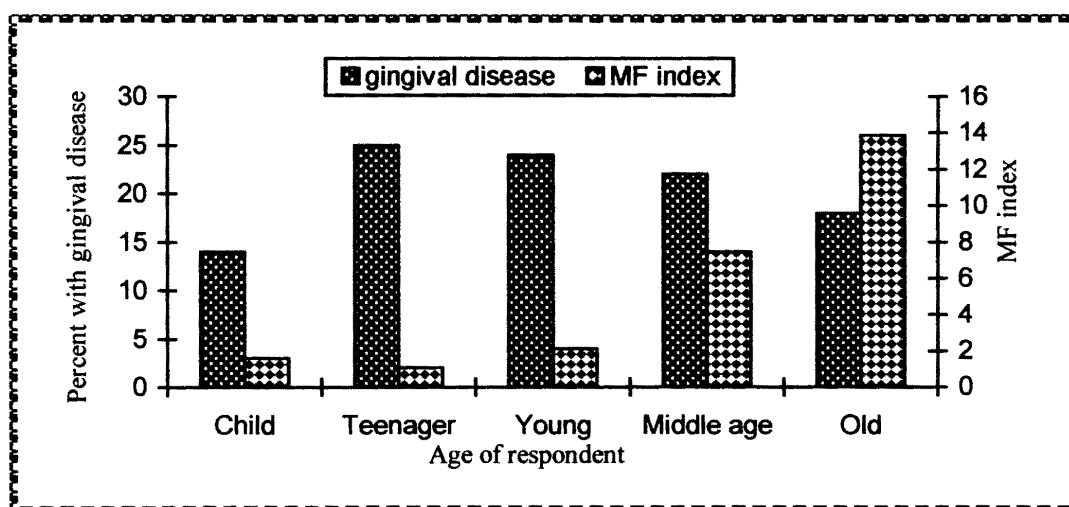


Figure 2: The relationship between the age of people and gingival disease prevalence (Ture, 1993)

teachers had problems with bleeding gingiva. Omanis of African origin experience a higher rate of periodontal disease (34%) and dental pain (31%) than the rest of the Omani population. Results suggested that younger people consume many sweet foods that contribute to an increased dental caries rate.

Ture concluded that as education in people increases, brushing frequency increases; less educated persons are most likely to go to the dentists only for extractions and brush less frequently. Dental and periodontal diseases occur in the Omani population even though people are being educated about oral hygiene. Increases in oral disease are most likely due to the Omanis' habit of delaying dental treatment. Ture (1993) suggests the need for dental health education, oral disease preventive measures and increased access to early dental care. The government has announced plans for a nationwide health campaign which would include the distribution of free toothbrushes and toothpaste to school children and villagers, and an increase in the numbers of dentists and clinics (Ture, 1993). Outcomes from this nationwide campaign must still be measured.

Buckley (1993) compared the attitudes of Irish dentists and the general public regarding periodontal health, and attempted to assist dentists in using the Community Periodontal Index of Treatment Needs (CPITIN) system. In the study, the CPITIN was renamed the basic periodontal exam (BPE). The BPE scores six sextants according to the following criteria: 0=healthy; 1=bleeding on probing; 2=calculus; 3=shallow pocketing of 4-5 mm; 4=deep pocketing of 6 mm or more. The three study phases involved obtaining questionnaire data from 382 dentists on periodontal issues; a post-graduate training program that used special instructors trained in the BPE method; and a public relations campaign to gather information on the general public's opinions regarding periodontal health and

knowledge of prevention (See Figure 3).

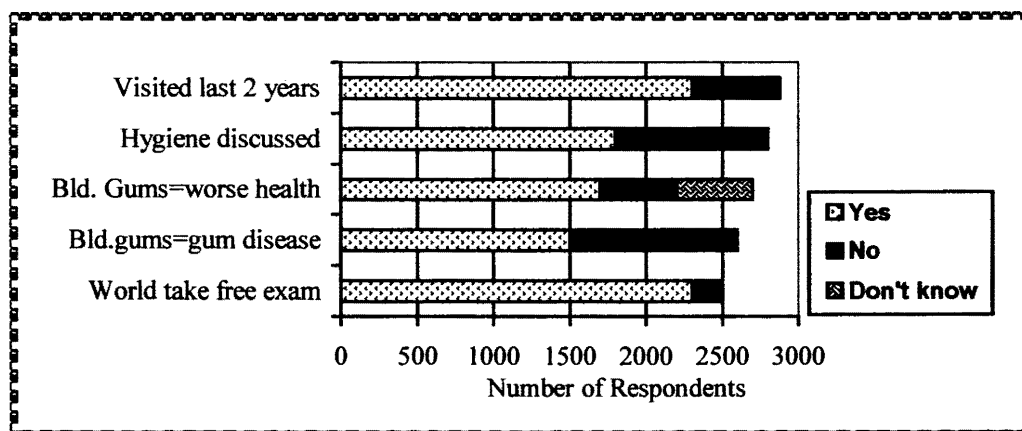


Figure 3: Irish patients attitudes toward oral health (Buckley, 1993)

A total of 2,400 people completed surveys. Buckley (1993) found that 90% of dentists believed their patients would be aware of bleeding gums (See Figure 4). Although 58% of dentists believed their patients are aware of periodontal disease, only 50% of the general public were cognizant of their periodontal condition (See Figure 4).

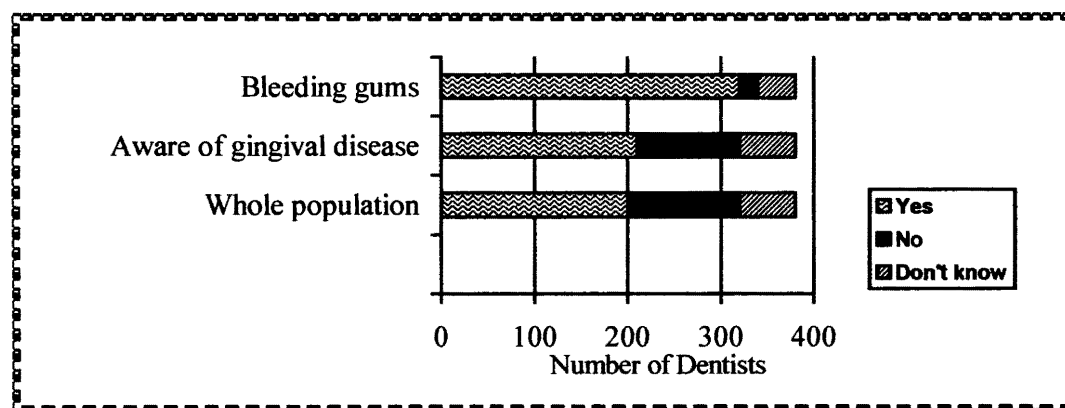


Figure 4: Dentist's knowledge about patients' awareness of oral health

It was noted that just 17% of a dentist's time was devoted to prevention, and only 18% used a periodontal probe regularly. Seventy-five percent of the Irish public knew that gingival bleeding was a sign of an oral health problem, and 68% considered it part of a serious gum

condition, much higher than predicted by dentists (See Figure 4) (Buckley, 1993). The survey showed that 55-70% of the Irish population had calculus, and that gingivitis was on the rise in the general population. This is especially significant because only 66% of the surveyed participants see a dentist regularly (Buckley, 1993).

Schwarz and Edward (1994) focused on adults in Hong Kong who have been shown, from studies by Lind et al (1987), Lee (1988), and Suo (1988) to have low levels of dental health knowledge. Two groups participated in the study: 35- 44 year old adults (n=398) and one group of 65-74 year old adults (n=559). Interviews were conducted using the same questions for each group. Participants were asked to rate their knowledge of dental caries, periodontal disease, and preventive measures using a belief scale of 0 to 100. The results of all the questions were combined and divided, and an importance scale was designed with 1 meaning *very important* to 5 meaning *not at all important*. An overall attitude score was obtained by combining the total belief score and importance score. Results suggested that misinformation about the causes of gum disease existed in both age groups. Twenty-seven percent of the younger group and 55% of the older group didn't know what causes gum disease. Regarding preventive interventions to fight gum disease, 43% of the middle age group and 70% of the elderly group were not aware of preventive options. A positive correlation existed between dental knowledge, higher education levels and regular dental visits in both groups. When asked if seeing a dentist was important, only 66% said yes. The highest attitude scores came from women, people who habitually seek dental care, and those who used preventive measures. Their study suggests that the adult Asian population needs oral hygiene education, and that most (95%) want to have healthy teeth. This study has led to public awareness campaigns in Hong Kong aimed at bacterial plaque control and toothbrushing

(Schwarz & Edward, 1994).

Rayant (1979) conducted a study in Britain to understand how dental health knowledge affects people who have relatively positive attitudes about oral hygiene. A total of 161 patients first filled out a survey to determine their dental health attitudes and knowledge. Thereafter, all subjects were examined to determine their individual plaque index (PI) and gingival index (GI) scores. The group was then divided into five segments, depending upon their GI scores. Gingival index scores in Rayant's (1979) study ranged from 0.13 to 1.83. Twenty percent of subjects had scores less than 0.67, 40% of subjects were less than 0.85, 60% of subjects were below 1.00, and 80% of subjects were below 1.25. Plaque index score, ranged from 0.17 to 1.71. Sixty percent of subjects had a score lower than 1.00. The survey revealed that 80% of the participants had a positive outlook on their dental health; 78% were concerned about losing their teeth, 99% were worried about how their teeth looked, and 78% were willing to invest time and money for the care of their teeth. The "difference" obtained from t-tests analyses were applied to find differences in attitudes and knowledge between those who did maintain gingival health (GI group $1 < 0.7$) and those who did not.

Dental knowledge also was assessed. Fifty percent of the subjects had recognized their own dental conditions, and just 10% were unaware that they needed treatment. Most patients ($n=126$) knew that bleeding gums were a sign of disease, 94 believed that they had swollen gums, and 70 patients thought loose teeth and recession were indicative of disease. One hundred nine patients knew that incorrect brushing could lead to gum disease, 91 patients acknowledged plaque, 77 patients said they knew about germs and bacteria. Halitosis and red gums were mentioned by 22 people, and only five patients didn't know that they had halitosis. In terms of oral health behavior, toothbrushes were the most common cleaning tool used

(n=157). An interproximal brush was used by 132 patients; 92 subjects used wood points; and 87 subjects used dental floss.

Even though the subjects' attitudes toward oral health were overwhelmingly positive, no obvious correlation was found between patient attitude and oral health. Rayant concluded that no significant relationships existed between oral health education and one's attitude toward oral health. This might suggest that most patients were not adequately instructed or motivated, or that oral health knowledge alone was not the key factor influencing oral health behavior (Rayant, 1979). To influence behavior, Rayant suggested that instruction should be "persuasive" and "motivational", instead of "informative". The author recommended that if behavior patterns were established first, then knowledge would increase through activity thus making the action pertinent; and if any underlying value exists, the behavior will become a habit (Rayant, 1979).

Yao and Kao (1989) assessed the amount of dental health knowledge in Taiwanese adults using vital statistics and evaluating their dental habits. The participants, 748 people in Taiwan, completed a questionnaire on oral health attitudes. Chi-square analysis revealed a noticeable relationship between 1) one's personal dental habits and the initiation of toothbrushing behavior in males and females, 2) toothbrushing frequency among the sexes and age, 3) toothbrushing frequency in regards to gender, 4) toothbrushing time and age, and 5) flossing and age. The average age for the onset of toothbrushing was 4.69 and brushing frequency was 2.42 times daily. A total of 47.5% of the participants brushed their teeth after eating and before going to sleep. The average duration for toothbrushing was one minute 53 seconds, and more people expressed personal preferences for toothpastes than for the brush itself. Yao and Kao (1989) concluded that oral hygiene education needs to begin once children

start brushing on their own, and regular check ups must be maintained.

A study by Ronis, Lang, Farghaly, and Ekdahl (1994) was conducted in Detroit from August to November 1989, to determine the percentage of adults who regularly brush and floss their teeth and obtain professional check-ups. Ronis et al (1994) mentioned that past studies (by the ADA and other organizations) found that 90% of the American public brush daily; about 50% see their dentist annually; and only a "minority" floss their teeth daily. Interviews of 662 adults in the Detroit area were conducted by 32 professional interviewers from the University of Michigan. Each participant was asked about brushing, flossing, dental check-ups, thoroughness, and a definition of dental check-ups. All answers were recorded word for word in large black letters so the participants could see exactly what was being written. The response rate for the survey was 72%. Approximately 25% of the subjects were under 30 years of age, while 25% were 55 years of age or more. Nonwhites made up 18% of the sample, and women (n=390) greatly outnumbered men (n=272). One out of seven were not high school graduates, and just about "half" had some college experience. More than one in four had incomes over \$51,000, and one out of five had incomes under \$20,000. Almost all subjects (96.8%) brushed their teeth at least once a day; 95.5% brushed their teeth that didn't show when smiling; and 91.3% brushed all of their teeth. Approximately 85.3% met all three criteria for toothbrushing (brush daily, brush all teeth, brush hidden parts) (See Figure 5). About 31.6% of subjects flossed every day, and among those, 67% flossed all of their teeth. Just about 72.9% received dental examinations once a year, while 51.2% had examinations twice a year. About 0.3% of participants said that brushing had no advantage, 0.5% said flossing had no advantage, and 0.6% said examinations had no advantage.

The major advantages of brushing as cited by the respondents were cleaning teeth (37.3%);

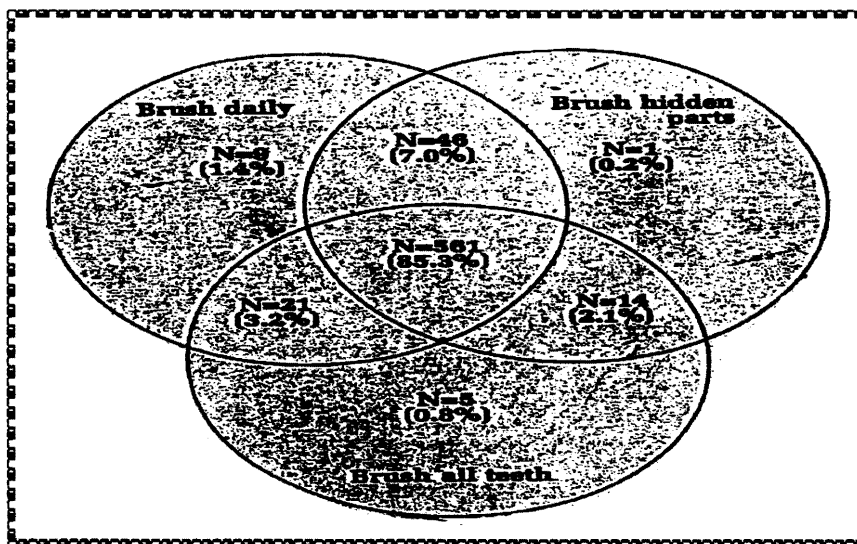


Figure 5: The frequency and the percentage of dental behavior in adults (Ronis et al, 1994).

63.3% reported cleaning benefits with flossing, while only 19% said it was a benefit in oral disease prevention. "Time consumed" was the only disadvantage for brushing and flossing perceived by the respondents, and the greatest disadvantage for check-ups as cited by the respondents was the cost. Ronis et al (1994) concluded that over 95% of adults brush their teeth every day. Dental flossing still remains an obstacle, due primarily to lack of knowledge about the correct flossing technique. Thoroughness in carrying out oral hygiene behavior is problematic possibly because most people find it too time consuming (Ronis et al, 1994).

Client Compliance with Oral Health Instructions

A patient's level of compliance is an important factor in understanding the relationship between the patient, his/her health status, and his/her healthcare provider. Patients can show their compliance by ceasing health harming behaviors, using preventive measures, following the advice of healthcare professionals, being receptive to treatments, and arriving on time for scheduled appointments. If patients are uncooperative in healthcare, it will affect them physically (increased gingival diseases and dental caries), and financially (wasting time and money on healthcare visits). Healthcare professionals' time also is precious, and as such, most

does not want to invest their time with noncompliant patients.

It is estimated that 95% of people have some type of dental disease (Strack et al, 1980); client education and the application of this information is necessary if dental disease is to be controlled. Strack, Mccullough, Conine (1980), Davis (1966) and Vesta (1970) agree that information about a disease does not motivate people to comply with home care recommendations.

A study by Strack, Mccullough, and Conine (1980) focused on how patients comply with oral hygiene instructions. Specifically, Strack's aim was to determine the percentage of patients who comply with oral hygiene instructions given by the hygienist and the relationship between the hygienist's empathy level and patient compliance. Strack et al (1980) mentioned that according to Davis (1966) compliance behavior by patients has been measured anywhere from 4% to 100%, while noncompliant behavior, according to Davis (1966) and Vesta (1970) ranged from 30 to 35%. Strack et al (1980) also mentioned work by Fine (1977) showing that "empathy is a basic personal quality which affects positive therapeutic outcomes in helping relationships." To establish empathy, rapport should be initiated between the dental hygienist and patients (Fine, 1977). Therefore, Strack et al asked dental hygienists employed in general dental practices to participate in research on patients' compliance with oral hygiene instructions. Each hygienist (n= 21) was asked to select ten adult patients and record what instructions and aids were provided. The patients (n= 170) were given a questionnaire regarding their compliance with the instructions they received. The hygienists' empathy levels were measured using the Melrabian and Epstein Measure of Emotional Empathy Test (EMT). The selected time for giving the EMT was controlled. The EMT scores of the hygienists, which ranged from -132 to +132, were compared with the compliance levels of the patients.

The EMT scores were divided into two groups, above average and below average. In the group with above average EMT scores, there was a 53% patient compliance rate, and in the below average group, 47% of the patients complied. Ten percent of the noncompliant patients were in the above average group, and 14% were in the below average group (Strack et al, 1980). Dental hygienists were found to be more empathetic (\bar{x} EMT= 50) than average women (\bar{x} EMT=44). Strack et al (1980) concluded that patient compliance is somewhat related to the empathy level of the person providing the oral health instruction.

Boyer (1988) conducted a study to understand why some patients comply with oral hygiene instructions while others do not. A total of 821 adult patients chosen from prevention-oriented dental practices received a particular oral hygiene instructional program from the dental clinic. All 821 subjects completed the program of plaque control; however, only 200 subjects were randomly selected to participate in the study. Subjects were categorized accordingly: Category 0 was reserved for noncompliers who do not brush or floss as instructed, and only brush once or so a day; Category 1 was reserved for noncompliers who used the recommended brushing method daily, but who do not floss, or who floss daily but do not brush; Category 2 encompassed persons who brush and floss as instructed, but only 1 or 2 times a day; Category 3 was for compliers who brush and floss correctly, but floss only 3-5 times weekly; Category 4 included compliers who brush and floss as directed, but who may miss brushing or flossing occasionally; Category 5 included compliers who brush and floss as instructed at least once a day. Twenty-three percent of adult patients surveyed were totally compliant, and 8% were completely noncompliant. Patients were found to change their daily habits for four reasons: 1) desire to try new things, 2) concern about dental health, 3) need to have more self-responsibility, and 4) encouragement from dental professionals. These four

reasons resulted in the identification of four unique patient types: the 1) internalized preventive patient, 2) internalized compliant patient, 3) role compliant patient, and 4) social compliant patient. According to Boyer's (1988), the internalized preventive patient will take care of himself as long as he/she has the right information. This person does not need many visits or any type of reinforcement. The internalized compliant patient accepts responsibility for oral hygiene and needs information on how to treat his/her condition. A role compliant patient wants to satisfy other people, in this case the dentist or hygienist. This patient takes responsibility, is receptive to reinforcement, and requires professional instruction and feedback. Lastly, the social compliant patient takes on certain behaviors because of another, but does this for social reasons only. This patient wants only to be perceived as compliant when under observation (Boyer, 1988).

Noncompliance in Dental Clients

Noncompliance according to Stewart (1987) is either intentional or unintentional. When noncompliance is intended, it is usually done by a well-informed patient and is viewed as the patient's "choice." When noncompliance is not on purpose, it may be from ignorance or a lack of information (Stewart, 1987). Noncompliance poses oral health risk. Encouraging patients to be more cognizant of their responsibilities towards their oral health is a major undertaking attempted by many dental professionals.

Wright (1993) mentioned that noncompliance with the use of prescriptive medication smoking cessation, and appointment keeping affects 50% of patients throughout the world. Surveys done in various countries demonstrate a fairly significant noncompliance rate of 37% (n=1828) in Canada, 37% (n=95 patients) in New Zealand, 19% (n=252 children) in Japan, 32% (n=8655 patients) in Tanzania, and between 11% and 56% in Ethiopia, India, Burma, and

Malawi concerning use of medications and/or advice from the healthcare provider (Wright, 1993).

Weinstein, Tosolin, Ghilardi, and Zanardeli (1996) studied the problem of noncompliance among periodontal patients, particularly from a behavioral psychology perspective. The psychological perspective is used to further understand noncompliance and in turn promote cooperation among dental patients. For example, psychological tests have been used to assess people by categorizing them by personality traits. This type of testing is not useful with periodontal patients since results do not address the goal of increasing oral hygiene compliance and promoting effective oral health behaviors. To understand dental patients, Weinstein et al (1996) used the *Applied Behavior Analysis* to enact behavioral goals, choose useful methods, and collect data consistently. To study noncompliance among dental patients, Weinstein et al (1996) also used Skinner's (1953) model which explains that each action is a function of its consequences (See Figure 6). Most behaviors come about by a series of events and then the consequences of the action or nonaction and its consequences (Weinstein et al, 1996). People engage in certain activities for many reasons. For example, a spouse might

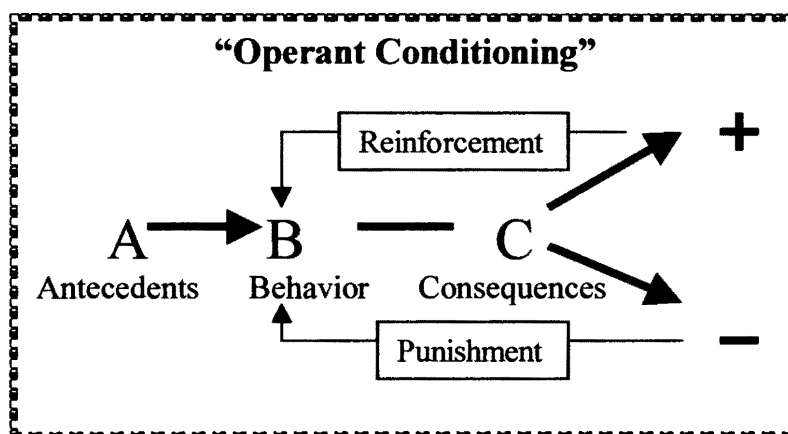


Figure 6: Skinner's paradigm showing the relationship between behavior (Weinstein et al, 1996).

remind the other to brush or floss, or a TV advertisement could stimulate certain actions. In contrast, factors can hinder behaviors such as being viewed as obsessive, and boredom with the behavior.

Intervention is a major component in combating noncompliance among dental patients. Most patients who do not comply do so for one of three reasons: insufficient information, poor motivation, and lack of oral hygiene techniques. Hygienists should not believe that their instruction is enough to achieve patient compliance. All dental professionals should listen to the patient, reinforce important points, and have a formal plan to keep patients informed and motivated (See Figure 7).

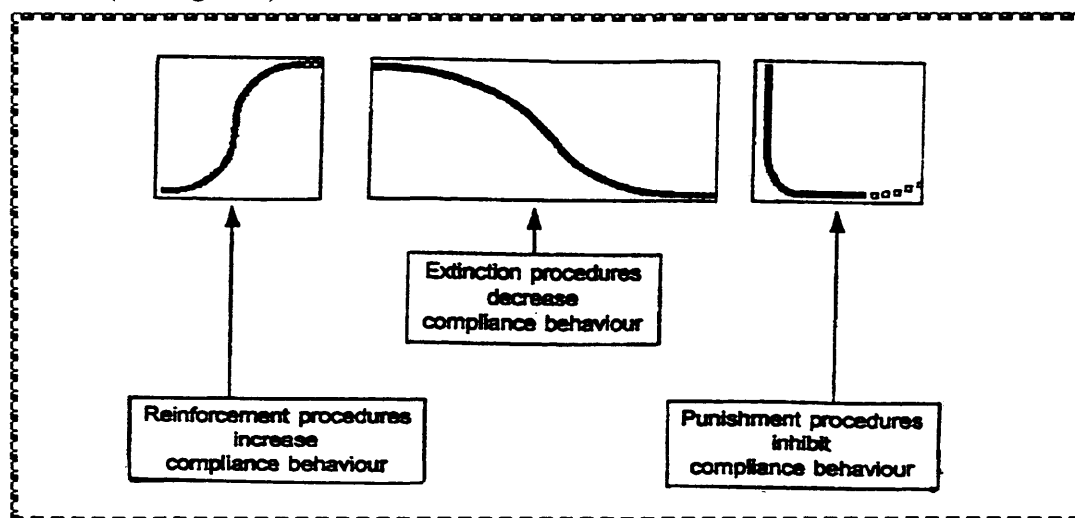


Figure 7: Dental patient behavior management via reinforcement, extinction, and punishment (Weinstein et al, 1996)

Oral behaviors commonly taught to patients usually are conveyed in a professional manner via the dentists' and/or dental hygienists' instructions (Weinstein et al, 1996).

The psychological context of the instruction allows these behaviors to be taught effectively.

Motivating patients is the most important factor for avoiding noncompliance. Part of motivation is reinforcing patients immediately after instruction and making them feel

comfortable and trusting towards the dental hygiene staff (Weinstein et al, 1996). Several motivational strategies can be utilized in the oral healthcare environment. The first strategy is situational leadership, which includes developing a personal relationship between the patient and the dental professionals. The second strategy, assertiveness training, uses verbal and nonverbal reinforcements to motivate patients to practice certain oral health behaviors. The third strategy, shaping, is a "gradual error-free approximation of the complete/definite habit" which is analyzing personal habits. Modelling, the fourth strategy, uses "methods for taking advantage of the patient's imitative mechanisms" and includes methods that encourage the client to copy the demonstrated oral health behaviors. Training gets parents or mentors involved to foster better oral hygiene habits and this is the fifth strategy (Weinstein et al, 1996). The Premack principle is the sixth strategy. This principle is based on the idea that if many habits are done in a series from the least liked to the most liked, after some time, the first (oral hygiene) will become as automatic as the last. The final strategy, rule-governed behavior, uses methods to guide the noncompliant person through the "thought" processes.

Weinstein et al (1996) attempted to clarify the influence these psychological strategies have on dental patient compliance. The researchers focused on the standard oral disease management procedures in comparison to three separate programs that use oral reinforcement and self-management techniques to control plaque. The effectiveness of each method and its relative compliance rate were assessed using the Full Mouth Plaque Score (FMPS) (See Figure 8). A total of 11 men and 9 women, between the ages of 32 and 50, who had various dental problems, were assigned randomly to one of the four treatments; five subjects served under each treatment.

The first hypothesis predicted that oral communication and instruction alone are apt to

have only short-term effects on plaque control, as there is no reinforcement. To test this hypothesis, the first group of subjects was given a demonstration on toothbrushing and flossing. The second hypothesis predicted that a demonstration of toothbrushing and flossing, followed by regular feedback where the patients receive additional information,

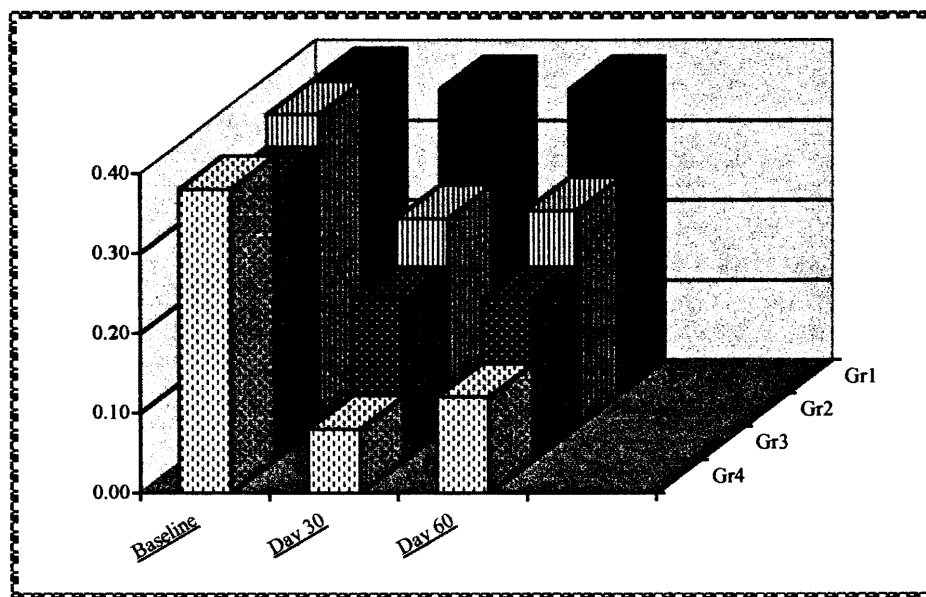


Figure 8: FMPS at three levels: baseline, after 30days, and after 60 days (Weinstein et al, 1996)

would have an effect in plaque control. Self-monitoring, necessary to test this hypotheses, was used by the second group of subjects. Twice weekly, patients had to call, provide results from their self- monitoring and then receive oral hygiene instructions and feedback. Hypothesis three predicted that social reinforcement would improve oral hygiene habits as measured by the plaque control status of the subjects. Twice weekly, patients who made up the first experimental group, were seen by a dentist, and received verbal feedback and reinforcements especially when plaque scores where poor. The fourth hypothesis predicted that self-monitoring of behaviors and closer contact with reinforcements at every step of the oral health program would affect plaque control. This group also kept a list to monitor the oral hygiene methods they used (Weinstein et al,

1996). Data were collected at baseline, after one month, and lastly after two months, and analyzed with the Freeman and Tukey procedures.

In-group one, oral hygiene instruction and regular visits didn't produce a high rate of compliance. For the FMPS at baseline, after 30 days, and after 60 days (See Figure 8), the effects of feedback and self-management on compliance were strong; the FMPS levels lowered significantly in groups 3 and 4.

In group 3 at baseline, the FMPS was 0.36; at 30 days it decreased to 0.18. In group 4, the baseline level was 0.37; at 30 days it was 0.6; and at 60 days it was 0.8 (Weinstein et al, 1996). Patient compliance seemed to be related to behavior techniques and oral hygiene instructions. Monthly visits alone did not yield patient compliance. Combining behavioral self-management (BSM) and positive reinforcements had the best results. Weinstein et al (1996) concluded that feedback and behavioral self-management positively affected the habits of dental patients over a three-month period. Further data are necessary to develop a standard program for dealing with noncompliance. Also, more information regarding psychological programs and their benefits is necessary to apply them effectively with oral hygiene patients (Weinstein et al, 1996).

Oral health behaviors are greatly affected by daily habits and adjustments in personal living. The Health Belief Model (1966) is one explanation of how one acquires oral health behaviors. The Health Belief Model focuses on three components: the patient's willingness to be responsible for his/her condition with the chance of a serious disease and the idea of real complications; the person's feelings about the professional recommendations and their effectiveness versus adversities (expense, pain, time-consuming, etc); and the patient's motivation to practice proper oral health behavior. To test the assumptions within the Health Belief Model, a study was conducted by Rayant

and Sheiham (1980) to analyze whether people were aware of periodontal disease, if they believed it was dangerous, if they knew how to avoid the disease, and if they could implement a recommended dental health routine. Subjects (n= 250) consisted of 20-40 year old recall patients at a dental hygiene clinic who experienced a minimum of one session of dental health education and scaling. After the patients finished the survey, their plaque and gingival index scores were taken by a dentist using a periodontal probe and dental mouth mirror. The plaque and gingival index scores were relatively low, with 60% of the patients having GI scores of 1.00 or less, 20% of patients having a GI of 1.04 to 1.25, and another 20% having GI scores between 1.29 and 1.83. PI scores were between 0.17 to 1.71, and 60% of the patients had less than 1.00. On the questionnaire, 75% of the patients answered affirmatively to six of the attitude assessment questions, and fewer than 50% of the patients answered affirmatively to the last four parts of the attitude assessment questions. Of the respondents, 89% agreed that they had a chance of developing oral disease; 78% were worried about the consequences; 78% believed treatment could help them maintain their teeth; 98% agreed that treatment was vital to dental health; and 99% felt their teeth were an integral aspect of their overall physical appearance. Although 81% of the patients felt that their teeth should stay intact throughout their lifetime, 48% of patients believed that they actually had the ability to achieve that goal, and 84% felt that decaying teeth and diseased gums resulted from poor oral hygiene. Unexpectedly, 78% of patients were willing to invest time and spend money to maintain their teeth. Concerning the hygienist, 95% regarded preventive visits as good, but only 43% felt very positive about their dental hygiene treatment. However, 81% of patients answered the question about the dental hygiene treatment more positively than negatively. Thirty-two percent of the patients did not feel anxious about their dental

visit, and as 78% of patients were not at all nervous about the hygienist. The actual dental hygiene treatment gave only 40% of the patients a feeling of anxiety.

Overall, the patients' perceptions concerning the etiology of periodontal disease were accurate, with 110 patients conceding that inadequate toothbrushing caused disease; 91 patients indicating that plaque was an etiological factor; 77 patients identified bacteria; and 62 patients implicated tartar. The most dominant indication of periodontal disease was bleeding gums, as identified by a total of 75% of the participants. The other symptoms known by the participants were loose teeth, swollen gums, and/or receding gums.

From the questionnaire item on personal habits and beliefs, most patients appeared to support the assumptions of the Health Belief Model. The researchers also assessed the relationship between the patient's answers and adherence to the hygienist's directions as measured by plaque and gingival index scores. To decide whether there was a relationship between patients' answers and following the dental hygienist instructions, the author assumed that patients who followed the hygienist instructions would have low GI scores. This relationship was tested by dividing the subjects into two groups: those with GI scores less than 0.70 and those with GI scores greater than 0.70. Plaque scores showed differences; otherwise the other information (number of visits, age, etc.) remained about the same. The GI scores were again ordered into groups at every 20th percentile, each with about 30 patients. Chi-square (χ^2) test revealed no noticeable differences.

The patients in Rayant and Sheiham's (1980) study made regular dental appointments, called for follow-up care, and gave positive answers concerning oral health maintenance. These findings are consistent with the Health Belief Model (HBM) which

explains that people who believe they are vulnerable to disease are apt to take preventive actions. Although 99% of the respondents believed that aesthetics was very important, 50% believed they could have a disease, even if they had a relatively healthy mouth. Most of the patients in the Rayant and Sheiham (1980) study noticed a problem with their teeth, and the others were informed of the problem by a dentist. Although most were concerned enough to seek professional care, many lost the concern once they received treatment.

Interestingly, most patients still had bleeding at the second examination as indicated on the GI and noted this to their hygienist, suggesting awareness about their gingival health. Perhaps the patients go to the hygienist because of bleeding, or this population may have insufficient information to control their bleeding. Although, many of the patients praised their hygienists, they were not very positive about the treatment (Rayant & Sheiham, 1980). In conclusion, patients seemed to be motivated to seek dental hygiene treatment, but needed continued motivation to continue good oral hygiene behavior. Progress was seen in patients using the HBM.

Psychological Concepts and their Application to Oral Hygiene Instructions

Anxiety. Many patients suffer from anxiety during dental visits (Lightfoot, 1994). Research suggests that dental stress results from many factors: inadvertent learning from family members, especially the mother; personality traits (open or closed personality); and bad previous dental experiences, especially between the ages of 6-12 years. This anxiety is mostly due to the patient's feeling that he/she is not in control of his/her environment (Lightfoot, 1994).

Lightfoot (1994) explored the concept of control and its relationship to dental stress. Control is important because every person wants to be responsible for himself.

The level of control a person possesses has been labeled in the psychological community as locus of control. People who have an external locus of control perceive events happening, regardless of any intervention. These people believe that events occur as punishment because of something they did before or are now doing. For example, if they have a dental cavity, they inflict self-blame (Lightfoot, 1994). In contrast, people with an internal locus of control believe that they can influence their environment, and in the case of oral health, prevent dental disease. People who feel more in control, i.e., have an internal locus of control, are believed to be more adaptable to changing their behavior. Dental professionals have the challenge of assessing the behavior of patients in regards to their locus of control. Without specialized testing, it is difficult to identify patients who desire a large level of control, and who are more passive.

Lightfoot mentioned in his review of the literature that Sieber, Rodin, Larson, Ortega (1992) studied the effects of controllable and uncontrollable stress. Emotions and stress are milder when predictable stress is about to happen. Corticosteroid levels increase when stressful situations are perceived as uncontrollable. Being able to predict an event that could pose anxiety is shown to reduce stress even if the situation cannot be controlled.

According to Lightfoot (1994), when Corah and Boffa (1970) studied the influence of choice on stress, they introduced two groups of people to sudden, high bursts of noise. Although both groups were instructed on how to escape the noise, the second group was told that they could choose to escape or not escape. Those persons in group two who had a choice exhibited less stress.

Lightfoot (1994) made several suggestions for reducing patient stress: 1) the practitioner should have no preconceived ideas about how the patient views treatment,

feels about treatment, or the patient's role and responsibilities toward the treatment procedure; 2) the practitioner should encourage the patient to express his/her feelings about the dental professional and the treatment procedure, and show concern for those feelings; 3) the patient should express concern when he feels stressed and be able to stop and proceed when necessary; and 4) the practitioner should inform patients of their options and patients must be able to make their own decisions (Lightfoot, 1994).

The dental hygienist is integral in instructing patients, lending support, and assessing control issues in the oral care environment. To carry out these functions effectively, hygienists need to "grab" the attention of their patients and maintain their level of interest (Lightfoot, 1994). Lightfoot (1994) mentioned that the information gained from the study of Breemhaar and Van-Der-Borne (1991) could increase the hygienist's awareness of patient concerns regarding control. A good suggestion to prevent client anxiety is to explain what procedures will be done. The hygienist's goal is for the patient to develop a trusting perception of the hygienist and oral healthcare, thereby increasing the chance of more regular dental visits. Patients who are well informed of the consequences of poor oral hygiene, are more likely to implement better personal habits (Lightfoot, 1994).

Kurer, Watts, Weinman, and Gower (1995) conducted a study on the connection between psychological moods, stress, and oral hygiene instruction for a group of people at a large British company. Specifically, the researchers wanted to know if moods and stress are predictable factors in oral hygiene responses. Initially, a total of 51 healthy participants, between 20-50 years of age, with at least 22 teeth were assessed for plaque and bleeding using Turesky's modification of the Quigley and Hein Plaque Index and a periodontal probe. Each person completed the Hospital Anxiety and Depression (HAD)

Short Psychiatric Questionnaire, which measured mood on a scale from 0 to 3. Saliva samples were taken to assess cortisol levels, an indication of anxiety. After the saliva sample was taken, subjects were given instructions in toothbrushing and asked to practice the new technique for five weeks. After five weeks, the plaque and bleeding assessment, the questionnaire, and saliva sample were repeated on the remaining 47 subjects and analyzed. Findings revealed that plaque and gingivitis levels decreased from 0.63 to 0.51, and 0.10 to 0.07 respectively, and that this result was positively related with the mood and cortisol measurements. At the .05 level, there was a low but statistically significant association between anxiety and gingivitis ($r=0.35$) and between depression and plaque ($r=0.28$). Not one of the subjects had a depression score of 11, which suggests that the subject needs treatment; only 4 had an 11 on HAD scale suggesting that few patients are anxious about the treatment. Mood and cortisol levels had no relationship to oral hygiene; however, this could have been due to the samples being taken at stress-free times. The author concluded that psychological mood has some connection with gingivitis and plaque control (Kurer et al, 1995).

Behavioral factors. Silversin and Kornacki (1984) discussed the impact of preventive measures on dental cavities in children and periodontal disease in adults from their review of about 100 papers spanning a ten year period. Most people know that maintaining good oral hygiene is important for optimal oral health, but practice of positive oral health behavior does not always occur. Gum disease is not perceived as a fatal condition, so many people take it lightly. Silversin and Kornacki (1984) identified five factors that influence client actions: 1) psychological factors of client, 2) personal interaction between client and practitioner, 3) wide social influences, 4) information and environment, and 5) reinforcement of oral health behavior. Personal interactions greatly

influence a person's actions. For example, with children, parents wield the most influence. Schools too are influential, but as societal problems increase, it becomes harder for schools to be effective. Adolescents tend to be more influenced by peers, rather than schools or parents. With adults, relationships with others are a factor in determining health habits (Silversin and Kornacki, 1984).

Understanding how the media effects behavioral change, increases its usefulness in health education. Public relations campaigns have been shown to influence people. Silversin and Kornacki (1984) reported that public campaigns have proven helpful in motivating preventive behavior, but not on a long-term basis. Commercial product advertisements can influence people as well.

Numerous factors can be responsible for motivating people to practice certain preventive measures if they feel there is a threat of disease, that the disease would hinder their lives, or that preventive measures would be greater in value than any financial costs. In order for a patient to comply, "the patient must believe that the advocated regimen will be effective and that the benefits of following it will outweigh the cost" (Silversin and Kornacki, 1984). Although information alone does not seem to influence people's behavior, it does promote more interaction between client and clinician. Interaction between client and clinician increases client comfort, which is vital for compliance. The idea of rewarding and punishing individuals for certain behaviors is another interesting area. Once rewards stop, children tend to cease preventive measures, and previous habits return.

When considering all of the previously mentioned psychological factors that influence an individual's oral health behavior, the studies have not been successful in explaining oral health behavior. Perhaps this is because so many factors in daily life

influence oral health behaviors. Therefore, a variety of strategies should be employed by dentists and dental hygienists to attain the desired affect (Silversin and Kornacki, 1984).

Oral hygiene programs established since the 1960's, are based on the assumption that if patients were properly instructed, they would implement the oral hygiene behavior correctly. Unfortunately over time, the oral hygiene behavior would be abandoned. Simultaneously, other medical professionals began to use behavioral psychology to get patients to comply with certain treatments, such as weight control and smoking. Oral hygiene was an obvious area for the application of behavioral psychology.

A study by Wolfe, Stewart, Schoen, and Jacobs (1989) focused on the influence of behavioral psychology on oral hygiene programs. Four particular aspects of psychology could be applied to help dental patients: 1) educational environments, 2) interviewing skills, 3) factors of behavior adjustment, and 4) cognitive psychology. It was noted by the researchers that two models of personal contact could affect dental patient behavior. Model I is characterized by the dental professional making goals and developing interventions, while ignoring the feeling of the patient, and keeping information from the patient. Results from the application of this model suggest that the patient sees the clinician as inconsistent, becomes defensive and has a low level of compliance. No real trust is developed and only short-term results can be expected.

Model II is characterized by a dentist or hygienist who assists the patient in taking an active role, with shared decision making, and interventions based on patient commitment. Model II encourages less defensiveness on the part of the patient, and is more consistent in encouraging long term changes (Wolfe et al, 1989). Important factors in Model II are interviewing skills, making a diagnosis, easing patient anxiety and

promoting mutual understanding and cooperation. Open-ended questions are used by skilled interviewers to gather information on the feelings of the patients.

Wolfe et al (1989) mentioned that behavioral adjustment is essential in changing old habits and promoting good oral hygiene. Two types of behavioral strategies can be applied in education: "respondent" and "operant education." Respondent education focuses on getting an immediate reaction; operant learning focuses on getting patients to perform certain behaviors with the promise of a reward and the fear of a punishment. According to Wolfe et al (1989), cognitive psychology techniques entail using problem-solving methods to consider several possible solutions to an oral health problem. Self-instruction is another important aspect of this problem-solving approach. Patients use a specifically designed monologue to assist themselves through a particular problem.

Plaque control instruction can be based upon cognitive psychology principles. With this approach, personal habits and attitudes of patients should first be evaluated by the practitioner, and the patient's concerns and beliefs recognized. In any oral health program, direct criticism should be avoided and clear goals must be established in collaboration with the client. A standard program can demonstrate correct brushing and flossing behaviors and patients taught to personally monitor their oral health status. In this approach, patients should be required to demonstrate their brushing and flossing so those problems can be corrected. Follow-up appointments reinforce the previous instruction and allow the hygienist to provide feedback to the client (Wolfe et al, 1989). If the hygienist is looking to change behaviors and attitudes, the hygienist should reinforce the good behavior with appropriate compliments.

Effects of Oral Hygiene Instruction on Knowledge, Attitude, Behavior and Fear

Hoogstraten and Moltzer (1983) initiated a study to compare the effects of two varying methods of relaying dental health instructions. The researchers tried to determine whether person to person contact during dental health instruction is more effective in modifying people's behavior, attitude and knowledge than the media; and if this was the case, whether it was possible to measure a difference in people's behaviors and attitudes from various means of communicating. A total of 108 male and female private practice patients, 15 to 60 years of age, without full dentures, were selected for the study and divided into one of three groups. In the first experimental group, the people received regular dental hygiene instructions from the dental hygienist and routine preventive measures (scaling and polishing). Experimental group two received the same preventive measures, and watched a 10 minute film on oral hygiene instead of the receiving dental hygiene instructions from the dental hygienist. The third group received no instructions nor outside information. Half of each group completed a pre-test. The pre and post-test questionnaires contained several items on dental knowledge, attitude, behavior, and fear of dental treatment (Hoogstraten & Moltzer, 1983). The questionnaire included 14 questions with a range from 0 to 14 on subjects' knowledge, and 10 attitudinal questions with ranks from 1 (agree) to 5 (disagree) about patient attitude toward oral hygiene instructions. A high score indicated a positive patient attitude. Anxiety about dental treatment was measured using one item scaled from 1 (very fearful) to 5 (not fearful). Six questions focused on dental behaviors such as consumption of sugar (ranged from 1-5), brushing frequency (ranged from 1-5), use of the toothbrush (ranged from 1-6), and oral hygiene technique (ranged from 1-5) (See Table 5).

Table 5

The criterion measures of Hoogstraten and Moltzer (1993)

Variables	Standard program		Film + Standard program		Control	
	Mean	SD	Mean	SD	Mean	SD
Pretested						
Knowledge (0-14)	9.12	2.91	9.35	2.21	7.74	2.68
Attitude (1-5)	4.12	0.39	4.44	0.38	4.09	0.56
Fear (1-5)	4.12	0.99	4.20	0.95	3.84	0.90
Sugar consumption (1-5)	3.41	1.50	3.53	1.27	2.89	0.99
Brushing frequency (1-5)	4.71	0.59	4.55	1.00	4.58	0.61
Brushing moment (1-6)	4.88	1.49	5.40	0.99	4.53	1.50
Use of brush (1-6)	5.24	0.90	5.11	0.97	4.64	1.16
Use of inter-dental stimulators (1-5)	1.76	1.09	2.60	1.63	1.68	1.11
Oral hygiene (1-5)	4.06	0.66	4.00	0.72	4.05	0.62
Not Pretested						
Knowledge (0-14)	8.00	2.31	8.81	2.07	7.29	2.52
Attitude (1-5)	4.31	0.44	4.29	0.47	3.82	0.51
Fear (1-5)	4.15	0.76	4.14	1.02	4.75	0.56
Sugar consumption (1-5)	3.58	1.07	3.06	1.12	2.88	1.27
Brushing frequency (1-5)	4.83	0.37	4.63	.50	4.59	0.51
Brushing moment (1-6)	5.63	0.50	5.31	0.79	3.94	1.64
Use of brush (1-6)	5.47	0.51	5.00	1.09	4.81	1.28
Use of inter- dental stimulators (1-5)	1.63	1.16	2.00	1.51	1.88	1.27
Oral hygiene (1-5)	4.26	0.56	4.06	0.57	3.94	0.66

The multivariate analysis of variance indicated a difference between the control group and experimental group 1 ($f= 3.10$, $df = 9/94$, $p < 0.01$) or experimental group 2 ($f= 4.47$, $df = 9/94$, $p < 0.01$). When encompassing the control condition and experimental group 1, it was found that instruction alone was useful in changing the opinions of participants regarding their dental behavior.

Experimental treatment 2 (instruction plus film) also was effective in changing attitudes and behaviors of subjects, but not effective in changing attitudes and behavior regarding sugar consumption or use of a toothbrush.

The researchers concluded that personal communication was more effective in delivering dental health instructions than a film. The film did not increase effectiveness, whereas direct contact with the hygienist compelled the patients to pay closer attention.

Personal communication yielded more effective results six months after the study (Hoogstraten & Moltzer, 1983).

In another study, Tan (1979) measured the effectiveness of one session of dental health education, including a prophylaxis, on patients' dental attitudes, habits, and knowledge. Education is an effective strategy in controlling plaque and gingivitis, and Tan's study built upon this belief by assessing how dental health instructions affect patients' knowledge and attitudes about oral health technique. In all, 96% of two Dutch army camp residents were assigned to one of four groups: a control group (A); a group who had one oral prophylaxis (B); a group that received one session of dental health instruction (C); and a group that received both prophylaxis and instruction (D). Groups C and D received lecture which included information about dental caries and gingivitis. Both a dentist and hygienist participated in the lecture that was followed by a group discussion. At the end of 30 minutes, groups C and D received individualized instructions for 10 minutes from the hygienist. The prophylaxis provided to groups B and D included calculus removal, curettage, and polishing. The hygienist was careful not to give any information on the prophylaxis to those in group B. All of the education and prophylaxes were done after the participants had completed a questionnaire on dental knowledge and attitudes toward oral hygiene. Home care kits were given to everyone. One to three months after the study, the patients completed a questionnaire containing 10 items about dental knowledge, 12 concerning dental attitudes, and 7 concerning oral health behaviors. Chi-square analysis, multivariate analysis of variance and univariate analysis of variance revealed no differences among the four groups. At the one and three month examinations, significant differences were observed between groups. The difference between groups A and B were minimal, but groups C and D had significantly increased

their knowledge. At one month, group C's knowledge score was 0.54 and increased to 0.56 at three months; group D's knowledge score was 0.42 and increased to 0.46 at three months. Regarding attitude, there were obvious differences between the groups at the baseline exam ($p < .05$). However, when comparing the baseline, one month, and three-month exams, no significant difference among the groups were found.

In terms of oral health behaviors, half of each group reported that they don't eat sweets between meals, and no one claimed to eat sweets more than three times daily. Groups A and B tended to discard their toothbrushes after a short time period, while in group C, the participants who discarded their toothbrushes within the one to three months rose from 39.1% to 69.6%; those who waited four to six months before discarding their toothbrush decreased from 56.5% to 17.4%. Group D (instruction plus prophylaxis) increased their toothbrush replacement behavior from 40.0% to 72.0% at the first month follow up. Most of the participants brushed daily (See Table 6). Group C showed a difference in that its members reported brushing two to three times daily. After three months, the use of toothpicks increased 54.6% in all the groups who had received information regarding their application; a 32.0% increase was noted in groups C and D.

Dental floss use was not significant in Groups A, B, and C; however, in Group D, floss use increased by 20%. Tan (1979) showed that although one educational program can increase the knowledge of patients and improve their attitude, behavior is least affected. Tan (1979) concluded that reinforcement needs to occur to maintain the desired levels of oral hygiene behaviors.

Table 6

Percentage of various dental behaviors of individuals in the Dutch military (Tan, 1979)

	Group A			Group B			Group C			Group D		
	Start	One month	Three months	Start	One month	Three months	Start	One month	Three months	Start	One month	Three months
1. Sweet consumption												
Never	50.0	45.8	50.0	50.0	54.2	54.2	65.2	60.9	60.9	52.0	52.0	52.0
A few times a week	25.0	45.8	37.5	33.0	25.0	41.7	13.0	21.7	26.1	28.0	44.0	40.0
1-2 times a day	25.0	8.3	12.0	12.5	16.7	4.3	17.4	17.4	13.0	20.0	4.0	4.0
3-5 times a day	0.0	0.0	0.0	4.2	4.2	0.0	0.0	0.0	0.0	0.0	0.0	4.0
More than 5 times a day	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2. New toothbrush												
1-3 Months	45.8	66.6	58.3	54.2	62.5	54.2	39.1	65.2	69.6	40.0	72.0	52.0
4-6 months	41.7	20.8	29.2	29.2	25.0	37.5	56.5	30.2	17.4	40.0	24.0	36.0
7-9 months	4.2	4.2	4.2	4.2	4.2	4.2	0.0	0.0	0.0	16.0	4.0	8.0
10-12 months	0.0	0.0	0.0	12.5	8.3	8.3	0.0	4.3	4.3	4.0	0.0	0.0
More than 12 months	8.3	8.3	8.3	0.0	0.0	0.0	4.2	8.7	8.7	0.0	0.0	0.0
3. Toothbrushing frequency												
2-3 times a day	45.8	37.5	37.5	37.5	41.7	37.5	34.7	52.2	56.5	48.0	60.0	48.0
Once a day	50.0	52.2	62.5	58.3	54.2	50.0	52.2	43.3	30.4	44.0	40.0	48.0
2-3 times a week	0.0	12.2	0.0	4.2	4.2	8.3	8.7	0.0	8.7	4.0	0.0	0.0
Once a week	4.2	0.0	0.0	0.0	0.0	4.2	0.0	4.3	4.3	0.0	0.0	0.0
Never	0.0	0.0	0.0	0.0	0.0	0.0	4.3	0.0	0.0	4.0	0.0	0.0
4. Time of toothbrushing												
After waking up	70.8	66.7	62.5	54.2	54.2	62.5	47.8	39.1	60.9	60.0	60.0	64.0
After breakfast	16.7	16.7	25.0	20.8	20.8	12.5	21.7	34.8	21.7	24.0	28.0	28.0
After lunch	8.3	4.2	16.7	8.3	20.8	16.7	17.4	17.4	21.7	12.0	16.0	12.0
After dinner	16.7	25.0	8.3	16.7	20.8	20.8	17.4	26.1	34.8	24.0	24.0	24.0
When going out	45.8	41.7	45.8	37.5	45.8	29.2	43.5	39.1	47.8	36.0	28.0	36.0
Before going to bed	41.7	50.0	50.0	50.0	41.7	33.3	56.5	43.5	60.9	60.0	76.0	56.0
Other times	4.2	0.0	0.0	4.2	0.0	8.3	0.0	0.0	0.0	4.0	0.0	0.0
5. Toothpaste used												
With fluoride	20.8	50.0	37.5	25.0	50.0	50.0	17.4	26.1	17.4	12.0	28.0	52.0
Without fluoride	58.3	29.2	50.0	29.2	16.7	4.2	52.2	21.7	17.4	48.0	44.0	36.0
"Don't know"	16.7	4.2	8.3	41.7	33.3	45.8	17.4	47.8	56.5	32.0	28.0	12.0
6. Use of toothpicks												
Yes	12.5	16.7	16.7	20.8	20.8	16.7	4.3	39.1	60.9	16.0	36.0	52.0
7. Use of dental floss												
Yes	0.0	4.2	0.0	0.0	0.0	4.2	0.0	0.0	0.0	4.0	16.0	24.0

Client Attitudes Towards Dental Hygienists and the Services They Provide

Boyer (1982) mentioned that a nationwide study done in 1959 concluded that hygienists spend the majority of their time (73%) doing oral prophylaxis, 6% of their time educating patients, 4% of their time taking radiographs, 2% giving fluoride treatments, 9% arranging recall appointments and carrying out secretarial work, and 1% for lab work. Boyer (1982) cited a 1966-1968 nationwide study showing that hygienists spend six times more hours performing the oral prophylaxis than other clinical services.

This means that hygienists spend approximately 35% of their time one-on-one with patients. In Boyer's (1982) study, the relationship between the hygienist and the patient was explored with two major ideas in mind: client attitudes towards dental hygienists in a dental practice, and the perceptions of patients from the same practice about dental hygienists and their professional roles.

Boyer (1982) used participant observation, interviews, and records review. One hundred twenty three patients were interviewed concerning their personal oral hygiene habits, and their ideas about dental hygienist's work. Boyer (1982) concluded that all of the patients in the study believed that the role of the hygienist was "cleaning teeth." The patients also conceded that they didn't feel any personal relationship between themselves and the hygienists. This may be due to the fact that most appointments are relatively short, occur only once or twice a year, and the turnover rate among hygienists is high. As a whole, hygienists were viewed as "nice", "friendly", and "congenial" Only two patients felt differently toward dental hygienists. The first one said: "I have a theory that they (dental hygienists) are all sadistic. My mouth really hurts when my teeth are cleaned. They say the teeth look pretty clean and then they find a few places. They say brush after." The second one said: "The feedback I got was important for changing my habits. She was an objective observer telling me what my mouth looked like now compared to other mouths and what I had done in the past."

With regards to the dental hygienists' attitudes toward their work and patients, they considered their work "very important," "enjoy working with people," and viewed the prophylaxis procedure as sometimes "boring." One of the hygienists interviewed felt that the patients wanted feedback. Both patients and hygienists did not want to be involved in lectures, and the hygienists didn't want a role in plaque control education.

Basically, they didn't want to tell patients what they were doing wrong; rather they preferred to encourage the patients. Although the hygienists were satisfied with their work, they didn't want to assume an authoritative role. Boyer (1982) also reported that patients don't listen to hygienists as they do dentists, because dental hygienists do not have an "assertive role." Boyer (1982) concluded that "people look up to dentists so much more than hygienists."

Summary

Noncompliance and self-care in dental patients is a major issue studied throughout the world. Most people know that maintaining good oral hygiene is important for optimal dental health, but the practice of positive oral health behaviors does not always occur (Silversin and Kornacki, 1984). Most people want to have healthy, disease free teeth, but those who willingly seek information and professional care tend to be from the educated and wealthy segments of the population. Individuals with less education tend to have the highest rates of oral diseases.

Dental professionals and institutions play a role in promoting oral health. School and work environments can promote healthy food choices, sponsor on site dental services, and provide oral wellness programs. Many countries have established dental sealant and fluoride mouthrinse programs or dental health curricula in the public schools (Silversin and Kornacki, 1984). As a basis, dental professionals should increase their patients' oral health status through educational services. Oral health education and care programs should promote open communication with people about dental problems, and employ dental hygienists who are capable of influencing client behavior.

CHAPTER III

METHODS AND MATERIALS

The purpose of this study was to assess the oral health knowledge, attitudes, and behaviors of Qatari people. A self-designed questionnaire entitled Oral Health Knowledge, Attitudes, and Behaviors of Qatari People was distributed among Qatari people in the State of Qatar. Since Arabic is the official language in the country, both the questionnaire and the cover letter were translated.

Sample Description

The nonprobability convenience sample (n=1000) included patients scheduled for a dental appointment in Hamad General Corporation-Dental Department and the Public Dental Health Care Centres, and private dental clinics. Also included were students enrolled at the University of Qatar, and Governmental Schools, persons employed at the Police and Army Departments, and other public members. These individuals were accessible because of their scheduled dental, and/or dental hygiene appointments at public centres or because they were in other public locations. To be included, subjects had to be within 18-72 years of age, and participation was not limited by health or dental history. Participation was voluntary and not obligatory. The final sample, n=859, was 41% male and 58.3% female. About 41% of the respondents were 18-25 years of age, 30.5% were between 26-32; 14.9% were between 33-40; 7.7% were between 41-48; 3.3% were between 49-56; 1.2% were between 57-64, and 1.0% were between 56-72. Most of the respondents hold a baccalaureate degree (49.2%), followed by high school graduates (29.6%), elementary school graduates (10.8%), individuals with graduate education

(5.4%), and individuals with no formal education (5.0%). Over 66% of the sample lived approximately 5-10 km from a dental clinic.

Methodology

One thousand questionnaires were distributed on a convenience basis in the State of Qatar, from March 14 - April 11, 1998 among Qatari people accordingly: 250 in Hamad Medical Corporation-Dental Department, 270 in the five biggest Public Health Centres in the country, 35 in private dental clinics, 112 in the University of Qatar, 125 in the Governmental School, 70 in the Police and Army Departments, and 138 other public members. Questionnaires were distributed from 7:00 am to 2:00 pm in Hamad Medical Corporation-Dental Department; from 7:00 am to 12:00 pm and 3:00 pm to 7:00 pm in the Public Dental Health Care Centres; from 4:00 pm to 10:00 pm in the private clinics; from 7:30 am until to 4:30 pm in Qatar University; from 6:30 to 12:30 in Governmental school and Police and Army Departments. A cover letter attached to the questionnaire clarified the aim of the research (See Appendix C and D for the Arabic translation), and explained how information from the participants will improve the health status and quality of life of Qatari people.

Data were kept confidential, and participants were informed that they could receive the results of the study by submitting their names and addresses to the principal investigator and/or the investigator assistants' after data collection. The response rate was 85.9% (n=859).

Protection of Human Rights

The following was submitted to the Old Dominion University Institutional Review Board for the Protection of Human Subjects; approval was received on March 9, 1998.

Subject Population: About 1000 adult Qatari dental patients, ages 18-70, from the State of Qatar were asked to complete the questionnaire. These individuals were chosen because no research exists on their oral health knowledge, attitudes, and behaviors.

Potential Risks: This study was descriptive with no risk to any participant during or after the study. The items on the questionnaire did not collect "sensitive" information from the subjects.

Consent Procedure: Participation in the study was voluntary. Subjects were informed of the study's purpose, procedures, and benefits prior to participation. They also were informed that the person collecting the data, Najat Saleh, is a dental hygienist working on her Master's Degree at Old Dominion University, School of Dental Hygiene. If they had any question about the study, they could contact Ms. Saleh at nas100g@worldnet.att.net or (757) 489-1017, or Michele Darby, faculty advisor at mdarby@odu.edu or (757) 683-5232. It was explained to the subjects, that they could refuse to participate in the study and withdraw from the study at any time, and that their participation in no way affects their status as patients at the dental clinic, as students in schools or as employees at their site of employment.

Protection of Subject's Rights: All data would remain confidential and only people associated with the study would have access to it. The results from the study will be reported in group form only and made available to participants upon request from the principal investigator or Michele Darby, faculty advisor. The names and addresses of all participants, who asked for the study results, were destroyed once results were forwarded to them. During the study, all data were stored in a locked file cabinet at Old Dominion University, School of Dental Hygiene or at the investigator's house. Qatari people surveyed were informed in the cover letter that responses would remain confidential.

Potential Benefits: The gathered information measured the oral health knowledge, attitudes, and behaviors of the Qatari people. This was essential for designing programs to increase Qatari people's awareness and knowledge of oral health, and to improve their oral health status.

Risk-Benefit Ratio: No risks were involved in this study. Results will be used to develop programs and procedures to improve the oral health attitudes, knowledge, and behaviors of Qatari people.

Instrumentation

A self-designed instrument titled: Oral Health Knowledge, Attitudes, and Behaviors of Qatari People was reviewed for content validity by a panel of experts from the Old Dominion University, School of Dental Hygiene, and then tested for its reliability by a test-retest procedure conducted by the principal investigator. The instrument included four sections: the first section, on demographics, addressed age, gender, marital status, and educational level of the respondents. The second section addressed participants' oral health behaviors and included questions about their self-care behavior. The third section surveyed participants' attitudes about the value of oral hygiene instructions. The fourth section collected data on the participants' knowledge of contemporary oral hygiene concepts and techniques. To establish test-retest reliability, a cover letter attached to the questionnaire was distributed on two separate occasions (13 days apart) to 20 Arab students at Old Dominion University. In section 1, questions 1-4, test-retest analyses revealed a 95-100% consistency. In section 2, questions 5-20 show a consistency of 85-100%. In section 3, questions 21-29 and 30-40, which used the Likert scale, had consistency of 45-85% and 89-100%. This section had the lowest level of consistency because the Likert scale may have changed the participants' attitudes or the

differences between important and very important may be small yet variable. In section 4, questions 41 through 48 show a consistency of 80-100%. No changes were made in the questionnaire after the test-retest procedure. All questionnaires for the actual study were translated into the Arabic language (See Appendix B).

Statistical Treatment

Data were discrete and continuous and reflect nominal, ordinal, and ratio scales of measurement. Survey data, using the SPSS system, were analyzed using frequencies, percentages, Chi-square test, and analysis of residual tests. All research questions were tested at the .05 level of significance. Chi square tests were used to determine associations between nominal demographic variables and other oral health-related variables. Also, the Chi-square test of association was used to determine statistical significance between numerous cross-tabulated variables. The analysis of residuals procedure, which tests the discrepancies between the observed and expected values, was used to determine which values were larger than what might be expected by chance.

CHAPTER IV

RESULTS AND DISCUSSION

One thousand questionnaires were distributed at selected sites in the State of Qatar: Hamad Medical Corporation and Dental Department (n=250), the five largest Public Health Centres (n=270) in the country, private dental clinics (n=35), University of Qatar (n=112), the Governmental school (n=125), Police and Army Departments (n=70), and to other public members (n=138). From the 1000 distributed questionnaires, 85.9% (n=859) were suitable for analysis. Of all the questionnaires distributed, a 14.1% (n=141) nonrespondent rate occurred because respondents were unwilling to complete the questionnaires, or questionnaires were taken home and never returned.

Results obtained from each questionnaire item are reported in Appendix K. Results are discussed in relation to the original research questions posed.

Results

Demographic information was obtained from items one through four located in section one of the questionnaire. Item one asked respondents to indicate their age from the following increments: 18-25, 26-32, 33-40, 41-48, 49-56, 57-64, and 56-72. Findings indicated that 41.4% of respondents were 18-25 years of age (n=356); 30.5% (n=262) were between 26-32; 14.9% (n=128) were between 33-40; 7.7% (n=66) were between 41-48; 3.3% (n=28) were between 49-56; 1.2% (n=10) were between 57-64; and 1.0% (n=9) were between 56-72 (See Figure 9).



Figure 9. The age ranges and percentages of Qatari people who participated in the study (n=859)

Item two asked the respondents to indicate their gender. Responses indicated that 41.7% (n=358) of the respondents were male while 58.3% (n=501) of the respondents were female (See Figure 10).

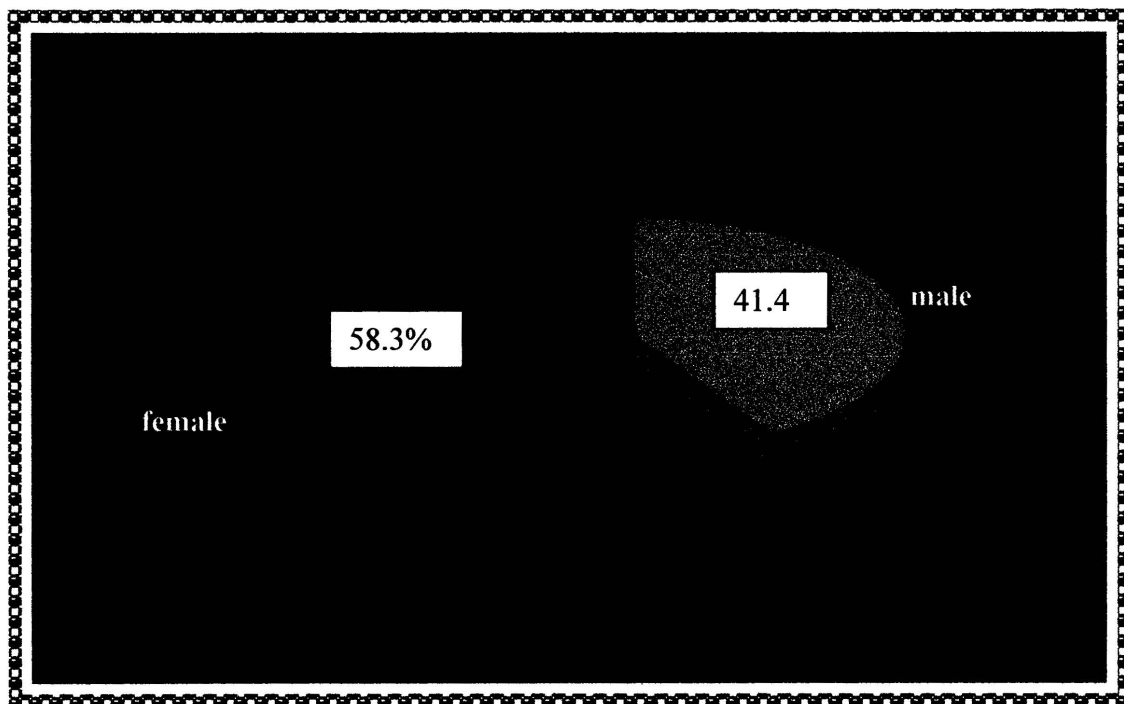


Figure 10. The gender of the Qatari people who participated in the study (n=859)

Item three asked respondents to indicate their highest level of education. Five percent (n=43) of the respondents had no formal education; 10.8% (n=93) were elementary school graduates; 29.6% (n=254) were people with high school diploma; 49.2% (n=423) were baccalaureate graduates; and 5.4% (n=46) of the respondents had graduate degrees (See Figure 11).

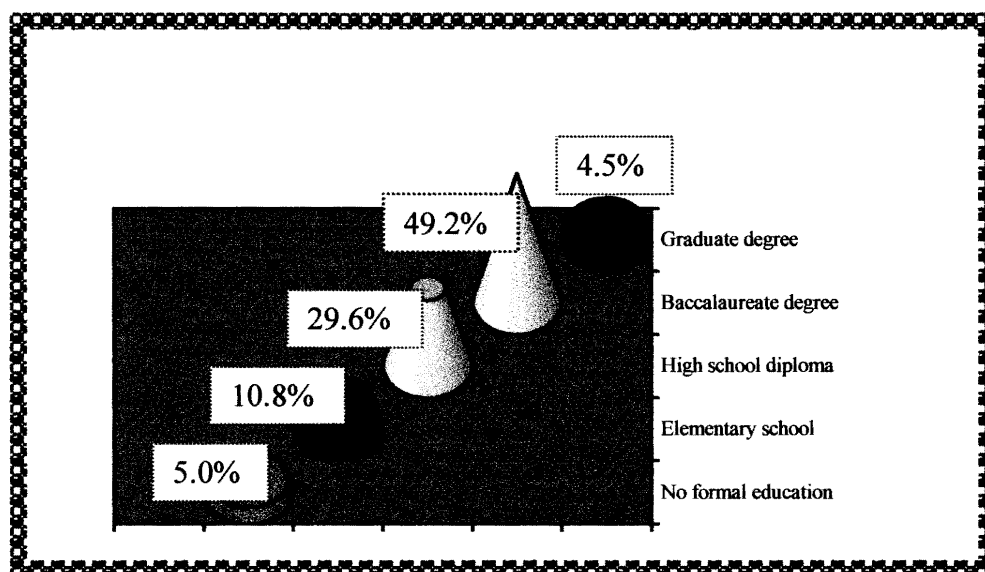


Figure 11. The levels of education of the Qatari people in the study (n=859)

Item four queried respondents on the distance between their home and the dental clinic where they obtain oral healthcare. Responses indicated that 32.7% (n=281) of the sample live approximately 5 km from a dental clinic; 33.6% (n=289) live approximately 10 km from a dental clinic; 21.8% (n=187) live approximately 30 km from a dental clinic; 10.2% (n=88) live approximately 100 km from a dental clinic (See Figure 12). There was a 98.4% (n=845) response rate to this question; 1.6% (n=14) of the respondents omitted this question and noted on the questionnaire that the distance from their home to a dental clinic was either less than 5 km, approximately 10 to 20 km, more than 30 km, or 400 km.

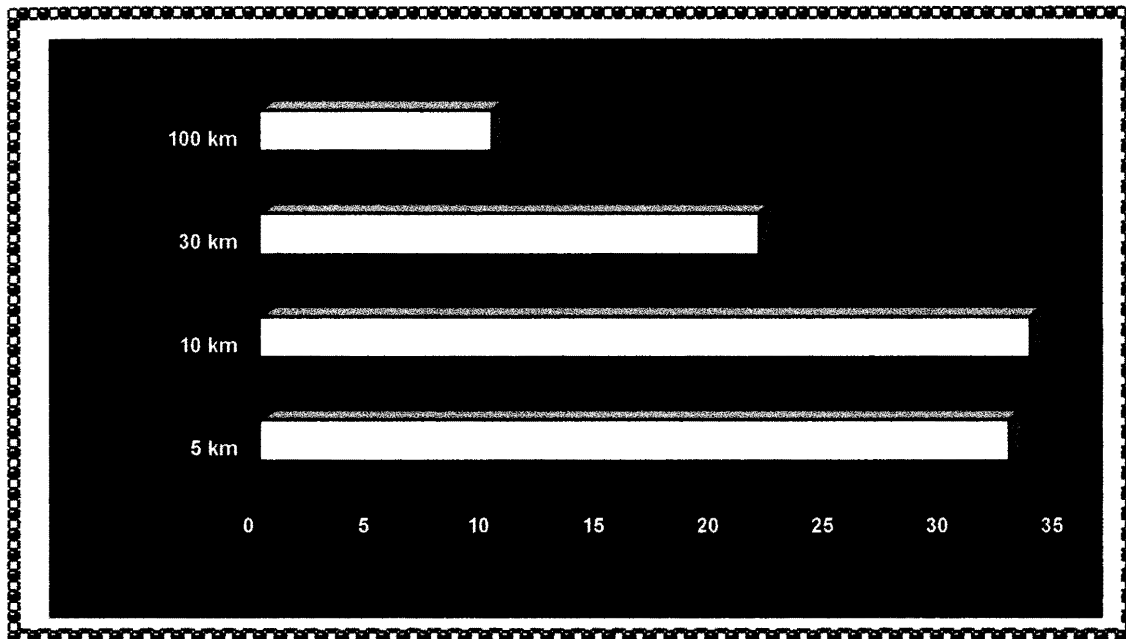


Figure 12. Average distance from home to a dental clinic for the Qatari people in the sample (n=859)

Research Question One

What are the oral health behaviors of Qatari people? Seven items (5-9, 13,14) from section two provided information related to this question. Item 5 asked subjects to indicate if they ever visited a dental clinic to have their teeth cleaned. Responses from item 5 revealed that 74.4% (n=639) of respondents received professional dental cleanings, while 25.6% (n=220) never received dental cleanings. Item 6 requested that respondents indicate if they ever received toothbrushing instructions at the dental clinic. Responses revealed that 37.8% (n=325) of the respondents had received toothbrushing instructions at the dental clinic and 62.2% (n=534) had not receive any toothbrushing instructions. Item 7 requested that subjects indicate if they ever received flossing instructions at the dental clinic. Responses revealed that 36.8% (n=316) of the respondents had received flossing instructions, while 63.2% (n=543) of the respondents had never received flossing instructions.

Item 8 requested subjects to indicate how often they visit the dental hygienist/dentist. Responses revealed that 9.4% (n=81) of the respondents never visit the dental hygienist/dentist; 10.6% (n=91) visit the hygienist/dentist once a year; 12.3% (n=106) visit the hygienist/dentist twice a year; 48.8% (n=419) of the respondents visit the hygienist/dentist when they experience pain; and 18.9% (n=162) visit the dental hygienist/dentist only for cosmetic reasons.

Using chi-square analysis, an association was measured between the number of times Qatari people visit the dental hygienist/dentist and their age. Findings revealed an association between age and visiting the dental hygienist/dentist ($\chi^2=67.793$, $df=24$, $p=.000$) (See Table 7). Analysis of residual results revealed that the age group of 18-25 (n=84) were more likely to visit the dental hygienist/dentist for cosmetic reasons; age groups 26-32 (n=134), 49-56 (n=16) were more likely to visit dental hygienist/dentist when experience pain, 65-72 (n=2) were less likely to visit the dental hygienist/dentist when they experienced pain; the 33-40 (n=22) year old age group was more likely to visit the dental hygienist/dentist once a year; the 57-64 (n=4) age group was more likely to visit the dental hygienist/dentist twice a year; and 41-48 (n=14) age group never visited the dental hygienist/dentist (See Table 8). Results revealed a weak association between gender and the number of times Qatari people visited the dental hygienist/dentist ($\chi^2=9.457$, $df=4$, $p=.051$). Residuals test revealed that males (n=44) were more likely to avoid visiting the dental hygienist/dentist and were less likely to visit the dental hygienist/dentist when they experienced pain. Females were (n=254) more likely to visit the dental hygienist/dentist when they experienced pain (See Table 8).

Chi-square analysis revealed significant relationships between the number of

Table 7

Results of the chi-square test of association between the demographic variables and the questionnaire variables (n=859)

Items	Demographics	χ^2	Df	P
The number of times Qatari people visit the dental hygienist/dentist	Age	67.793	24	.000**
	Gender	9.457	4	.051**
	Level of education	41.983	16	.000**
	Distance from clinic	11.600	12	.478
The frequency of brushing teeth with a toothbrush	Age	69.687	30	.000**
	Gender	58.194	5	.000**
	Level of education	37.889	20	.009**
	Distance from clinic	10.202	15	.807
The time spend each day cleaning teeth	Age	47.892	30	.020**
	Gender	8.192	5	.146
	Level of education	24.399	20	.225
Reasons for arriving late for a dental appointment	Age	17.147	18	.513
	Gender	12.384	3	.006**
	Level of education	24.467	12	.018**
	Distance from clinic	18.729	9	.028**
Reaction when oral hygiene instructions are given at each dental visit	Age	38.271	18	.004**
	Gender	20.887	3	.000**
	Level of education	13.196	12	.355
	Distance from clinic	10.957	9	.279
Reaction when asked to demonstrate home care techniques at the dental clinic	Age	21.955	18	.234
	Gender	13.710	3	.003**
	Level of education	25.728	12	.012**
	Distance from clinic	10.687	9	.298
Reaction when oral hygiene is checked at each dental visit	Age	16.355	18	.568
	Gender	5.411	3	.144
	Level of education	20.441	12	.059**
	Distance from clinic	14.413	9	.108
Reaction when asked to return for professional teeth cleanings for several visits	Age	10.593	12	.564
	Gender	5.830	2	.054**
	Level of education	11.859	8	.158
	Distance from clinic	7.566	6	.272
Embarrassed when a professional of the opposite gender tells me my oral hygiene needs improvement	Age	43.092	24	.010**
	Gender	8.263	4	.082
	Level of education	34.542	16	.005**

** Statistically Significant at the .05 level

Table 7 (Continued)

Results of the chi-square test of association between the demographic variables and the questionnaire variables (n=859)

Items	Demographics	χ^2	Df	P
Embarrassed when a professional of the opposite gender teaches me oral hygiene technique	Age	73.843	24	.000**
	Gender	14.302	4	.006**
	Level of education	34.973	16	.004**
Accepting new oral hygiene concepts from dental hygienist/dentist	Age	26.636	12	.009**
	Gender	5.153	2	.076
	Level of education	29.169	8	.000**
	Distance from clinic	6.897	6	.330
Flossing my teeth every day	Age	41.759	12	.000**
	Gender	2.735	2	.255
	Level of education	54.036	8	.000**
Follow the dental hygienist/dentist flossing instructions	Age	53.951	12	.000**
	Gender	1.500	2	.472
	Level of education	56.766	8	.000**
	Distance from clinic	3.740	6	.712

** Statistically Significant at the .05 level

times a person visited the dental hygienist/dentist and their level of education ($\chi^2 = 41.983$, $df=16$, $p=.000$) (See Table 7). Residual test results showed that Qatari people who had no formal education ($n=10$) and elementary level education ($n=13$) were more likely to not visit the dental hygienist/dentist; high school diplomas were more likely to visit dental hygienist/ dentist for cosmetic reasons. Qatari people holding baccalaureate degrees ($n=59$) were more likely to visit the dental hygienist/dentist once a year; and Qatari people with graduate degrees ($n=7$) were less likely to avoid visiting the dental hygienist/dentist (See Table 8). Results showed no association between the number of times a person visited the dental hygienist or dentist and their distance from home to the dental clinic ($\chi^2 = 11.600$, $df=12$, $p=.478$) (See Table7).

Table 8

Cross-tabulations with analysis of residual test between demographic variables and the frequency of dental visits of Qatari people (n=859)

	I never visit the dental hygienist or dentist			Once a year			Twice a year			When I'm in pain			Only when cosmetically desired		
	n	%	R	n	%	R	n	%	R	n	%	R	n	%	R
<u>Age</u>															
18-25	40	11.2	6.4	24	6.7	-13.7	30	8.4	-13.9	178	50.0	4.4	84	23.6	16.9
26-32	16	6.1	-8.7	31	11.8	3.2	37	14.1	4.7	134	51.1	6.2	44	16.8	-5.4
33-40	4	3.1	-8.1	22	17.2	8.4	24	18.8	8.2	60	46.9	-2.4	18	14.1	-6.1
41-48	14	21.2	7.8	10	15.2	3.0	5	7.6	-3.1	26	39.4	-6.2	11	16.7	-1.4
49-56	4	14.3	1.4	2	7.1	-1.0	5	17.9	1.5	16	57.1	2.3	1	3.6	-4.3
57-64	1	10.0	.1	0	.0	-1.1	4	40.0	2.8	3	30.0	-1.9	2	20.0	.1
65-72	2	22.2	1.2	2	1.0	1.0	1	11.1	-1.1	2	22.2	-2.4	2	22.2	.3
<u>Gender</u>															
Male	44	12.3	10.2	45	12.6	7.1	42	11.7	-2.2	165	46.1	-9.6	62	17.3	-5.5
Female	37	7.4	-10.2	46	9.2	-7.1	64	12.8	2.2	254	50.7	9.6	100	20.0	5.5
<u>Educational level</u>															
No formal education	10	23.3	5.9	1	2.3	-3.6	6	14.0	.7	19	44.2	-2.0	7	16.3	-1.1
Elementary	13	14.0	4.2	14	15.1	4.1	12	12.9	.5	40	43.0	-5.4	14	15.1	-3.5
High school	31	12.2	7.0	11	4.3	-15.9	29	11.4	-2.3	128	50.4	4.1	55	21.7	7.1
Baccalaureate	25	5.9	-14.9	59	13.9	14.2	52	12.3	-2	210	49.6	3.7	77	18.2	-2.8
Graduate	2	4.3	-2.3	6	13.0	1.1	7	15.2	1.3	22	47.8	-4	9	19.6	-3

R= Residual analysis test

Regarding the number of times respondents brush their teeth using a toothbrush, 2.6% do not brush their teeth (n=22); 2.0% (n=17) brush their teeth on special occasions; 0.8% (n=7) brush their teeth once a month; 3.6% (n=31) brush their teeth once a week; 29.2% (n=251) brush their teeth once a day; and 61.8% (n=531) brush their teeth more than once a day.

When considering the number of times Qatari people brush their teeth with a toothbrush, there was a statistically significant relationship with age ($\chi^2 = 69.687$, $df=30$, $p=.000$), gender ($\chi^2 = 58.194$, $df=5$, $p=.000$), and highest level of education ($\chi^2 = 37.889$, $df=20$, $p=.009$). There was no association between the number of times Qatari people brush their teeth with a toothbrush and distance from a dental clinic ($\chi^2=10.202$, $df=15$, $p=.807$) (See Table 7).

Analysis of residuals revealed that 118 people in the 18-25 age group and 5 from the 57-64 age group were more likely to brush their teeth once a day. Age groups 26-32 (n=176) and 33-40 (n=88) were more likely to brush their teeth more than once a day; the 41-48 (n=8) age group was more likely to not brush their teeth. Furthermore, 25 of Qatari males were more likely to brush once a week, while 348 of the Qatari females were more likely to brush their teeth more than once a day (See Table 9).

In regards to the level of education, 4 Qatari people who had no formal education were more likely to not brush their teeth and less likely to brush more than once a day; 62 elementary level and 275 baccalaureate degreed people were more likely to brush their teeth more than once a day; 83 people with high school diploma were more likely to brush their teeth once a day and less likely to brush their teeth more than once a day; and 10 with graduate degrees were less likely to brush their teeth once a day (See Table 9).

Item 13 asked subjects to indicate the amount of time they spent each day cleaning their teeth. Responses revealed that 17.6% (n=151) of the respondents spent less than one minute each day cleaning their teeth; 41.7% (n=358) spent more than one minute but less than two minutes each day cleaning their teeth; 21.0% (n=180) spent more than two minutes but less than three minutes each day cleaning their teeth; 10.0% (n=86) spent more than three minutes but less than four minutes each day cleaning their teeth; 5.8% (n=50) spent more than four minutes but less than five minutes each day cleaning their teeth; and 4.0% (n=34) spent more than five minutes each day cleaning their teeth.

A statistically significant relationship was established between the period of time Qatari people spend each day cleaning their teeth and age ($\chi^2=47.892$, $df=30$, $p=.020$) (See Table 7). Analysis of residuals revealed that Qatari people ages 18-25 (n=73) were more likely to brush their teeth for less than one minute; persons within the 26-32 (n=120) and 49-56 (n=14) age groups were more likely to spend more than one minute but less than two minutes; 33 persons in the age group 33-40 and 6 persons in the age group 41-48 were likely to spend more than two minutes but less than three minutes brushing their teeth (See Table 10). No statistically significant association was found between the period of time Qatari people spent each day cleaning their teeth and the following demographic variables of gender ($\chi^2 = 8.192$, $df= 5$, $p=.146$) and highest level of education ($\chi^2 =24.399$, $df=20$, $p=.225$) (See Table 7).

In item 14, subjects were asked to indicate when they cleaned their teeth: after waking up, after eating breakfast, after eating dinner, before going out, before going to bed, prior to special occasions, e.g., parties and holidays. Findings from item 14 revealed that 74% (n=641) of the respondents cleaned their teeth after waking up; 18.4% (n=158)

Table 9

Cross-tabulation with analysis of residual test between demographic variables and the toothbrushing frequency Qatari people (n=859)

	I do not brush my teeth			On special Occasion			Once a month			Once a week			Once a day			More than once a day		
	n	%	R	n	%	R	n	%	R	n	%	R	n	%	R	n	%	R
<u>Age</u>																		
18-25	6	1.7	-3.1	8	2.2	1.0	3	.8	.1	18	5.1	5.2	118	33.1	14.0	203	57.0	-17.1
26-32	6	2.3	-.7	5	1.9	-.2	0	.0	-2.1	3	1.1	-6.5	72	27.5	-4.6	176	67.2	14.0
33-40	1	.8	-2.3	1	.8	-1.5	1	.8	.0	4	3.1	-.6	33	25.8	-4.4	88	68.8	8.9
41-48	8	12.1	6.3	3	4.5	1.7	3	4.5	2.5	5	7.6	2.6	12	18.2	-7.3	35	53.0	-5.8
49-56	0	.0	-.7	0	.0	-.6	0	.0	-.2	1	3.6	.0	8	28.6	-.2	19	67.9	1.7
57-64	0	.0	-.3	0	.0	-.2	0	.0	-.1	0	.0	-.4	5	2.0	2.1	5	50.0	-1.2
65-72	1	11.1	.8	1	.0	-.2	0	.0	-.1	0	.0	-.3	3	33.3	.4	5	55.6	-.6
<u>Gender</u>																		
Male	18	5.0	8.8	12	3.4	4.9	6	1.7	3.1	25	7.0	12.1	114	31.8	9.4	183	51.1	-38.3
Female	4	.8	-8.8	5	1.0	-4.9	1	.2	-3.1	6	1.2	-12.1	137	27.3	-9.4	348	69.5	38.3
<u>Educational level</u>																		
No formal education	4	9.3	2.9	3	7.0	2.1	0	.0	-.4	3	7.0	1.4	12	27.9	-.6	21	48.8	-5.6
Elementary	4	4.3	1.6	1	1.1	-.8	2	2.2	1.2	3	3.2	-.4	21	22.6	-6.2	62	66.7	4.5
High school	6	2.4	-.5	4	1.6	-1.0	3	1.2	.9	14	5.5	4.8	83	32.7	8.8	144	56.7	-13.0
Baccalaureate	6	1.4	-4.8	7	1.7	-1.4	1	.2	-2.4	9	2.1	-6.3	125	29.6	1.4	275	56.0	13.5
Graduate	2	4.3	.8	2	4.3	1.1	1	2.2	.6	2	4.3	.3	10	21.7	-3.4	29	63.0	.6

R= Residual analysis test

Table 10

The time spend by Qatari people each day cleaning their teeth cross-tabulated with age (n=859)

	< one minute			> one minute but < two minutes			> two minutes but < three minutes			> three minutes but < four minutes			> four minutes but < five minutes			> five minutes		
	n	%	R	n	%	R	n	%	R	n	%	R	n	%	R	n	%	R
Age	73	48.3	10.4	146	40.8	-2.4	72	40.0	-2.6	35	40.7	-0.6	18	36.0	-2.7	12	35.3	-2.1
18-25	44	29.1	-2.1	120	33.5	10.8	47	26.1	-7.9	24	27.9	-2.2	17	34.0	1.7	10	29.4	-4
26-32	19	12.6	-3.5	53	14.8	-3	33	18.3	6.2	16	18.6	3.2	5	10.0	-2.5	2	5.9	-3.1
33-40	10	6.6	-1.6	20	5.6	-7.5	18	10.0	4.2	4	4.7	-2.6	8	16.0	4.2	6	17.6	3.4
41-48	3	2.0	-1.9	14	3.9	2.3	6	3.3	.1	3	3.5	.2	2	4.0	.4	0	.0	-1.1
49-56	0	.0	-1.8	3	.8	-1.2	3	1.7	.9	2	2.3	1.0	0	.0	-0.6	2	5.9	1.6
57-64	2	1.3	.4	2	.6	-1.8	1	.6	-0.9	2	2.3	1.1	0	.0	-0.5	2	5.9	1.6
65-72																		

R= Residual analysis test

cleaned their teeth after eating breakfast; 31.4% (n=270) cleaned their teeth after eating dinner; 23.4% (n=201) cleaned their teeth before going out; 56.5% (n=485) cleaned their teeth before going to bed; 26.5% (n=228) cleaned their teeth prior to special occasions; and 6.6% (n=57) included “other” answers (See Appendix L).

Research question 1a

What oral cleaning techniques are used by Qatari people? Item 10 asked about the technique used by Qatari people when brushing their teeth. Responses revealed that 52.3% (n=449) of the respondents use their own technique; 27.9% (n=240) use a technique taught to them at a dental clinic; 16.4% (n=141) use no special technique; 3.4% (n=29) use other techniques (See Appendix L).

In item 11, respondents rated the effectiveness of their toothbrushing techniques. Responses revealed that 26.7% (n=229) believed that their toothbrushing technique was 100% effective, 45.8% (n=393) answered that may be it was effective, 23.3% (n=200) were not sure, and 4.3% (n=37) did not believe that their toothbrushing technique was effective.

Research question 1b

What are the oral healthcare aids used by Qatari people? Item 12 provided the information for this research question. Responses indicated that 5.9% (n=51) of the sample use charcoal plus salt to clean their teeth; 21.0% (n=180) use miswak; 88.8% (n=763) use a toothbrush; 88.0% (n=756) use toothpaste; 26.4% (n=227) use dental floss; and 4.7% (n=40) use other oral health aids (See Appendix L).

Research question 1c

Do Qatari people use mouthrinses? Question 15 provided information relative to this research question. Responses revealed that 48.8% (n=419) of the respondents do not use a

mouthrinse; 15.6% (n=134) use salt water; 24.2% (n=208) use a mouthrinse recommended by the hygienist/dentist; 9.2% (n=79) use any commercial mouthwash; and 2.2% (n=19) use other mouthrinses (See Appendix L).

Research Question 1d

Why do Qatari people arrive late to their dental hygiene appointments? Responses to item 16 revealed that 11.2% (n=96) of the respondents arrive late to avoid oral care instructions; 59.5% arrive late because of another commitment (n=511); 15.3% (n=131) arrive late because of a scheduling conflict; and 14.1% (n=121) indicated “other” reasons (See Appendix L).

Chi-square analysis revealed statistically significant relationships between the reasons Qatari people arrive late to their dental hygiene appointment and the following demographic variables: gender ($\chi^2=12.384$, $df=3$, $p=.006$), highest level of education ($\chi^2=24.467$, $df=12$, $p=.018$), and distance of a dental clinic from their home ($\chi^2=18.729$, $df=9$, $p=.028$). No statistically significant relationship existed between arriving late and age ($\chi^2=17.147$, $df=18$, $p=.513$) (See Table 7).

Analysis of residuals revealed that 52 of the Qatari males were more likely to arrive late to avoid oral care instructions while 317 of the Qatari females were more likely to arrive late because of another commitment (See Table 11). Regarding the level of education and the reason Qatari people arrive late, the analysis of residual revealed that Qatari people who had no formal education (n=4) were less likely to arrive late because of scheduling conflict; people who hold elementary education (n=17), or hold graduate degrees (n=9) were more likely to arrive late to avoid oral care instructions; 45 of the Qatari people with high school diplomas were more likely to arrive late because of a scheduling conflict, and 267 of the

Table 11

Cross-tabulation between the demographic variables and the reason Qatari people arrive late to the dental appointment (n=859)

	To avoid oral care instructions			Because of another commitment			Because of a Scheduling conflict			Others		
	n	%	R	n	%	R	n	%	R	n	%	R
<u>Gender</u>												
Male	52	14.5	12.0	194	54.2	-19.0	52	14.5	-2.6	60	16.8	9.6
Female	44	8.8	-12.0	317	63.3	19.0	79	15.8	2.6	61	12.2	-9.6
<u>Educational level</u>												
No formal education	6	14.0	1.2	26	60.5	.4	4	9.3	-2.6	7	16.3	.9
Elementary	17	18.3	6.6	57	61.3	1.7	14	15.1	-2	5	5.4	-8.1
High school	30	11.8	1.6	141	55.5	-10.1	45	17.7	6.3	38	15.0	2.2
Baccalaureate	34	8.0	-13.3	267	63.1	15.4	58	13.7	-6.5	64	15.1	4.4
Graduate	9	19.6	3.9	20	43.5	-7.4	10	43.5	3.0	7	15.2	.5
<u>Distance from dental clinic</u>												
Approximately 5 km	39	13.9	7.7	149	53.0	-17.9	52	18.5	9.1	41	14.6	1.1
Approximately 10 km	27	9.3	-5.1	193	66.8	21.3	28	9.7	-16.1	41	14.2	.0
Approximately 30 km	19	10.2	-1.8	112	59.9	.9	34	18.2	5.5	22	11.8	-4.2
Approximately 100 km	9	10.2	-8	48	54.5	-4.3	15	17.0	1.6	16	18.2	3.5

R= Residual analysis test

persons with baccalaureate degrees were more likely to arrive late because of another commitment (See Table 11). Analysis of residuals also revealed that 52 Qatari people who live 5 km and 34 people who live 30 km from the dental clinic are more likely to arrive late because of a scheduling conflict; 193 people who live 10 km from the dental clinic are more likely to arrive late because of another commitment; and 16 people who live 100 km from the dental clinic are more likely to arrive late for other reasons (See Table 11).

Research question 1e

What is the reaction of Qatari people toward oral hygiene instructions given to them at the dental hygiene appointment? Via item 17, subjects were asked their reaction when given oral health instructions by a dental hygienist/dentist at each visit. Responses revealed that 7.6% (n=65) of the respondents refuse the instructions and insist on having the professional cleaning completed in one visit; 3.8% (n=33) of the respondents will change to a new dental hygienist/dentist to avoid receiving instructions; 81.6% (n=701) of the respondents will accept the treatment; and 7.0% (n=60) had some other reaction (See Appendix L)

Chi-square analysis revealed statistically significant associations between the reactions of Qatari people when oral hygiene instructions are given at each visit and the following demographic variables of age ($\chi^2 = 38.271$, $df=18$, $p= .004$) and gender ($\chi^2 =20.887$, $df=3$, $p=.000$). Chi-square revealed no association between the reactions of Qatari people when oral hygiene instructions were given at each visit and the following demographic variables of level of education ($\chi^2=13.196$, $df=12$, $p= .355$), and distance from dental clinic ($\chi^2=10.957$, $df=9$, $p= .279$) (See Table 7).

Analysis of residuals revealed that people within the 18-25 age group (n=28) was

more likely to have “other” actions (See Appendix L); the 49-56 (n=25) was more likely to accept the treatment; the 33-40 (n=13) and 41-48 age group (n=11) were more likely to refuse their oral hygiene to be checked at each visit; and 26-32 (n=13), were less likely to refuse their oral hygiene checked at each visit (See Table 12).

In regards to gender, residual analysis revealed that 38 of the Qatari males were more likely to refuse the treatment while 430 of the females were more likely to accept the treatment (See Table 12).

Research question 1f

What is the reaction of Qatari people if asked by a dental hygienist/dentist to demonstrate their home care technique? Item 18 provided information relative to this research question. Subjects were asked to indicate their reaction when the dental hygienist/dentist asks them to demonstrate how they clean their teeth at home. Responses revealed that 6.1% (n=52) of the respondents refuse to show the dental hygienist/dentist their toothbrushing technique; 5.2% (n=45) said that the dental hygienist/dentist is not supposed to ask questions like this; 4.4% (n=38) will ignore the request; and 84.3% (n=724) of the respondents will demonstrate their toothbrushing techniques.

A statistically significant association was found between demonstrating the toothbrushing technique at each visit and the following demographic variables of gender ($\chi^2=13.710$, $df=3$, $p=.003$), and highest level of education ($\chi^2=25.728$, $df=12$, $p=.012$). There were no significant relationships between demonstrating their toothbrushing technique at each visit and the demographic variables of age ($\chi^2=21.955$, $df=18$, $p=.234$), and the distance from a dental clinic ($\chi^2=10.687$, $df=9$, $p=.298$) (See Table 7).

Analysis of residuals revealed that Qatari males (n=26) were more likely to ignore

Table 12

Age and gender cross-tabulated with the reaction of Qatari people when oral hygiene instructions are given at each dental hygiene visit by dental hygienist or dentist (n=859)

	I refuse the treatment and insist on having professional cleaning completed at once			I change to a new hygienist/dentist			I accept the treatment because it will improve my oral health			Other reaction		
	n	%	R	n	%	R	n	%	R	n	%	R
Age												
18-25	25	7.0	-1.9	16	4.5	2.3	287	80.6	-3.5	28	7.9	3.1
26-32	13	5.0	-6.8	6	2.3	-4.1	226	86.3	-4.1	17	6.5	-1.3
33-40	13	10.2	3.3	2	1.6	-2.9	105	82.0	.5	8	6.3	-9
41-48	11	16.7	6.0	8	12.1	5.5	41	62.1	-12.9	6	9.1	1.4
49-56	1	3.6	-1.1	1	3.6	-1	25	89.3	2.2	1	3.6	-1.0
57-64	0	.0	-8	0	.0	-4	10	100.0	1.8	0	.0	-7
65-72	2	22.2	1.3	0	.0	-3	7	77.8	-3	0	.0	-6
Gender												
Male	38	10.6	10.9	23	6.4	9.2	271	75.7	-21.2	26	7.3	1.0
Female	27	5.4	-1.8	10	2.0	-9.2	430	85.8	21.2	34	6.8	-1.0

R= Residual analysis test

the dental hygienist/dentist request, while Qatari females (n=430) were more likely to demonstrate their toothbrushing technique. Regarding the highest level of education, analysis of residuals revealed that Qatari people with no formal education (n=7), people with elementary education (n=10) were more likely to refuse to demonstrate their toothbrushing technique; persons with high school diplomas (n=18) were more likely to ignore the request of the dentist or dental hygienist; and 370 persons with baccalaureate degrees were more likely to demonstrate their home toothbrushing technique (See Table 13).

Research question 1g

What is the reaction of Qatari people when their oral hygiene status is checked at each dental or dental hygiene appointment? Item 19 requested that subjects indicate their reaction to having their oral hygiene checked at each dental appointment. Responses to item 19 revealed that 3.4% (n=29) of the respondents refused to have their teeth checked at each visit; 7.8% (n=67) insisted on having their teeth cleaned only; 18.6% (n=160) accepted having their oral hygiene checked after their dental treatment is completed. The majority (70.2%, n=603) wanted their oral hygiene checked at each visit to monitor their progress.

A cross-tabulation was made between the reaction of Qatari people when their oral hygiene was checked at each visit and their highest level of education. A statistically weak significant relationship was found between the reaction of Qatari people when their oral hygiene was checked at each visit and their highest level of education ($\chi^2=20.441$, $df=12$, $p=.059$). No statistically significant relationship occurred between the reaction of Qatari people when their oral hygiene was checked at each visit and the following demographic variables: age ($\chi^2= 16.355$, $df=18$, $p= .568$), gender ($\chi^2= 5.411$, $df=3$, $p= .144$), and the distance from a dental clinic ($\chi^2= 14.413$, $df= 9$, $p= .108$) (See Table 7).

Table 13

Cross-tabulation of demographic variables with the reaction of Qatari people when asked to demonstrate home care at dental hygiene appointment (n=859)

	I refuse to show the dental hygienist/ dentist my toothbrushing technique			Dentist or dental hygienist are not supposed to ask questions like this			I ignore the request			I demonstrate my toothbrushing technique because I want my gum to improve		
	n	%	R	n	%	R	n	%	R	n	%	R
Gender												
Male	17	4.7	-4.7	21	5.9	2.2	26	7.3	10.2	294	82.1	-7.7
Female	35	7.0	4.7	24	4.8	-2.2	12	2.4	-10.2	430	85.8	7.7
Educational level												
No formal education	7	16.3	4.4	4	9.3	1.7	3	7.0	1.1	29	67.4	-7.2
Elementary	10	10.8	4.4	3	3.2	-1.9	4	4.3	-1	76	81.7	-2.4
High school	12	4.7	-3.4	14	5.5	.7	18	7.1	6.8	210	82.7	-4.1
Baccalaureate	19	4.5	-6.6	22	5.2	-2	12	2.8	-6.7	370	87.5	13.5
Graduate	4	8.7	1.2	2	4.3	-4	1	2.2	-1.0	39	84.8	.2

R= Residual analysis test

Residual analysis was used to determine which observed values were larger than what might be expected by chance alone. Qatari people who had no formal education (n=10) were more likely to want their oral hygiene checked only after their dental treatment was completed, 7 respondents with elementary school diplomas were more likely to refuse their oral hygiene status checked at each visit; 26 of the Qatari people with high school diplomas were more likely to insist on only having their teeth cleaned; and 307 people with baccalaureate degrees or 35 people with graduate degrees were more likely to accept their oral hygiene status check at each visit (See Table 14).

Research question 1h

What is the reaction of Qatari people if asked by the hygienist/dentist to return for multiple appointments to have their teeth professionally cleaned? Responses to item 20 revealed that 19.4% (n=167) of the respondents would not like to return to have their teeth cleaned; 7.8% (n=67) would not return to the dental hygienist/ dentist for several visits just to have their teeth cleaned; the majority (72.8%, n=625) would accept the treatment to improve their oral health.

A comparison of respondents' reactions toward having their teeth professionally cleaned on several visits was made using the demographic variable of gender. Chi-square analysis revealed a weak statistically significant relationship between the gender and the reaction toward professional cleaning on several visits ($\chi^2= 5.830$, $df=2$, $p=.054$). No significant relationship existed between people's reaction toward having professional oral cleanings on several visits and the following demographic variables: age ($\chi^2=10.593$, $df=12$, $p=.564$), highest level of education ($\chi^2=11.859$, $df=8$, $p=.158$), and distance from a dental clinic ($\chi^2=7.566$, $df=6$, $p=.272$) (See Table 7).

Residual analysis test revealed that males (n=37) were more likely to avoid returning just to have their teeth cleaned, while females (n=375) were more likely to accept the treatment and return on several visits to have their teeth professionally cleaned (Table 15).

Research Question Two

What are the attitudes of Qatari people toward oral health instructions delivered to them by a healthcare provider of the opposite gender? Item 25 and 26 were used to answer this research question. Subjects had to indicate *strongly agree*, *agree*, *no opinion*, *disagree*, and *strongly disagree* to the statement: "I feel embarrassed when the hygienist/dentist of the opposite gender tells me that my oral hygiene needs improvement." Responses revealed that 20.5% (n=176) of the respondents *strongly agree* that they feel embarrassed when a hygienist/dentist of the opposite gender tells them that their oral hygiene needs improvement; 26.4% (n=227) *agree* that they feel embarrassed when a hygienist/dentist of the opposite gender tells them that their oral hygiene needs improvement; 14.2% (n=122) had *no opinion*; 26.0% (n=223) of the respondents *disagree* with the statement; and 12.9% (n=111) *strongly disagreed*.

Chi-square analysis revealed statistically significant relationships between the embarrassment of Qatari people when a hygienist/dentist of the opposite gender tells them that their oral hygiene needs improvement and demographic variables of age ($\chi^2=43.092$, $df=24$, $p=.010$) and level of education ($\chi^2=34.542$, $df=16$, $p=.005$). There was no statistically significant relationship between the embarrassment from dental hygienist/dentist of the opposite gender and gender ($\chi^2=8.263$, $df=4$, $p=.082$) (See Table 7).

When the analysis of residuals was used, findings revealed that people in the 18-25 age group (n=104) were more likely to *agree* with the statement; the age groups 26-

Table 14

Reaction of Qatari people when their oral hygiene is checked at each dental hygiene appointment cross-tabulated with level of education (n=859)

	I refuse to have my teeth checked at each visit		I insist on having my teeth cleaned only		I want my oral hygiene progress checked only after my dental treatment is completed		I want my oral hygiene checked at each visit to monitor my progress		
	n	%	n	R	n	%	n	%	R
<u>Educational level</u>									
No formal education	3	7.0	5	11.6	10	23.3	25	58.1	-5.2
Elementary	7	7.5	11	11.8	15	16.1	60	64.5	-5.3
High school	5	2.0	26	10.2	47	18.5	176	69.3	-2.3
Baccalaureate	12	2.8	22	5.2	82	19.4	307	72.6	10.1
Graduate	2	4.3	3	6.5	6	13.0	35	76.1	2.7

R= Residual analysis test

Table 15

Reaction of Qatari people when asked to return to the dental clinic for several visits to have their teeth professionally cleaned cross-tabulated with gender (n=859)

	I do not like it; I want my teeth cleaned at once		I would not return to the dentist/hygienist for several visits just to have my teeth cleaned		I accept the treatment because it will improve my oral health		
	n	%	n	R	n	%	R
<u>Gender</u>							
Male	71	19.8	37	9.1	250	69.8	-10.5
Female	96	19.2	30	6.0	375	74.9	10.5

R= Residual analysis test

32(n=89) and 49-56 (n=10) were more likely to *disagree* with the statement; the age group 33-40 (n=20) was more likely to *strongly disagree* with the statement; age groups of 41-48 (n=22) and 65-72 (n=4) were more likely to *strongly agree* with the statement (See Table 16).

Analysis of residuals revealed that 15 people with no formal education, 30 with elementary level education and 59 with high school diploma were more likely to *strongly agree* with the statement; 124 with baccalaureate degrees were more likely to *disagree* with the statement; and 11 holding graduate degrees were more likely to *strongly disagree* (See Table 16).

Given the statement, "I feel embarrassed if a hygienist/dentist of the opposite gender teaches me oral hygiene techniques," respondents revealed that 17.0% (n=146) *strongly agreed*; 21.2% (n=182) *agreed*; 14.1% (n=121) had *no opinion*; 33.3% (n=286) *disagreed*; and 14.4% (n=124) *strongly disagreed*.

Chi-square analysis revealed a statistically significant relationship between the embarrassment of Qatari people when the dental hygienist/dentist taught them oral hygiene techniques and the following demographic variables: age ($\chi^2=73.843$, $df=24$, $p=.000$), gender ($\chi^2=14.302$, $df=4$, $p=.006$), and the highest level of education ($\chi^2=34.973$, $df=16$, $p=.004$) (See Table 7).

Residual analysis test revealed that 91 people within the 18-25 age group was more likely to *agree* with the statement; 96 within the 26-32 year old age group was more likely to *disagree* with the statement; 22 people from the 33-40 age group was more likely to *strongly disagree* with the statement; age groups 41-48 (n=31), 49-56 (n=7), and 65-72 (n=4) were more likely to *strongly agree* with the statement; and 2 from the 57-64 age group was less likely to *disagree* with the statement (See Table 17).

Table 16

Embarrassment level of Qatari people when the dental hygienist/ dentist of the opposite gender tells them that oral hygiene needs improvement cross-tabulated with the age and the educational level (n=859)

	Strongly agree			Agree			No opinion			Disagree			Strongly disagree		
	n	%	R	n	%	R	n	%	R	n	%	R	n	%	R
Age															
18-25	76	21.3	3.1	104	29.2	9.9	57	16.0	6.4	74	21.1	-17.4	44	12.4	-2.0
26-32	36	13.7	-17.7	68	26.0	-1.2	36	13.7	-1.2	89	34.0	21.0	33	12.6	-9
33-40	28	21.9	1.8	29	22.7	-4.8	18	14.1	-2	33	25.8	-2	20	15.6	3.5
41-48	22	33.3	8.5	17	25.8	-4	4	6.1	-5.4	14	21.2	-3.1	9	13.6	.5
49-56	7	25.0	1.3	6	21.4	-1.4	1	3.6	-3.0	10	35.7	2.7	4	14.3	.4
57-64	3	30.0	1.0	2	20.0	-6	3	30.0	1.6	1	10.0	-1.6	1	10.0	-3
65-72	4	44.4	2.2	1	11.1	-1.4	3	33.3	1.7	1	11.1	-1.3	0	.0	-1.2
Educational level															
No formal education	15	34.9	6.2	14	32.6	2.6	4	9.3	-2.1	9	20.9	-2.2	1	2.3	-4.6
Elementary	30	32.3	10.9	20	21.5	-4.6	13	14.0	-2	20	21.5	-4.1	10	10.8	-2.0
High school	59	23.2	7.0	62	24.4	-5.1	42	16.5	5.9	58	22.8	-7.9	33	13.0	.2
Baccalaureate	66	15.6	-20.7	120	28.4	8.2	57	13.5	-3.1	124	29.3	14.2	56	13.2	1.3
Graduate	6	13.0	-3.4	11	23.9	-1.2	6	13.0	-5	12	26.1	.1	11	23.9	5.1

R= Residual analysis test

Table 17

Embarrassment level of Qatari people when oral hygiene instructions are taught by a professional of the opposite gender (n=859)

	Strongly agree			Agree			No opinion			Disagree			Strongly disagree		
	n	%	R	n	%	R	n	%	R	n	%	R	n	%	R
Age															
18-25	49	13.8	-11.5	91	25.6	15.6	52	14.6	1.9	113	31.7	-5.5	51	14.3	-4
26-32	33	12.6	-11.5	54	20.6	-1.5	43	16.4	6.1	96	36.6	8.8	36	13.7	-1.8
33-40	20	15.6	-1.8	25	19.5	-2.1	18	14.1	.0	43	36.6	.4	22	17.2	3.5
41-48	31	47.0	19.8	6	9.1	-8.0	0	.0	-9.3	21	31.8	-1.0	8	12.1	-1.5
49-56	7	25.0	2.2	4	14.3	-1.9	3	10.7	-9.9	9	32.1	-.3	5	17.9	1.0
57-64	2	20.0	.3	2	20.0	-1	2	20.0	.6	2	20.0	-1.3	2	20.0	.6
65-72	4	44.4	2.5	0	.0	-1.9	3	22.2	1.7	2	22.2	-1.0	0	.0	-1.3
Gender															
Male	78	21.8	17.2	60	16.8	-15.9	50	14.0	-4	116	32.4	-3.2	54	15.1	2.3
Female	68	13.6	-17.2	122	24.4	15.9	71	14.2	.4	170	33.9	3.2	70	14.0	-2.3
Educational level															
No formal education	13	30.2	5.7	8	18.6	-1.1	5	11.6	-1.1	12	27.9	-2.3	5	11.6	-1.2
Elementary	21	22.6	5.2	23	24.7	3.3	16	17.2	2.9	24	25.8	-7.0	9	9.7	-4.4
High school	55	21.7	11.8	60	23.6	6.2	37	14.6	1.2	72	28.3	-12.6	30	11.8	-6.7
Baccalaureate	49	11.6	-22.9	85	20.1	-4.6	55	13.0	-4.6	164	38.8	23.2	70	16.5	8.9
Graduate	8	17.4	.2	6	13.0	-3.7	8	17.6	1.5	14	30.4	-1.3	10	21.7	3.4

R= Residual analysis test

Analysis of residuals revealed that males (n=78) were more likely to *strongly agree* while females (n=122) were more likely to *agree* with the statement. People without formal education (n=13), with an elementary school education (n=12), and those with high school diplomas (n=55) were more likely to *strongly agree* with the statement; those with baccalaureate degrees (n=164) were more likely to *disagree*; and 10 holding graduate degrees *strongly disagree* with the statement.

Research question 2a

Do Qatari people value professional oral health instructions from the dental hygienist or dentist? Subjects responded to items 21-24, 28, and 29 by indicating their level of agreement with the statement: *strongly agree*, *agree*, *no opinion*, *disagree*, and *strongly disagree*. In item 40, subjects ranked the statement as: *very important*, *somewhat important*, and *not important*.

Item 21: I like when my hygienist/dentist teaches me oral hygiene methods. Responses revealed that 54.8% (n=471) of the respondents *strongly agreed*; 36.1% (n=310) of the respondents *agreed*; 5.4% (n=46) had *no opinion*; 2.0% (n=17) *disagreed*; and 1.7% (n=15) *strongly disagreed*.

Item 22: It is a waste of time having my oral hygiene status checked at every dental visit. Responses revealed that 8.0% (n=69) of the respondents *strongly agreed*; 13.9% (n=119) of the respondents *agreed*; 8.1% (n=70) had *no opinion*; 36.6% (n=314) *disagreed*; and 33.4% (n=287) *strongly disagreed*.

Item 23: Checking my toothbrushing method at the beginning of each visit is a waste of time. Results revealed that 9.5% (n=82) of the respondents *strongly agreed*; 19.8% (n=170) of the respondents *agreed*; 13.9% (n=119) had *no opinion*; 36.7% (n=315)

disagreed; and 20.1% (n=173) *strongly disagreed* about having their toothbrushing method checked at the beginning of each visit because it is a waste of time.

Item 24: Learning to use dental floss at the beginning of each visit is a waste of time. Responses revealed that 10.6% (n=91) of the respondents *strongly agreed* that learning to floss at each visit is a waste of time; 20.5% (n=176) *agreed*; 15.3% (n=131) had *no opinion*; 36.0% (n=309) of the respondents *disagreed*; and 17.7% (n=152) *strongly disagreed*.

Item 28: Good oral health is something that I value. Responses revealed that 19.6% (n=168) of the respondents *strongly agreed* with this statement; 20.6% (n=177) *agreed*; 12.3% (n=106) had *no opinion*; 32.0% (n=275) *disagreed*; and 15.5% (n=133) *strongly disagreed*.

Item 29: I believe that I can keep my teeth healthy for a lifetime. Responses revealed that 15.3% (n=131) of the respondents *strongly agreed*; 25.0% (n=215) *agreed*; 19.7% (n=169) had *no opinion*; 27.4% (n=235) *disagreed*; and 12.7% (n=109) *strongly disagreed*.

Item 40: Visiting the dental hygienist/dentist for preventive dental care. Responses revealed that the majority of 60.2% (n=517) of the respondents felt it was *very important* to visit the hygienist and/or dentist for preventive dental care; 32.4% (n=278) of the respondents felt it was *somewhat important*; and 7.5% (n=64) felt it was *not important* to visit hygienist/ dentist for preventive dental care.

Research question 2b

How important is the dental/dental hygiene appointment to Qatari people? Items 31 and 39 provided information related to this research question. Items 31 and 39 involved a statement with three choices: *very important*, *somewhat important*, and *not important*.

Item 31: Attending all scheduled appointments for professional teeth cleaning. Responses revealed that the majority (69.4%, n=596) of the respondents felt it was *very important*; 26.5% (n=228) felt it was *somewhat important*; and 4.1% (n=35) felt it was *not important*.

Item 39: Being on time to have my teeth professionally cleaned. Responses revealed that 67.1% (n=576) of the respondents felt it was *very important*; 28.9% (n=248) felt it was *somewhat important*; 4.1% (n=35) felt it was *not important*.

Research question 2c

Are Qatari people receptive to learning new oral home care techniques? Subjects were asked to rank the statements in items 30, 32, 35 and 37 as: *very important*, *somewhat important*, and *not important*.

Item 30: Following the hygienist's/dentist's toothbrushing instructions. Responses revealed that 75.3% (n=647) of the respondents said it is *very important*; 21.4% (n=184) of the respondents said it is *somewhat important*; and 3.3% (n=28) of the respondents said it is *not important*.

Item 32: Accepting new oral hygiene concepts from the dental hygienist/dentist. Responses revealed that the majority (68.9%; n=592) of the respondents believed it is *very important* to accept new oral hygiene concepts from the hygienist/dentist; 27.2% (n=234) said it is *somewhat important*; and 3.8% (n=33) said accepting new oral hygiene concept from the hygienist/dentist is *not important*.

A cross-tabulation between item 32 and the following demographic variables revealed a statistically significant relationship with: age ($\chi^2=26.636$, df=12, p=.009) and level of education ($\chi^2=29.169$, df=8, p=.000). No significant relationship occurred

between item 32 and the following demographic variables: gender ($\chi^2=5.153$, $df=2$, $p=.076$) and distance from a dental clinic ($\chi^2=6.897$, $df=6$, $p=.330$) (See Table 7).

Analysis of residuals revealed that the 18-25 ($n=113$) age group was more likely to answer *somewhat important* to item 32; age groups 26-32 ($n=189$) and 33-40 ($n=98$) were more likely to answer *very important* to item 32; and age group 41-48 ($n=8$) was more likely to answer *not important*. Regarding the level of education, people with no formal education ($n=7$) and with elementary education ($n=7$) were more likely to choose *not important* about the statement; people with high school diplomas ($n=73$) were more likely to choose *somewhat important*; and people with baccalaureate degrees ($n=302$) and graduate degrees ($n=35$) were more likely to choose *very important* (See Table 18).

Table 18

Importance level of Qatari people surveyed accepting new oral hygiene concepts from the dental hygienist/dentist, cross-tabulated with their age and level of education ($n=859$)

	Very important			Somewhat important			Not important		
	n	%	R	n	%	R	n	%	R
Age									
18-25	227	63.8	-18.3	113	31.7	16.0	16	4.5	2.3
26-32	189	72.1	8.4	68	26.0	-3.4	5	1.9	-5.1
33-40	98	76.6	9.8	28	21.9	-6.9	2	1.6	-2.9
41-48	44	66.7	-1.5	14	21.2	-4.0	8	12.1	5.5
49-56	21	75.0	1.7	6	21.4	-1.6	1	3.6	-.1
57-64	7	70.0	.1	3	30.0	.3	0	.0	-.4
65-72	6	66.7	-.2	2	22.2	-.5	1	11.1	.7
Educational level									
No formal education	26	60.5	-3.6	10	23.3	-1.7	7	16.3	5.3
Elementary	59	63.4	-5.1	27	29.0	1.7	7	7.5	3.4
High school	170	66.9	-5.1	73	28.7	3.8	11	4.3	1.2
Baccalaureate	302	71.4	10.5	114	27.0	-1.2	7	1.7	-9.3
Graduate	35	76.1	3.3	10	21.7	-2.5	1	2.2	-.8

R= Residual analysis test

Item 35: Learning effective toothbrushing techniques. Responses revealed that the majority (77.4%; $n=665$) of the respondents felt that the statement was *very important*;

20.0% (n=172) felt it was *somewhat important*; and 2.6% (n=22) felt it was *not important*.

Item 37: Following the dentist's/hygienist's flossing instructions. Responses revealed that 40.7% (n=350) of the respondents felt it was *very important* to follow a professional flossing instructions; 44.1% (n=379) felt it was *somewhat important*; and 15.1% (n=130) felt it was *not important* to follow a dentist's/hygienist's instructions.

Chi-square analysis was used to compare item 37 to key demographic variables. Findings revealed a statistically significant association between item 37 and the following demographic variables of age ($\chi^2=53.951$, $df=12$, $p=.000$) and education level ($\chi^2=56.766$, $df=8$, $p=.000$). No statistically significant relationship was found between item 37 and the following demographic variables of gender ($\chi^2=1.500$, $df=2$, $p=.472$) and distance from a dental clinic ($\chi^2=3.740$, $df=6$, $p=.712$) (See Table7).

Residual analysis tests identified that people in the 18-25 (n=187) and the 41-48 age groups (n=32) were more likely to answer *somewhat important* to item 37, following the dental hygienist's/dentist's flossing instructions; the 26-32 (n=121), 33-40 (n=73), 49-56 (n=17), and 65-72 (n=6) age groups were more likely to answer *very important* to item 37; and the 57-64 age group (n=4) were more likely to answer *not important* to item 37 (See Table 19).

Analysis of residuals revealed that Qatari people with no formal education (n=17), with an elementary level education (n=23), or those with a high school diploma (n=51) were more likely to answer *not important* to item 37, while Qatari people with baccalaureate degrees (n=193) and/or graduate degrees (n=21) were more likely to answer *very important* (See Table 19).

Table 19

Importance of following the dental hygienist/dentist flossing instructions to Qatari people, cross-tabulated with their age and level of education (n=859)

	Very important			Somewhat important			Not important		
	N	%	R	n	%	R	n	%	R
<u>Age</u>									
18-25	107	30.1	-38.1	187	52.5	29.9	62	17.4	8.1
26-32	121	46.2	14.2	110	42.0	-5.4	31	11.8	-8.7
33-40	73	57.0	20.8	42	32.8	-14.5	13	10.2	-6.4
41-48	22	33.3	-4.9	32	48.5	2.9	12	18.2	2.0
49-56	17	60.7	5.6	5	17.9	-7.4	6	21.4	1.8
57-64	4	40.0	-1	2	20.0	-2.4	4	40.0	2.5
65-72	6	66.7	2.3	1	11.1	-3.0	2	22.2	.6
<u>Educational level</u>									
No formal education	14	32.6	-3.5	12	27.9	-7.0	17	39.5	10.5
Elementary	39	41.9	1.1	31	33.3	-10.0	23	24.7	8.9
High school	83	32.7	-20.5	120	47.2	7.9	51	20.1	12.6
Baccalaureate	193	45.6	20.6	198	46.8	11.4	32	7.6	-32.0
Graduate	21	45.7	2.3	18	39.1	-2.3	7	15.2	.0

R= Residual analysis test

Research question 2d

How important is brushing and flossing to Qatari people? In question 33 and 34, subjects were asked to evaluate the importance of daily brushing and flossing. Of the sample, 87.9% (n=755) felt that daily toothbrushing was *very important*; 8.8% (n=76) felt that daily brushing was *somewhat important*; and 3.3% (n=28) of the respondents felt brushing daily was *not important*.

From question 34, findings revealed that 22.5% (n=193) of the respondents viewed daily flossing as *very important*; 49.2% (n=423) indicated it was *somewhat important*; and 28.3% (n=243) viewed daily flossing as *not important*.

A cross-tabulation between item 34 and the demographic variables revealed a statistically significant relationship with age ($\chi^2=41.759$, df=12, p=.000) and the level of education ($\chi^2=54.036$, df=8, p=.000). No significant relationship occurred between item 34

and the demographic variables of gender ($\chi^2= 2.735$, $df=2$, $p=.255$) and distance of residence from a dental clinic ($\chi^2=4.113$, $df=6$, $p=.661$) (See Table 7).

Residual analysis revealed that people in the 18-25 ($n=186$) and people in the 26-32 ($n=139$) age groups were more likely to answer *somewhat important* to the statement; people in the 33-40 ($n=44$) age group were more likely to answer *very important* to the statement and less likely to answer *not important* about the statement; people in the 41-48 ($n=24$), people in the 49-56 ($n=11$), and people in the 65-72 ($n=7$) age groups were more likely to answer *not important* to the statement. Also, the analysis of residual revealed that Qatari people with no formal education ($n=29$) or a high school diploma ($n=87$) were more likely to answer *not important* to item 34; people ($n=25$) with an elementary education were more likely to answer *very important*; and people ($n=228$) with a baccalaureate degrees and people ($n=27$) with graduate degrees were more likely to answer *somewhat important* (See Table 20).

From item 36, responses revealed that the majority (85.0%; $n=730$) believed it was *very important* to brush all teeth thoroughly; 11.4% ($n=98$) felt it was *somewhat important*; and 3.6% ($n=31$) felt it was *not important*.

Item 38 indicated the importance of using miswak for cleaning the teeth. Responses revealed that 35.3% ($n=303$) of the respondents felt using miswak was *very important*; 38.4% ($n=330$) felt it was *somewhat important*; and 26.3% ($n=226$) of the respondents felt it was *not important*.

Research Question Three

What is the general dental knowledge level of Qatari people? Items 41 and 42 provided information relative to this research question. Via item 41, subjects indicated the

primary reasons for tooth loss. Responses revealed that 8.5% (n=73) of the respondents felt

Table 20

The importance of daily dental flossing cross-tabulated with their age and level of education of the Qatari people sampled (n=859)

	Very important			Somewhat important			Not important		
	n	%	R	n	%	R	n	%	R
Age									
18-25	59	16.6	-21.0	186	52.2	10.7	111	31.2	10.3
26-32	63	24.0	4.1	139	53.1	10.0	60	22.9	-14.1
33-40	44	34.4	15.2	58	45.3	-5.0	26	20.3	-10.2
41-48	14	21.2	-.8	28	42.4	-4.5	24	36.4	5.3
49-56	9	32.1	2.7	8	28.6	-5.8	11	39.3	3.1
57-64	3	30.0	.8	3	30.0	-1.9	4	40.0	1.2
65-72	1	11.1	-1.0	1	11.1	-3.4	7	77.8	4.5
Educational level									
No formal education	5	11.6	-4.7	9	20.9	-12.2	29	67.4	16.8
Elementary	25	26.9	4.1	39	41.9	-6.8	29	31.2	2.7
High school	47	18.5	-10.1	120	47.2	-5.1	87	34.3	15.1
Baccalaureate	108	25.5	13.0	228	53.9	19.7	87	20.6	-32.7
Graduate	8	17.4	-2.3	27	58.7	4.3	11	23.9	-2.0

R= Residual analysis test

aging was the primary reason for people to tooth loss; 5.6% (n=48) of the respondents said accident/injury was the primary reason; the majority (64.3%; n=552) indicated tooth decay; and 21.7% (n=186) reported gum diseases.

From item 42, subjects indicated their primary reason for visiting a dental clinic. Of the respondents, 50.3% (n=432) came to a dental clinic when experiencing pain; 17.5% (n=150) came for check ups; 12.1% (n=104) came for fillings; 2.8% (n=24) came for tooth extraction; and 3.1% (n=27) had other reasons (See Appendix L).

Research question 3a

How do Qatari people view gingival bleeding? Subjects were asked in item 45 to indicate why they thought their gums bled. Findings revealed that 26.4% (n=227) of the respondents do not have bleeding gums; 20.1% (n=173) did not know the reason for their

bleeding gums; 9.8% (n=84) implicated bacterial plaque; 19.4% (n=167) answered poor brushing technique; 3.5% (n=30) implicated poor flossing technique as the culprit for bleeding gums; 14.8% (n=127) answered brushing too hard; and 5.9% (n=51) believed that bleeding gums were normal.

Item 46 requested subjects to indicate how often their gums bled. Responses revealed that 5.7% (n=49) of the respondents experienced bleeding gums frequently; 30.8% (n=265) have gums that bleed sometimes; 35.2% (n=302) said that their gums seldom bleed; and 7.9% (n=68) did not know the reason for their bleeding gums. The other 175 subjects indicated in item 45 that their gums did not bleed.

Research Question 3b

Do Qatari people know the primary etiologies for dental caries and periodontal disease? Question 43 required respondents to identify the primary cause of tooth decay. Data revealed that 9.0% (n=77) of the respondents did not know the primary cause of tooth decay; 10.8% (n=93) answered bacterial plaque; 25.3% (n=217) answered accumulation of food debris; 36.9% (n=317) answered poor oral hygiene; 13.3% (n=114) answered eating a lot of sweets; and 4.8% (n=41) answered soft or weak teeth were the cause of tooth decay.

Question 44 required respondents to identify the primary cause of periodontal disease. Of the respondents, 26.8% (n=230) did not know the primary cause of periodontal disease; 12.7% (n=109) implicated bacterial plaque; 6.1% (n=52) answered accumulation of food debris; 22.8% (n=196) answered accumulation of calculus; and 31.7% (n=272) believed that not cleaning teeth and gums daily was the primary cause for periodontal disease.

Research question 3c

How do Qatari people rate the health of their gingiva and teeth? Item 47 and 48 requested subjects to rate the health of their gums and teeth using: *very healthy*, *somewhat healthy*, *unhealthy*, and *I do not know*. Responses to item 47 revealed that 22.1% (n=190) of the respondents rated their gums as *very healthy*; the majority (52.0%; n=447) rated their gums as *sometimes healthy*; 7.7% (n=66) rated their gums as *unhealthy*; and 18.2% (n=156) of the respondents *did not know*. In terms of teeth, item 48 revealed that 17.0% (n=146) of the respondents rate their teeth as *very healthy*; the majority (61.4%; n=527) rated their teeth as *sometimes healthy*; 10.4% (n=89) rated their teeth as *unhealthy*; and 11.3% (n=97) of the respondents *did not know*.

In addition to the questionnaire, the following results are from an unplanned, oral interview conducted by the investigator on 210 Qatari people who completed the questionnaires. There were five questions perplexing the researcher (See Appendix M). The first question focused on the reason why some Qatari people use charcoal and salt to clean their teeth. Of the 210 people, 52.3% (n=110) said that charcoal is a natural material for whitening teeth, 33.3% (n=70) said charcoal is an old traditional material, not used any more, 14.2% (n=30) said either that they had never heard about charcoal or that they did not know.

The second question the investigator asked was on the usage of miswak. Of the 210 respondents, 47.6% (n=100) said it had its basis in religion, 23.8% (n=50) said miswak contains fluoride, 19.0% (n=40) said miswak was good for killing mouth bacteria in addition to using toothbrush and toothpaste, 9.5% (n=20) said miswak had a pleasant taste and smell.

The third question asked by the investigator dealt with the ability of Qatari people to

differentiate between the terms dentist and dental hygienist. Of the 210 respondents, 85.7% (n=180) did not know the difference between a dental hygienist and dentist, 4.7% (n=10) thought that the term dental hygienist was a nickname for the dentist, 9.5% (n=20) said dental hygienists are only available in Western countries.

The fourth question asked by the investigator was related to the number of dental hygiene appointments needed for a professional dental cleaning. Of the 210 respondents, 50% (n=105) believed one visit was enough to complete a professional dental cleaning, 19.0% (n=40) believed two visits were enough to complete a professional dental cleaning, and 30.9% (n=65) did not care.

In the fifth question, the investigator asked about the number of visits needed to complete dental fillings. Of the 210 respondents, 52.8% (n=111) said it depended on the dentist's skills and time schedule, 9.5% (n=20) believed fillings should be done all at once, 23.3% (n=49) did not know, and 14.2% (n=30) said that it depended on the number of teeth with cavities.

Discussion

Given the 18-72 year age range of the sample, 41.4% (n=356) ranged in age from 18-25 and 30.5% (n=262) were between 26-32 suggesting a fairly young group. Only about 6.5% were in the 56-72 year old range. In terms of age, this sample varies from the samples of Ture (1993) and Roins (1994). While 95% of the respondents were under 51 years of age in Ture's (1993) study, in Roins's (1994), 25% of the subjects were under 30 years of age and 25% were 55 years of age or more. The respondents in the Schwarz and Edward study (1994) were between 33-44 and 65-74 years of age.

The demographic findings suggest that females (58.3%; n=501) outnumbered males

(41.7%; n=358) in this study, which is similar to Roins (1994) where women (n=390) outnumbered men (n=272). Perhaps women are more likely than men to volunteer as study participants or that they experience more dental care than men. Of the respondents in the present study, 5.0% had no formal education, 10.8% completed elementary education, 29.6% earned a high school diploma, 49.2% earned a baccalaureate degree, and 5.4% held a graduate degree. The present study's population represented a greater diversity in educational levels and a more highly educated sample than used by past researchers who studied people with either the highest or lowest levels of education, or people from specific educational levels. Of the respondents in Ture's study, 50% had a college degree, and 14% had no formal education; in Douglas et al (1990) study, 24% had a college degree, 14% had no formal education, and 49% were school students. Focusing on a number of specific educational levels enables the researcher to determine how persons from various educational backgrounds think, behave, or perceive.

Regarding the distance between subjects' homes and the dental clinics where they obtained oral healthcare, results indicated that 32.7% of the respondents lived approximately 5 km from the dental clinic (n=281) which differs slightly from Ture's findings (1993) where 42% of the respondents lived 5 km from a dentist's office.

Research Question One

What are the oral health behaviors of Qatari people? When respondents were asked to indicate if they ever visited a dental clinic for dental cleanings, or if they received any toothbrushing or flossing instructions, data revealed that the majority (74.4%) had experienced a professional dental cleaning; however, the majority had never received any toothbrushing (62.2%), or flossing (63.2%) instructions. Although many

Qatari people visit dental clinics to have their teeth professionally cleaned, few dentists devote time to client education. Therefore, data suggest a need for oral health professionals who will invest treatment time in preventive oral health instructions. Alkuwari (1988) mentioned in his dissertation that no dental hygienists exist in the State of Qatar and their role in education and preventive therapy could be an important contribution to the oral health of the people.

Of the respondents, 48.8% visit the hygienist/dentist when in pain, whereas 9.4% have never been to a dental hygienist/dentist. The number of Qatari people who have never been to a dental hygienist/dentist might be an underestimation, since most of the people in the survey were waiting to be treated at a dental clinic. To improve their quality of life, Qatari people could benefit from to receive regular preventive care and should not wait until they experience pain before seeking professional treatment. These findings further suggest that Qatari people need oral health education to prevent pain and disease. These findings not only apply to Qatari people, but also to the Omanis, who share a similar culture, and who like the Qatari people, go to the dentist when they experience pain. About 54% of the Omanis population have never been to a dentist (Ture, 1993). These findings are further supported by Douglas et al (1990) who found that 50% of the Jordanian people experienced pain before seeing a dentist. All these studies provide similar information about the oral health behaviors of Middle Eastern people. Of the respondents, 18.9% visit the dental hygienist or dentist only for cosmetic reasons. Although aesthetics is valued in all cultures, disease prevention is the most important factor that should motivate people to practice preventive self-care behaviors.

The variable “how often do Qatari people visit the dental hygienist or dentist” was

cross-tabulated with demographic characteristics of Qatari people in the sample. An association was found between the number of times Qatari people visit the dental hygienist or dentist and age. Therefore, age is a factor associated with whether Qatari people visit the dental hygienist or dentist. Data suggest that the 57-64 year old age group is more likely to visit the dental hygienist or dentist twice a year, while the 65-72 year old group are less likely to visit the dental hygienist or dentist until they are in pain. Although a small age difference exists between the 57-64 and 65-72 age groups, they (65-72) do not visit the hygienist or dentist until they are in pain. Perhaps, this is related to their level of education, or to their lack of knowledge about or comfort with modern dental care. When these Qatari people experience pain, they probably have their own treatment, use herbs to relieve pain, or avoid the dental clinic out of fear. It is interesting to note that even though dental care in Qatar is free, barriers still prevent people from seeking care.

A weak association was found between the number of visits to the dental hygienist/dentist and gender. Residual analysis revealed that females were more likely to visit the dental hygienist/dentist than males when they experienced pain. Perhaps women were more likely than men to experience dental pain, or preferred to visit the dental hygienist/dentist for emergency only.

Data suggest that Qatari people surveyed with no formal education and elementary school education were more likely to avoid the dental hygienist/dentist, high school diplomas were more likely to visit dental hygienist/dentist for cosmetic reasons; while those with baccalaureate degrees were more likely to visit the dental hygienist/dentist once a year, and Qatari people with graduate degrees were less likely to visit the dental hygienist/dentist. Perhaps less educated Qatari people adhere to the traditional philosophy that healthcare is

sought only when absolutely necessary. People with higher levels of education probably have the knowledge to obtain regular dental care from private practitioners and understand how a dental hygienist or dentist can benefit them. People who are less educated tend to have external loci of control and would therefore perceive dental diseases in fatalistic terms. In contrast, persons with higher levels of education tend to have internal loci of control, and therefore, embrace preventive dental concepts as something they can do to thwart dental disease. In addition, people who are less educated may have experienced dental pain, extractions and tooth loss at an early age, and therefore come to accept poor dental health, disease and pain as a normal part of life.

Findings from the present investigation suggest that 7.4% of the sample do not brush their teeth, brush only on special occasions, or brush once a month; 3.6% brush their teeth once a week; 29.2% brush their teeth once a day; and 61.8% brush their teeth more than once a day. These data suggest that only a small portion of the population experience no regular oral self-care. Of course, the effectiveness of the majority's self-care was not determined. These findings vary slightly from those of Douglas (1990), Ture (1993) and Roins et al (1994). Douglas (1990) found that 22% of 2,000 people did not brush their teeth and 75% brushed five times a day. Of the 3,820 people in Ture's (1993) study, 54% brush once a day, 25% brush twice a day and 13% never brush. Of the 662 people studied by Roins et al (1994), 96.8% brushed their teeth at least once a day. Because these findings are all self-reported data, their validity must be questioned.

An association was found between the number of times Qatari people brush their teeth and the variables of age, gender, and level of education. Data suggest that younger people are more likely to brush their teeth once or more a day, while age groups 41-48 is

more likely to not brush their teeth at all. The younger Qatari people may be more modern, may have learned oral health concepts in schools or from television and may have the willingness to accept new preventive measures. In addition, younger people desire aesthetics while older people may place less emphasis on their appearance, or they may not embrace new concepts of disease prevention. Regarding gender, women are more likely than men to brush their teeth more than once a day. Regarding level of education, Qatari people with no formal education are more likely to avoid brushing completely, while surprisingly, those with graduate degrees are less likely to brush their teeth once a day. Although graduate level Qatari people may be highly educated in their fields, having knowledge about the value of toothbrushing was not present in this segment of the sample population. Perhaps those with graduate degrees are older, and because of their age, less likely to practice contemporary oral self-care behaviors.

Data revealed that Qatari people brush their teeth, on average, two minutes and 57 seconds, while the average duration of the Taiwanese people for toothbrushing was one minute and 53 seconds (Yao and Kao, 1989). This finding suggests that Qatari people who brush their teeth invest quality time in the behaviors. Perhaps this is because they value clean teeth free from oral microbia, or because they brush slowly to avoid gingival injury and bleeding. In contrast, this finding could reflect a socially acceptable response set that overestimates the true brushing time of the sample.

None of the previous studies asked the respondents about when they brushed their teeth except Yao and Kao (1989) who found that 47.5% of their sample brush their teeth after eating and before going to sleep. This finding is far less positive than in the present investigation where data revealed that 74% of Qatari people clean their teeth after waking

up; 18.4% clean their teeth after eating breakfast; 31.4% clean their teeth after eating dinner; 23.4% clean their teeth before going out; 56.5% clean their teeth before going to bed; 26.5% clean their teeth prior to special occasions; and 6.6% specified after lunch, before or after ablution for prayer, before or after prayer, before going to the dental clinic, after eating dessert, after each meal, and after the afternoon nap.

A statistically significant association was found between age and how much time the respondents spend each day cleaning their teeth. Younger Qatari people, between the ages of 18-25 years, were most likely to brush less than one minute; the 26-32 and 49-56 age groups were more likely to brush their teeth more than one minute but less than two minutes; the people in the 33-48 age group were more likely to brush more than two minutes but less than three minutes. Perhaps younger people (18-25), in a hurry, brush much faster than other age groups; however, they might not brush their teeth thoroughly, or place a lower priority on self-care behavior. In contrast, other age groups appear to spend more time on their teeth, perhaps because they may have more apparent dental disease and because they believe time brushing is related to tooth cleanliness.

Research question 1a

What oral cleaning techniques are used by Qatari people? Responses revealed that 52.3% of the respondents use their own technique; 27.9% use a technique taught to them at the dental clinic; 16.4% use no special technique; and 3.4% reported that the techniques they use came from watching a dental program on television. None of the previous studies had asked a similar question. Regarding item 11 on the effectiveness of brushing techniques, 26.7% of the respondents revealed that their technique is 100% effective. The 100% confidence in their home care techniques may lead respondents to refuse oral hygiene

instructions because they believe that they already know how to brush their teeth. This kind of person, called the internalized preventive patient by Boyer (1988), does not need many visits or any type of reinforcement, but he/she will take care of him/her self-given the right information. This noncompliant person wants only to be perceived as compliant when under observation (Boyer, 1988). While Weinstein et al (1996) mentioned that noncompliance, irregular brushing habits and infrequent dental visits pose many problems and risks, encouraging patients to be more cognizant of their responsibilities towards their oral health is a major undertaking that must be attempted by dental professionals.

Research question 1b

What are the oral healthcare aids used by Qatari people? Data suggest that only 5.9% of the Qatari people use charcoal and salt to clean their teeth. This finding is supported by Hanna (1989) who found that some Arab people use a mixture of ground charcoal with salt and water to clean their teeth. Of the respondents, 21.0% use miswak to clean their teeth, which varies significantly from the Jordanian population where the majority (75%) use miswak to clean their teeth (Douglas et al, 1990). Perhaps this is because the toothbrush and toothpaste is expensive for the Jordanian people and is not readily available in the markets, and because of their low economic status.

In an oral interview with Qatari people, the investigator asked about their reason for using charcoal and salt (Personal Communication, March 19-April 1 1998) (See Appendix M). The respondents answered by saying that they use it as a natural agents for whitening their teeth rather than using materials containing chemical ingredients. Respondents of the present study seem less inclined to use miswak than Jordanian people because toothbrushes and toothpastes are offered by the government in the dental clinics and they are not

expensive to buy. Some of the Qatari people surveyed (47.6%) mentioned a religious belief associated with the use of miswak. For example, the prophet Mohammed (peace be upon him) recommended that people use miswak before prayers for its pleasant taste. Some people (19.0%) said that miswak is a good germ killer in addition to the toothbrush and toothpaste; and others (23.8%) said they either heard or read that miswak contains fluoride (Personal Communication, March 19- April 1 1998). Al-lafi and Ababneh (1995) confirm that miswak contains fluoride, is effective against oral microbia and recommend the use of miswak at home and in dental health programs.

Of the respondents, 88.8% use the toothbrush and toothpaste to clean their teeth; 26.4% use dental floss; and 4.7% specified that they use other materials such as toothpicks, paper used as an interdental cleaner, interdental brushes, floss threaders, teeth whitening agents, lemon and miswak paste, and sodium bicarbonate plus honey. Some of the respondents mix materials together imagining it is good for their teeth and gingiva. The respondents appear unaware of the effects of honey or lemon on their teeth and gingiva.

Research question 1c

Do Qatari dental patients use mouthrinses? Data revealed that 48.8% of the respondents do not use a mouthrinse; 15.6% of the respondents use salt and water. Musketeer (1988) mentioned that 7.6% of the Bahrainis use salt water as a disinfectant and antibacterial agent to prevent ulcers and help stop bleeding after extraction. Of the respondents, 24.2% use a mouthrinse recommended by the hygienist/dentist; 9.2% of the respondents use any commercial mouthwash; and 2.2% of the respondents use pure water, hot water, a solution of hydrogen peroxide with water, and oraldin (commercial mouthwash) as mouthrinses. Even though commercial mouthrinses are readily available, perhaps few

Qatari people use mouthrinses because they fear chemical ingredients and/or the danger if swallowed. Thus, some Qatari people prefer to rinse with salt and water because it contains natural ingredients, and is effective and economical. Perhaps Qatari dentists prefer using mechanical therapies instead of recommending mouthrinses to help control plaque and gingivitis.

Research Question 1d

Why do Qatari people arrive late to their dental hygiene appointments? Responses revealed that 11.2% of the respondents arrive late to avoid oral care instructions. This behavior is considered a variation of noncompliance. People will not refuse oral health instructions in front of the provider, but they will arrive late so that little time exists for oral hygiene instructions. Such people may be noncompliant either intentionally or unintentionally. When noncompliance is intended, it may be a well-informed patient choice. When noncompliance is unintentional, it may be from ignorance or lack of information (Stewart, 1987). Additionally, 59.5% of the respondents revealed that they arrive late because of other commitments. A person agrees to the time and date to schedule an appointment with the dental hygienist/dentist. Since a person agrees, the appointment is considered a commitment. People can show their compliance by ceasing health harming behaviors, using preventive measures, following the advice of healthcare professionals, cooperating in treatment, and arriving on time for scheduled appointments.

An association was found between the respondents who arrive late to the dental clinic and the following demographic variables: gender, level of education, and distance from the dental clinic. Qatari males are more likely than females to arrive late to avoid oral care instructions, while females are more likely to arrive late because of another

commitment. Qatari people surveyed who had no formal education are less likely to arrive late because of scheduling conflict; people with elementary education, or graduate degrees are more likely to arrive late to avoid oral care instructions. Individuals with a high school education tend to arrive late because of a scheduling conflict. On the other hand, individuals with baccalaureate degrees are more likely to arrive late because of other commitments. Distance to the dental clinic may play a role in arriving late; however, the residual analysis results suggest that people who live 5 km and 30 km from the dental clinic are more likely to arrive late because of a scheduling conflict, people who live 10 km or more away are more likely to arrive late because of another commitment, and people who live 100 km away are more likely to arrive late because of other reasons.

Research question 1e

What is the reaction of Qatari people toward oral hygiene instructions given to them at the dental hygiene appointment? Subjects were asked about their reaction when given oral health instructions by a dental hygienist/dentist at each visit. A small percentage (7.6%) of the respondents will refuse the intervention and insist on having the professional cleaning completed in one visit, and 3.8% of the respondents will change to a new dental hygienist/dentist to avoid the intervention. Uncooperative subjects will be affected either physically, via increased periodontal diseases and dental caries, and/or financially, wasting time and money on healthcare visits. Such individuals need to be educated about the value of oral health instructions for keeping teeth for a lifetime. Weinstein et al (1996) insist on regular reinforcement after instruction to motivate clients and make them feel comfortable and trusting towards the dental staff. The majority (81.6%) of the respondents in this study would accept the oral health instructions, which is viewed as a positive dental health attitude

by the Qatari people. Unfortunately, the Qatari community faces a shortage of dental hygienists who could provide the preventive oral health care including self-care instructions.

None of the subjects could differentiate between the terms dental hygienist and dentist. Dental hygiene is a new profession in the State of Qatar. Of the respondents, 89.1% had never heard of a dental hygienist before, 5.1% said that the hygienist is a nickname for the dentist, and 5.8% said that dental hygienists are only available in Western countries (Personal Communication, March 19-April 1, 1998). Qatari children and adults need to be taught about the role of the dental hygienists, their value to society, and the career opportunities that exist for dental hygienists.

There is an association between the reaction of the respondents toward oral health instructions, age, and gender. People who are between 26-32 are less likely to refuse oral hygiene instructions during dental hygiene treatment. People who are between the age of 49-56 years are more likely to accept the oral health instructions while age group of 33-48 years of age is more likely to refuse the oral health instructions. Age group of 18-25 years old is more likely to have other reactions (See Appendix L). Qatari females are more likely to accept the oral health instructions. Perhaps females in Qatar are more receptive to healthcare information, care more about their oral health than men, or believe that the instructions can help them improve oral health for themselves and their families. Qatari men may feel that these instructions violate their manliness or that the issue is too personal.

Research question 1f

What is the reaction of Qatari people if asked by a dental hygienist or dentist to demonstrate their home care technique? Only 6.1% of the respondents reported they would

refuse to show the dental hygienist/dentist their toothbrushing technique; 5.2% of the respondents said that the dental hygienist/dentist should not ask questions like this; 4.4% will ignore the request; and the majority (84.3%) will demonstrate their toothbrushing techniques because they want their gingiva to improve. Although the number of people who will demonstrate their home care is high, there are still people who need to be influenced to participate actively in their care. Again, Qatari people need dental hygienists and dentists to increase their awareness about the importance of oral hygiene instruction, self-care, and disease preventive measures.

A statistically significant relationship was found between the reaction of the respondents when asked to demonstrate their home toothbrushing technique, gender, and level of education. While Qatari males are more likely to ignore the request of the dental hygienist/dentist, Qatari females are more likely to demonstrate the procedure during the appointment time. Regarding the level of education, it seems that Qatari people who had no formal education, elementary education are more likely to refuse to demonstrate their home care technique. Again, lack of education leads people to devalue home care, whereas, the most educated may feel that they know how to care for their mouths and that a demonstration is unnecessary. While high school people are more likely to ignore the request, people with baccalaureate degrees are likely to comply. Unfortunately, no studies are available to confirm or contradict these findings.

Research question 1g

What is the reaction of Qatari people when their oral hygiene status is checked at each dental or dental hygiene appointment? Responses to item 19 revealed that the majority (70.2%) want their oral hygiene checked at each visit to monitor their progress; 3.4% of the

respondents will refuse to have their teeth checked at each visit; 7.8% will insist on having their teeth cleaned only; and 18.6% want their oral hygiene progress checked only after their dental treatment. If Qatari people who refuse their oral hygiene progress checked are educated about the importance of having their oral hygiene status checked at each visit, they will welcome their oral hygiene check. Qatar is in need of dental hygiene programs that graduate dental hygienists. Al-kuwari (1988) planned a two year dental hygiene program believing in the importance of having dental hygienists in the State of Qatar to provide both educational and clinical preventive therapy. This program has never been established.

A weak association was found between the respondents' reaction to the oral hygiene check at each visit and their level of education. People with no formal education are more likely to want their oral hygiene check only after their dental treatment is completed. People with elementary level education are more likely to refuse their oral hygiene status check at each visit; people with high school diplomas are likely to insist on having their teeth cleaned only; and people with baccalaureate or graduate degrees are more likely to accept their dental hygiene check at each visit. These findings imply that people may refuse their oral hygiene status check without considering its benefit. When considering periodontal diseases and dental caries, there are obviously more dangerous diseases such as cancer and hepatitis; therefore, people do not believe that oral hygiene status checks are important. Several reasons for refusal may be the limited time people have to finish their appointment and to return to work, or because checking oral hygiene status causes embarrassment.

Research question 1h

What is the reaction of Qatari people if asked by the hygienist/dentist to return for multiple appointments to have their teeth professionally cleaned? Although some of the

respondents (19.4%) do not like it because they want their teeth cleaned at one appointment, 7.8% refuse to return for several visits just to have their teeth cleaned, and the majority (72.8%) will accept the treatment. Qatari people surveyed think that professional teeth cleaning is a simple cosmetic procedure that may be completed at one appointment. Some Qatari people surveyed cannot accept the idea that preventive oral health and nonsurgical periodontal therapy take several visits. The investigator, in this present study, queried subjects orally about the number of visits they think are needed for a professional cleaning. Fifty percent of the subjects said that teeth cleaning should be completed at one appointment, 19% said at two appointments, and 30.9% did not care. When asking about fillings, 52.8% of Qatari people said it depends on the dentist's skill and time schedule, 9.5% preferred it to be done at one appointment, 23.3% did not know, and 14.2% said that time depended on the number of teeth with cavities. Apparently, most people realize the treatment time depends on a number of key factors.

A weak association was found between gender and the reaction of Qatari people to return for several visits to the dental clinic. Males are more likely to avoid returning to have their teeth cleaned, while females are more likely to accept the time commitment required. Qatari women seem to be more positive than men toward their oral healthcare. Perhaps this is because women are more likely to care about their teeth, or trust that a professional will not ask him/her to return for several visits unless necessary. Since the dental treatment is free for citizens within the governmental dental clinics, there is no economic barrier preventing males from returning for professional care. Some people may think that governmental dental clinics are not as good as the private clinics in the provision of dental care or because of the length of an appointment, and therefore, not seek care unless in pain.

Research Question Two

What are the attitudes of Qatari people toward oral health instructions delivered to them by a healthcare provider of the opposite gender? The statement "I feel embarrassed when the hygienist/dentist of the opposite gender tells me that my oral hygiene needs improvement" led 20.5% to *strongly agree*; 26.4% to *agree*; 14.2% to have *no opinion*; 26.0% to *disagree*; and 12.9% to *strongly disagreed*. Embarrassment in the Qatari community from the opposite gender is common. Melikian (1981) mentioned in his book that all the actions of Qatari people are "dichotomized into the permitted and forbidden, into shameful and....acceptable." Perhaps having an oral health professional of the same gender will help those people who feel embarrassed obtaining oral preventive care.

Results show an association between the embarrassment statement and age and level of education. Residual analysis suggests that 18-25 year olds are more likely to *agree* with the statement, while 26-32 and 49-56 year olds are more likely to *disagree*. In contrast, age groups 41-48 and 65-72 are more likely to *strongly agree* with the statement, and 33-40 year olds are more likely to *strongly disagree* with the statement. This embarrassment increases if the professional is of the opposite gender, and a person is either young and likes to show his best, or older when a person's dignity is valued. Regarding level of education, people who had either no formal education, or elementary level education and high school diplomas are more likely to *strongly agree* with the statement, while graduate degree holders are more likely to *strongly disagree*, along with baccalaureate degree holders who are more likely to disagree. Apparently, educated individuals are less likely to be embarrassed by individuals of the opposite sex.

The statement, "I feel embarrassed if a dentist/hygienist of the opposite gender

teaches me oral hygiene techniques” led 17.0% of the respondents to *strongly agree*; 21.2% to *agree*; 14.1% to have *no opinion*; 33.3% to *disagree*; and 14.4% to *strongly disagree*. Although the majority of Qatari people in the survey disagreed or strongly disagreed with this statement, embarrassment is a critical barrier to care for either men or women who have the right and need to be treated. Lemu and Heeren (1991) mentioned that women are directed in the *Qur'an* to appear in public in a modest type of dress “so as not to attract men;” therefore, some ladies may refuse to receive oral hygiene instructions from a person of the opposite gender so as not to have any of their body parts exposed while demonstrating oral hygiene instructions. From the investigator’s point of view, cultures cannot change. So to improve the Qatari community’s with oral health knowledge and behaviors, a Qatari school of dental hygiene that graduates both males and females should be established so each can work with clients of their same gender.

An association was found between embarrassment during oral hygiene instructions and the following demographic variables: age, gender, and level of education. Regarding age, young and old aged Qatari people tend to *strongly agree* or *agree* with the statement, while 26-40 year olds are more likely to either *disagree* or *strongly disagree*. Perhaps younger groups of people have more self-confidence, more experience in the dental care setting, and/or do not care about the opinions of the opposite gender. Both Qatari males and females are equally likely to strongly agree or agree with the statement. In addition, level of education may play an important role in identifying people who are more embarrassed than others. Data showed that people with no formal education, elementary level education, or high school education are more embarrassed when oral hygiene instructions are taught to them than people with baccalaureate or graduate degrees. Perhaps educated people feel less

embarrassed because of their modern life styles, or because they are less adherent to tradition or Islamic values. Less educated people are more likely to maintain traditions.

Research question 2a:

Do Qatari people value professional oral health instructions from the dental hygienist or dentist? Items 21-24, 28, and 29, used to answer this question, included a Likert scale: *Strongly agree, agree, no opinion, disagree, and strongly disagree*. Item 40 used a Likert scale: *Very important, somewhat important, and not important* to express their perspective of the message in each statement.

Item 21 stated "I like when my dentist/hygienist teaches me oral hygiene methods." The majority (54.8%) of Qatari people surveyed *strongly agreed* with the statement while the minority (1.7%) *strongly disagreed*. This finding provides oral health professionals in Qatar with a positive endorsement of the value of their oral hygiene instructions to Qatari people.

Item 22 stated "It is a waste of time having my oral hygiene status checked at every dental visit." Data revealed that 8.0% of the respondents *strongly agreed*; 13.9% *agreed*; 8.1% had *no opinion*; 36.6% *disagreed*; and 33.4% *strongly disagreed*. These findings suggest that Qatari people possess positive attitudes toward learning about their oral health status. The government should capitalize on this positive attitude and increase the number of dental hygienists in Qatar who will work with the people to improve their oral health status in a cost-effective manner.

Item 23 stated "checking my toothbrushing method at the beginning of each visit is a waste of time." Results revealed that 9.5% *strongly agreed*; 19.8% *agreed*; 13.9% had *no opinion*; 36.7% *disagreed*; and 20.1% *strongly disagreed*. This finding suggests that a

portion of the population sees no value in assessing their toothbrushing method at each dental visit. Perhaps they fail to follow the instructions given, or they may feel embarrassed if a professional found them wrongly performing the technique. Perhaps they trust themselves and their current technique, or they feel it is useless to learn a new technique.

Item 24 stated "Learning to use dental floss at the beginning of each visit is a waste of time." Data revealed that 10.6% of the respondents *strongly agreed*; 20.5% *agreed*; 15.3% had *no opinion* regarding this statement; 36.0% *disagreed*; and 17.7% *strongly disagreed*. Floss is available and inexpensive in the State of Qatar, but it is still considered a new dental behavior for Qatari people, and many people do not perceive its value. Also, many Qatari people do not know how to use dental floss. Roins et al (1994) concluded that dental floss still remains an obstacle to Detroit adults, due primarily to the lack of knowledge about the correct flossing technique.

Item 28 stated "Good oral health is something that I value." Responses revealed that 19.6% of the respondents *strongly agreed* with this statement; 20.6% *agreed*; 12.3% had *no opinion*; 32.0% *disagreed*; and 15.5% *strongly disagreed*. This finding suggests that almost half of the Qatari people surveyed do not value their oral health, perhaps because people do not die from oral disease. This area is fertile ground for improving the quality of oral health and hence life within the Qatari population.

Item 29 stated "I believe that I can keep my teeth healthy for a lifetime." Responses revealed that 15.3% *strongly agreed*; 25.0% *agreed*; 19.7% had *no opinion*; 27.4% *disagreed*; and 12.7% *strongly disagreed*. Qatari people do not have the knowledge and resources or the self-confidence to prevent oral disease over their lifespan. Thus, community oral health education and regular preventive care are required. Perhaps people

assume that tooth loss cannot be prevented and occur naturally with age. Findings from respondents who had no opinion about many of the statements make this data difficult to interpret. Subjects may be undecided because they have little experience with professional oral healthcare.

Item 40 queried the importance of “visiting the dental hygienist/dentist for preventive dental care.” Responses revealed that the majority (60.2%) indicated that this behavior is *very important*; 32.4% said it is *somewhat important*; and 7.5% said it is *not important*. Televised dental health programs might influence Qatari people to think more positively about the preventive dental care. Qatari people are likely to accept preventive dental care if more oral health programs are available through television, schools, and dental clinics.

Research question 2b

How important is the dental/dental hygiene appointment to Qatari people? Items 31 and 39, via a Likert scale, provided information on the respondents’ feelings toward attending and being on time for scheduled professional cleaning appointments.

Item 31, “attending all scheduled appointments for professional teeth cleaning,” was rated by the majority (69.4%) as *very important*; 26.5% believed it to be *somewhat important*; and 4.1% said *not important*. This finding revealed a positive attitude of Qatari people toward attending the dental hygiene appointment. Unfortunately, from the researcher’s experience and experience of consulting dentists, 5 out of 12 clients fail to attend their scheduled dental hygiene appointments (Personal Communication, March 20 1998). Patients may cancel or not show up because they are certain to get another future appointment.

Item 39, “being on time to have my teeth professionally cleaned,” was ranked as *very important* to the majority (67.1%); with 28.9% indicating *somewhat important*; 4.1% indicating *not important*. Although the majority value being on time for appointments, a few still waste the dental professional’s time and effort which prevents other patients from keeping their appointments in a timely manner. Time is economically valuable to the health professional, and as such, most do not want to invest time with consistently noncompliant patients.

Research question 2c

Are Qatari people receptive to learning new oral home care techniques? Items 30, 32, 35, and 37 provided information to this research question. None of the previous studies addressed this question.

Item 30, “following the dentist’s/or hygienist’s toothbrushing instructions,” was rated by the majority (75.3%) as *very important*, and only 3.3% indicating that it was *not important*. Of the respondents, 21.4% indicate *somewhat important*. Perhaps the majority complies with toothbrushing instructions because they are suffering from a lack of oral health education. Qatari people seem more likely to follow toothbrushing instructions (item 30) and less likely to follow flossing instructions (item 37). This is because the toothbrush is familiar to Qatari people.

Item 32, “accepting new oral hygiene concepts from the dentist/dental hygienist,” was rated as *very important* by the majority (68.9%); 27.2% rated it as *somewhat important*; and 3.8% rated it as *not important*. These findings suggest that the Qatari people are open to new ideas about oral health and disease. The Qatari healthcare system should take advantage of this positive, receptive attitude and make oral health instruction a part of the

regular dental appointment.

An association was found between accepting new oral hygiene concepts, age, and level of education. Accepting new oral health concepts is more important to the 26-40 age group and somewhat important to the 18-25 year old age group. In contrast, 41-48 year olds consider new concepts as unimportant. This finding suggests that younger people can be difficult to teach because of their all knowing attitude or their competing priorities. Perhaps the 41-48 year old age group does not accept new oral hygiene concepts because they have reached a stage where they believe that their method works, or they already know about the concepts. The level of education suggests that persons with baccalaureate and/or graduate degrees are more likely to accept new information, while individuals with no formal education or an elementary education fail to see value in new oral health concepts. People with high school diplomas consider the acceptance of new oral health concepts as *somewhat important*, suggesting that a person may or may not accept new concepts, depending on the value of the information provided, or the ability of the dental professional to communicate the information. Perhaps less educated people need more time and motivation to accept new concepts. New concepts might not be perceived as important to less educated people because of the words or statements chosen by the dental professional. Since these people are less educated, a dental professional needs to use layman's terms rather than scientific terms. Moreover, less educated people, with little knowledge of research, experience differently assessing the validity of information presented to them. Perhaps inadequate communication between the dental professional and the patient lead the patient to reject new oral health concepts.

Item 35, "Learning effective toothbrushing techniques," was ranked as *very*

important by the majority (77.4%); 20.0% rated it *somewhat important*; and 2.6% said toothbrushing technique was *not important*. This finding revealed a positive attitude of Qatari people toward learning effective toothbrushing techniques. Some people still need to be educated to accept effective toothbrushing behaviors as part of their lifestyle behavior.

Although dental floss is still new for Qatari people, 40.7% rated the statement, "following the hygienist's/dentist's flossing instructions," as *very important*. Only 15.1% of Qatari people rated dental floss as *not important* to use for cleaning teeth. This finding is related to the lack of information available to Qatari people about the importance of dental floss and its use in interdental cleaning. Although dental floss is provided in dental clinics, distributed freely to patients, and available in pharmacies at low prices, less than half believe in its use. Perhaps it is because dentists fail to encourage its use or because of the time consuming nature of dental flossing. This interpretation is supported by Roins et al (1994) who found that the only disadvantage of brushing and flossing, as perceived by his respondents, was the time commitment required for flossing.

There is an association between age, level of education and following the dentists'/hygienists' flossing instructions. People in the age groups 26-40, 49-56, and 65-72 are more likely to follow the flossing instructions, while people who are 57-64 years of age are more likely to reject the flossing instructions provided by the dentist/dental hygienist. People in age groups 18-25 and 41-48 indicate that following flossing instructions is *somewhat important*. People in age groups 57-64 and 65-72 are close in age; however, they have totally different perspectives on the value of flossing instructions. Perhaps this is related to educational level, e.g., they answered based on their knowledge of dental floss. Older people may reject flossing instructions because they have problems holding the floss

(nerve or muscle problem) and acquiring the correct flossing technique, feel that they are too old to accept instructions from a younger professional, or feel embarrassed in the presence of a younger professional.

In regards to the level of education, individuals with no formal education, elementary level education, or high school degrees are more likely to not follow flossing instructions, while individuals with baccalaureate and/or graduate degrees are more likely to follow the flossing instructions taught by the dental hygienist and/or dentist. The findings suggest that less educated people are more likely to refuse or ignore flossing instructions. This behavior may be due to a lack of knowledge about the benefit of dental floss, an unwillingness to accept new techniques, lack of time, oral discomfort with flossing, failure to master flossing techniques, or knowing that they may not flossing correctly. While less educated people may not follow the flossing instructions, educated people will follow the flossing instructions because they understand the benefits gained from this technique. Flossing is considered a new oral health behavior for Qatari people, so a person who accepts the concept of interdental cleaning is likely to accept and learn the technique.

Research question 2d

How important is brushing and flossing to Qatari people? The majority (87.9%) of the respondents value daily brushing, while the minority (3.3%) do not brush daily. Although the majority brush their teeth, a few people are unconcerned about their oral health. Perhaps this is related to age or the level of education. For example, some people are more likely to avoid toothbrushing because they feel it is not important, lack dental knowledge on the importance of keeping their teeth and gingiva free from bacteria, feel

brushing is time consuming, become slothful in keeping their teeth and gingiva clean, or believe that brushing has no advantage.

Findings revealed that few Qatari people (22.5%) value daily flossing; 49.2% view daily flossing as *somewhat important*; and 28.3% said flossing daily is *not important*. As dental floss use is a new behavior for Qatari people, some Qatari people may accept flossing as an important item to prevent interdental caries, and reduce papillary inflammation, others may view it as having no advantage.

An association between daily flossing and age was tested. Respondents 41 year of age and over are not likely to floss every day, while younger people are more likely to view flossing as *somewhat important*. The middle age group (33-40) is likely to floss daily. Perhaps, since older people view daily flossing as having no advantage, they may not accept new techniques, or are unmotivated to use several devices to clean their gingiva and teeth.

Regarding daily flossing and level of education, individuals with no formal education or high school diplomas are more likely to not floss, while individuals with baccalaureate and/or graduates degrees are likely to view flossing daily as *somewhat important*. Surprisingly, the elementary educated people are likely to floss daily. These differences are probably related to how informed a person is about flossing and its benefit. For those who believe that flossing is unimportant, perhaps they see it as a time consuming, complex task, which is frustrating since all teeth cannot be reached easily.

The majority (85.0%) of Qatari people surveyed believe brushing all teeth thoroughly is *very important*, while some view this statement as *somewhat important* (11.4%), and *not important* (3.6%). This finding suggests that the majority believe in the value of thorough brushing. Perhaps the minority of Qatari people prefers to brush their

anterior teeth for aesthetics, brush selective areas to avoid discomfort associated with sensitive gingiva, or to avoid gingival bleeding. On the other hand, this may be related to the lack of information these people receive, their age or their level of education.

Respondents believe in using miswak as a *very important* (35.3%) or *somewhat important* (38.4%) oral health aid, in conjunction with the toothbrush and toothpaste; however, 26.3% view miswak as *not important*. Perhaps people who do not use miswak feel that it will harm their gingiva since it originated from wood, lack knowledge about miswak and its ingredients, lack experience with miswak, dislike its taste, or simply prefer to use toothpaste and a toothbrush. Although miswak is recommended by the Islamic religion, some people do not use it, preferring the new miswak toothpaste, a commercially available products.

Research Question Three

What is the general dental knowledge level of Qatari people? The majority (64.3%) of Qatari people reported that tooth decay is the primary reason for tooth loss; 8.5% said aging; 5.6% said accident/injury; and 21.7% said gum disease. Perhaps the majority reported caries because of their obvious occurrence. The minority believed that aging and accident/injury are the primary reasons for tooth loss. Perhaps these factors were identified as a reason because some people experience tooth loss during old age, and it is common to lose teeth from an accident or injury.

In regards to understanding why Qatari people visit the dental clinic, 50.3% come to the dental clinic when they experience pain; 17.5% for a check up; 12.1% for fillings; 2.8% for extractions; and 3.1% had other reasons such as a desire for orthodontic or prosthodontic care. Qatari people need to be educated on the importance of visiting the dental clinic for

regular preventive care and not just when they experience pain. Some people visit the dental clinic for emergency pain and, if the pain subsides, they feel no need to return to the clinic. Perhaps time conflicts between work, family, and dental appointments keep some Qatari people from seeking dental care unless an emergency situation arises.

Research question 3a

How do Qatari people view gingival bleeding? Data from item 45 suggest that 26.4% of respondents do not report gingival bleeding; 20.1% have gingival bleeding, but do not know the reason for the bleeding; 9.8% believe that gingival bleeding is due to the accumulation of bacterial plaque; 19.4% believe that poor brushing techniques are the culprit; 3.5% implicate poor flossing techniques; 14.8% said brushing too hard is the reason for gingiva to bleed; and 5.9% believe that gingival bleeding is normal. This finding suggests that people with gingival bleeding are unclear about its causes. This is probably related to their lack of knowledge about oral health and the general lack of emphasis on periodontal diseases in the Qatari society. Some Qatari people were unsure of the cause of gingival bleeding, as noted on their questionnaires, and some people crossed-out two answers and chose another, suggesting insecurity in their responses.

Qatari society lacks oral health knowledge and oral health professionals who have the ability to motivate and educate people about the importance of preventive dental care. The only erroneous choice in item 45 is that "it is normal for gums to bleed." Perhaps bleeding gingiva reflects an oral health condition that few Qatari people possess.

Results indicate that the minority (5.7%) of respondents have frequent gingival bleeding; 30.8% have gingival bleeding sometimes; 35.2% seldom experience gingival bleeding; and 7.9% have no idea when their gums bleed. Comparing these results to

Douglas et al (1990), 10.6% of the respondents regularly experienced gingival bleeding, while the Omani respondents in Ture's (1993) study had frequent or occasional (21%) gingival bleeding. This finding suggests that Qatari people might have better oral health than the Omanis people, but they still need oral health education to move them to greater levels of oral wellness.

Research Question 3b

Do Qatari people know the primary etiologies for dental caries and periodontal disease? In regards to the primary cause of tooth decay, 9.0% of the Qatari people do not know; 10.8% answered bacterial plaque; 25.3% answered accumulation of food debris; 36.9% answered poor oral hygiene; 13.3% answered eating a lot of sweets; and 4.8% answered *soft* or *weak teeth*. This finding suggests a fair sophistication regarding the etiology of dental caries. Some people gave different reasons for dental caries; however, most of the responses were reasonable choices. The minority and totally incorrect response included *soft* or *weak teeth* as a reason for dental caries. This response may be related to education level, or the pervasive "wives tale" that some people have "soft" teeth.

Results suggest that 26.8% of the Qatari people do not know the primary cause of periodontal disease, and this is related to their lack of knowledge about gingival diseases. Of the respondents, 12.7% believed that the accumulation of bacterial plaque is the cause for periodontal disease; 6.1% answered accumulation of food debris; 22.8% answered accumulation of calculus; and 31.7% answered not cleaning the teeth and gums daily. Although there were no right or wrong answers to this question, periodontal disease is not obvious like dental caries, so perhaps Qatari people may not think about periodontal disease until gingival enlargement, bleeding, mobility, and discomfort occur.

Research question 3c

How do Qatari people rate the health of their gingiva and teeth? Data suggest that 22.1% of the Qatari people rate their gums as *very healthy*; the majority (52.0%) rate their gums as *sometimes healthy*; 7.7% rate their gums as *unhealthy*; and 18.2% of the respondents *do not know* about the health of their gums. There is a difference between this present study and Rayant's (1979) study where the majority of respondents (80%) had a positive outlook on their dental health. Perhaps Qatari people acquiesce to the dental hygienist/dentist who will decide whether their gingiva is healthy, so they answered "*do not know*." Perhaps the Qatari people who thought their gum are *very healthy* have been told by a dental professional, so they are sure about their answer, while others who answered *sometimes healthy* are more likely to doubt their gingival health status.

In regards to how Qatari people rate the health of their teeth, 17.0% answered *very healthy*; the majority (61.4%) answered *sometimes healthy*; 10.4% answered *unhealthy*; and 11.3% *do not know* about the health of their teeth. This finding revealed that the Qatari people who answered *very healthy* probably have been informed of their health status by a professional. On the other hand, Qatari people who answered *sometimes healthy* might have recurrent tooth pain, while the people who rate their teeth as *unhealthy*, may have experienced pain, tooth extractions, fillings, or many cavities.

CHAPTER V

SUMMARY AND CONCLUSIONS

Although literature exists about Qatar as an oil producing country, little information is available about the Qatari people, their lifestyle, and healthcare practices (Melikian, 1981). Furthermore, a lack of research exists on their knowledge and attitudes toward oral health. The purpose of this descriptive study was to determine the oral health knowledge, attitudes, and behaviors of Qatari people, and the factors related to the refusal or acceptance of oral preventive care.

A pilot study that included 20 Arab students at Old Dominion University was used to establish the validity and reliability of the self-designed data collection instrument. Upon completion of the pilot study, the *Oral Health Knowledge, Attitudes, and Behaviors of Qatari People Questionnaire* was distributed during March 1998 in the State of Qatar to a nonprobability sample of 1000 Qatari people. Data obtained from 859 (85.9%) individuals were suitable for the study, and analyzed by means of frequencies, percentages, chi-square, residual analysis test, and cross-tabulation of variables.

Results of this survey provided the following information concerning the oral health knowledge, attitudes, and behaviors of the Qatari people who participated in this study:

Regarding oral health behaviors:

1. The majority (74.4%) of respondents visited a dental clinic for professional teeth cleaning, but received neither toothbrushing (62.2%) nor flossing (63.2%) instructions.

Less than half (48.8%) visited a dental hygienist or dentist when experiencing pain,

and a few (9.4%) never visited the dental hygienist or dentist. Data suggest that males were more likely to avoid visiting the dental hygienist or dentist, while female were more likely to visit the dental hygienist or dentist when they experienced pain. In addition, less educated people (those with no formal education and elementary education) were more likely to avoid visiting dental hygienist or dentist, while educated people (those with baccalaureate degrees) were more likely to visit the dental hygienist or dentist once a year. People with graduate degrees were less likely to avoid visiting the dental hygienist or dentist.

The majority (61.8%) of Qatari people surveyed brushed their teeth more than once a day, while 29.2% brushed their teeth once a day, 3.6% brushed their teeth once a week, 2.6% never brushed their teeth, 2.0% brushed their teeth on special occasions, and 0.8% brushed their teeth once a month. Results showed that people with in 41-48 age group were least likely to brush their teeth; while other ages were more likely to brush their teeth once to more than one a day. Qatari males were more likely to brush once a weak, while females were more likely to brush more than once a day.

Less than half (41.7%) of Qatari people surveyed spent one minute to less than two minutes cleaning their teeth, 21.0% spent more than two minutes to less than three minutes cleaning their teeth, 17.6% spent less than one minute a day cleaning their teeth, 10.0% spent more than three minutes to less than four minutes cleaning their teeth, 5.8% spent more than four minutes to less than five minutes cleaning their teeth, and 4.0% spent more than five minutes cleaning their teeth. An association was found between age and the time spend on cleaning teeth. Results showed that Qatari people spend an average of two minutes and 57 seconds cleaning their teeth.

The majority of respondents brush their teeth upon waking up and before going to

bed, and the minority who brush their teeth do so after lunch, before or after ablution, after or before prayer, before going to a dental clinic, after eating dessert, after each meal, and/or after the afternoon nap. Some respondents only brush their teeth on special occasions, or before going out.

2. Most Qatari people surveyed used their own toothbrushing techniques. A minority used techniques learned from watching preventive oral health programs on television. Some (27.9%) Qatari people used a technique taught to them at the dental department, and 16.4% use no special technique. Regarding the effectiveness of the technique used, 45.8% thought their technique may be effective, 26.7% were positive about the 100% effectiveness of their technique, 23.3% were not sure if their technique was effective, and the minority (4.3%) did not think their technique was effective.

3. Most Qatari people surveyed use a toothbrush and toothpaste to clean their teeth. A small percentage used miswak and dental floss, while the minority use charcoal and salt. Other Qatari people reported using toothpicks, interdental toothbrushes, floss threaders, and teeth whitening dentifrices to clean their teeth. In contrast, some respondents combine materials to clean their teeth such as lemon and miswak paste, and sodium bicarbonate and honey. Unfortunately, some of these combinations are detrimental to ones oral health.

4. Results showed that 48.8% of Qatari people surveyed did not use a mouthwash, 24.2% used a mouthwash recommended by the dental hygienist/dentist, 9.2% used a commercial mouthwash, and the smallest percentage of respondents used either regular water, hot water, or a solution of hydrogen peroxide and water as a mouthwash.

5. The majority (59.5%) of Qatari people in the sample arrive late for dental appointments because of another commitment or a schedule conflict. The minority (11.2%)

arrives late to avoid oral care instructions. An association was found between Qatari people who arrive late and the following demographic variables: gender, highest level of education, and distance from the dental clinic. Results suggested that Qatari males are more likely to arrive late to avoid oral care instructions, while females are more likely to arrive late because of another commitment. Persons with elementary education, and graduate degrees are more likely to arrive late to avoid oral care instructions; whereas, persons with high school degrees or baccalaureate degrees are more likely to arrive late because of a scheduling conflict or because of another commitment. In addition, Qatari people surveyed who live 5 km and 30 km from a dental clinic are more likely to arrive late because of scheduling conflicts, people who live 10 km from a dental clinic arrived late because of another commitment; and people who live 100 km from a dental clinic tend to arrive late because of other reasons (See Appendix L).

6. The majority of the respondents will accept oral hygiene instructions during the dental hygiene appointment. However, this intervention will cause some people to change to another dental hygienist or dentist, or to refuse the interventions and insist on having the professional cleaning completed in one visit. A relationship was found between accepting oral hygiene instructions at each visit, age, and gender. People 18-25 years of age were more likely to take other actions (See Appendix L); 33-48 years of age were more likely to refuse the intervention; and 49-56 years of age were more likely to accept the intervention. Qatari males were more likely than females to refuse the oral hygiene instructions at each visit.

7. When asked by a dental hygienist/dentist, the majority of Qatari people surveyed reported that they willingly demonstrated their toothbrushing technique. Others (5.2%)

thought that neither the dental hygienist nor dentist should ask a question like this and refused to demonstrate their home care behavior at the dental clinic. A relationship was found between people's willingness to demonstrate their toothbrushing technique, and gender and education level. Males were more likely to ignore the request of the dental hygienist/ dentist, while females were more likely to demonstrate their home toothbrushing technique. People without formal education or elementary education were more likely to refuse to demonstrate their toothbrushing technique. Individuals with high school diplomas were more likely to ignore the request, and the baccalaureate degree people were more likely to demonstrate their home toothbrushing techniques.

8. Most respondents accepted the regular monitoring of their oral hygiene at each visit. Some wanted their oral hygiene evaluated at the end of the dental treatment; while others insisted on only having their teeth cleaned. A minority will refuse the evaluation entirely. A weak association was found between acceptance of the oral hygiene evaluation at each visit and one's level of education. People with no formal education were more likely to want their oral hygiene checked only after the dental treatment is completed; people with elementary level education were more likely to refuse the oral hygiene status check at each visit; high school graduates were more likely to insist on having their teeth cleaned only; and people with baccalaureate or graduate degrees were more likely to accept an oral hygiene status evaluation at each visit.

9. Most Qatari people surveyed accepted the need to return to the dental clinic for several visits to have their teeth professionally cleaned. A minority refused to return for numerous appointments because they want to be finished with one visit. A weak relationship was found between people's willingness to return for several professional dental

cleaning visits and gender. Qatari males were likely to not return for several visits for only cleaning, while females were more likely to accept the need to return over a course of several visits.

Regarding the oral health attitudes:

1. Of Qatari people surveyed, 20.5% felt strongly embarrassed when they were informed by a professional of the opposite gender that their oral hygiene needed to be improved, 26.4% do *agree* they become embarrassed, while 26.0% and 12.9%, respectively, *disagree* and *strongly disagree* about the embarrassment. Only 14.2% had *no opinion* about the statement. An association relationship was found between embarrassment when a professional of the opposite gender told a patient that his/her oral hygiene needed improvement, age, and level of education. Results showed that group ages of 18-25, 41-48, and 65-72 were more likely to feel embarrassed than group ages 26-40 and 49-56 when a professional of the opposite gender informed them that their oral hygiene needed to be improved. Regarding the level of education, less educated people were more likely to feel embarrassed than highly educated people when a professional of the opposite gender informed them that their oral hygiene needed to be improved.

In regards to embarrassment felt when oral hygiene instruction was taught by professionals of the opposite gender, 17% and 21.2% of Qatari people were between strongly agree and agree, while 33.3% and 14.4% were between disagree and strongly disagree with the statement. A relationship was found between the embarrassment felt when a professional of opposite gender taught oral hygiene techniques, age, gender, and highest level of education. Group age of 18-25 and 41 and over were more likely feel embarrassed

with the statement, while 26-40 were more likely to not feel embarrassed when oral hygiene instructions were taught by a professional of the opposite gender.

Results revealed both males and females feel embarrassed about the statement. Also results revealed that less educated people were more likely to feel embarrassment than highly educated people with the statement.

2. Most Qatari people surveyed (54.8%) strongly would like the dental hygienist or dentist to teach them the oral hygiene technique, 36.1% do *agree*, 5.4% had *no opinion*, 2.0% *disagree*, and 1.7% *totally disagree*. Regarding checking toothbrushing method at the beginning of each visit, many people did not like their toothbrushing technique to be checked at each visit while the minority liked the idea. With regards to flossing instructions at the beginning of each visit, many Qatari people did not like to be instructed about flossing technique because they felt it was a waste of time. According to the results, 19.6% and 20.6% of Qatari people are between *strongly agree* and *agree* about valuing their oral health, and 32.0% and 15.5% were between *disagree* and *strongly disagree*. Only 12.3% of Qatari people surveyed had *no opinion*. Some Qatari people believed that they could keep their teeth healthy for lifetime, while others did not believe they could keep their teeth healthy for long periods of time. The majority of respondents believed that visiting dental hygienist for preventive dental care is very important, and the minority believed it was not important.

3. The majority of respondents would like to attend all the scheduled appointments for professional teeth cleaning. Some people felt it was *somewhat important* to attend such appointments, and the minority did not feel it was *important* to attend all the scheduled appointments. Most of the Qatari people surveyed be on time to have their teeth

professionally cleaned, some feel it was *somewhat important*, and the minority felt it was *not important*.

4. Most respondents felt it was important or somewhat important to follow the hygienist's/dentist's toothbrushing technique. The minority of Qatari people in the sample did not follow these instructions because they believed that it is not important.

The majority of subjects accepted the new oral hygiene concepts from the dental hygienist/dentist, some people felt it was *somewhat important*, and the minority felt it is *not important* to accept any new oral hygiene concepts from the dental hygienist/dentist. An association was found between the statement and age and level of education. Persons in the 18-25, and 26-40 age groups were more likely to feel that accepting new oral hygiene concepts from hygienist/dentist was *somewhat to very important*; 41-48 age group was more likely to ignore new oral hygiene concepts from dental hygienist/dentist. In regards to the level of education, people with less education were more likely to reject new oral hygiene concepts; while people with high education were more likely to accept new oral hygiene concepts. The majority of Qatari people surveyed liked to learn effective toothbrushing techniques; however, the minority felt it was not important to learn an effective method to brush their teeth.

Some subjects thought that following the hygienist/dentist flossing technique was somewhat important (44.1%) or very important (40.7%); others thought it was not important. An association was found between following the hygienist/dentist flossing, age, and high level of education. Results revealed that 18-56 and 65-72 years olds were more likely to view flossing as somewhat to very important; and 57-64 was more likely to not follow the flossing instructions of the dental hygienist/dentist. Regarding the level of

education, persons with less education were more likely to view flossing as not important; while people with high education were more likely to view professional flossing instructions as very important.

5. The majority of Qatari people surveyed believe in daily brushing. Almost half (49.2%) of Qatari people surveyed felt that daily flossing was somewhat important, and 22.5% floss daily, and 28.3% believe flossing daily is not that important. A relationship was found between flossing daily, and age and level of education. Results showed that persons 18-40 years of age were more likely to view daily flossing daily as somewhat to very important; 41-72 age groups were more likely to view daily flossing as not important. Qatari people with less education view daily flossing as very to not important; while highly educated people view daily flossing as somewhat important.

The majority of respondents believed in thoroughly brushing all of the teeth, with a minority believing it was not important. Of the Qatari people, 73.3% felt that using miswak was somewhat to very important, and 26.3% believe it was not important.

Regarding dental knowledge:

1. Most Respondents viewed tooth decay as the primary cause of tooth loss while others implicated gum disease and aging as possible reasons for tooth loss. A minority identified accident/injury as the primary reason for tooth loss. Qatari people still viewed pain as the primary reason for seeking dental care. Only 12.1% said that they came to the dental clinic for restorative care, and 17.5% came for regular checkups.

2. Qatari people surveyed viewed gingival bleeding as an outcome of bacterial plaque accumulation (9.8%), poor brushing technique (19.4%), poor flossing technique (3.5%), brushing too hard (14.8%), and as a normal occurrence (5.9%). Of the Qatari

people sampled, 26.4% report no gingival bleeding, and 20.1% did not know the reason for gum bleeding.

Of the Qatari people surveyed with gingival bleeding, 5.7% had frequent bleeding, 30.8% had bleeding sometimes, 35.2% seldom experienced bleeding, and 7.9% did not know the frequency of their gingival bleeding.

3. A few Qatari people in the sample (9.0%) did not know the primary cause of tooth decay, 10.8% identified bacterial plaque, 25.3% identified accumulation of food debris, 36.9% identified poor oral hygiene, and 4.8% identified soft or weak teeth as the cause of tooth decay. When Qatari people were asked about the primary cause of periodontal disease, 26.8% did not know the reason, 12.7% believed that accumulation of bacterial plaque led to periodontal disease, while 6.1% identified the accumulation of food debris, 22.8% identified accumulation of calculus, and 31.7% identified failure to clean gums and teeth daily as the reason for the development of periodontal disease.

4. A majority of Qatari people surveyed rated their gingival health as *sometimes to very healthy*, 7.7% rated their gums as *unhealthy* and 18.2% *did not know* about the health of their gums. Similarly, a majority of Qatari people rated their teeth as *sometimes to very healthy*, 10.4% rated their teeth as *unhealthy* and 11.3% *did not know* about the health of their gums.

Based on these findings, the following conclusion are made:

1. Most Qatari people surveyed visit a dental clinic for professional dental cleaning, but only a few of the people who visit a dental clinic receive oral hygiene instructions.
2. Most Qatari people surveyed use a toothbrush and toothpaste to clean their teeth.
3. Most Qatari people surveyed brush more than once a day, and spend an average

of 2 minutes and 57 seconds cleaning their teeth each day.

4. Qatari people surveyed feel embarrassed when oral health instructions are conducted by a professional of the opposite gender.

5. Most respondents surveyed willingly accept oral hygiene instructions given to them at the dental clinic, demonstrate oral home care during the dental hygiene appointment, allow a dental hygienist/dentist to check the progress of their oral hygiene at each visit, and return for several professional teeth cleaning visits.

6. Although some people floss their teeth, flossing is still viewed as a complex task by some Qatari people.

7. Qatari people's dental knowledge, attitudes and behaviors could benefit from more education and experience with contemporary oral health concepts and other preventive dental care interventions.

8. Qatari people surveyed visit a dental clinic for professional dental cleanings but not for preventive care information. The oral health knowledge, attitudes, and behaviors of Qatari people surveyed would benefit from an increase in the number of dental hygienists available to provide preventive care. Thus, a dental hygiene program should be established or the government should import dental hygienists from other countries.

Based upon this study, the following recommendations are made:

1. Qatari people surveyed need dental health education, preventive measures, and increased access to early dental care.

2. A campaign could be directed toward Qatari dentists about the value of dental hygienists.

3. Qatari professionals who want to increase oral health awareness and improve oral health status must be persuasive, motivational and provide informative instructions. In addition, they should listen to the patient, reinforce important oral health concepts, and have a definitive plan to keep patients informed and motivated (Weinstein et al, 1996).

4. Oral hygiene education in the State of Qatar should start with the pregnant woman, and regular contact with the dental hygienist/dentist must start for each individual at birth.

5. The Qatari community should increase the number of qualified dental hygienists to educate clients on preventive oral health interventions. Thus, a dental hygiene program should be initiated in the country. The dental hygiene program should attempt to recruit and graduate both men and women who could then treat clients of their same gender.

Considering the results and limitations of this study, future studies should focus on the following research questions:

1. What is the prevalence of oral disease in the Qatari population?
2. At what frequency do Qatari people cancel dental and dental hygiene appointment? What is the economic impact of this behavior?
3. Do Qatari people value oral hygiene instructions as compared with scaling and root planning as a valid preventive and therapeutic intervention?
4. What effect does a dental hygiene education program have on the community's awareness about oral health care?
5. How do Qatari people rate the importance of professional oral health instructions for controlling periodontal diseases? For controlling dental caries?
6. What kinds of dental education programs are most effective in increasing Qatari

people's awareness about oral health care and preventive dental care procedures?

7. What is the relationship between the oral health behaviors of Qatari and American people?

8. What differences exist between the dental hygiene education programs in Arab countries and the United States?

9. What are the differences between Arab and American dental hygienists in terms of career and employment satisfaction?

10. How do Qatari dentists view the oral health status of their patients?

11. What percentage of practice time is devoted to oral hygiene instructions and professional teeth cleaning by Qatari dentists?

12. What are the dental anxiety level of Qatari people (before, during, and after) a dental/dental hygiene appointment at the dental clinic?

13. What is the attitude of Qatari people toward dental professionals and the dental services they rendered?

This study represents the first known attempt to document the oral health knowledge, attitudes, and behaviors of Qatari people. There are a small number of Qatari people who do not comply with the oral health instructions. To avoid noncompliance, and promote oral health, patients have to feel comfortable with the professional environment and staff. Availability of dental hygienists in the State of Qatar would increase the awareness of Qatari people about the importance of oral health care. Overall, Qatari people have positive attitudes toward oral health instructions provided by dental hygienists/dentists. Obstacles to preventive care in Qatar include inadequate numbers of dental hygienists, a lack of professionals of the same gender to treat patients, thus precipitating the feelings of

embarrassment for Qatari people, and inadequate oral healthcare programs. This study provides the foundation for more studies on the dental status of Qatari people.

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APPENDICES

APPENDIX A***ORAL HEALTH KNOWLEDGE, ATTITUDES, AND BEHAVIORS OF
QATARI PEOPLE QUESTIONNAIRE***

ORAL HEALTH KNOWLEDGE, ATTITUDES, AND BEHAVIORS OF QATARI PEOPLE QUESTIONNAIRE

DIRECTIONS: Please answer all of the following questions by circling the answer that best reflects your chosen response.

SECTION 1: Demographics

1. Age:
- a. 18-25
 - b. 26-32
 - c. 33-40
 - d. 41-48
 - e. 49-56
 - f. 57-64
 - g. 65-72
2. Gender:
- a. Male
 - b. Female
3. Highest level of education completed:
- a. No formal education
 - b. Elementary school
 - c. High school diploma
 - d. Baccalaureate degree
 - e. Graduate degree (Master degree or Doctoral degree)
4. How far do you live from the dental care facility?
- a. Approximately 5 km
 - b. Approximately 10 km
 - c. Approximately 30 km
 - d. Approximately 100 km

SECTION 2: Oral hygiene behaviors

5. Did you ever visit the dental clinic for professional teeth cleaning?
- a. Yes
 - b. No
6. Have you ever received toothbrushing instructions at the dental clinic ?
- a. Yes
 - b. No
7. Have you ever received flossing instructions at the dental clinic?
- a. Yes
 - b. No

8. How often do you visit the dentist or dental hygienist? (choose only one)
- a. I never visit the dental hygienist or dentist
 - b. Once a year
 - c. Twice a year
 - d. When I'm in pain
 - e. Only when cosmetically desired
9. How often do you brush your teeth with a toothbrush? (choose only one)
- a. I do not brush my teeth (go directly to item 12)
 - b. On special occasions
 - c. Once a month
 - d. Once a week
 - e. Once a day
 - f. More than once a day
10. Do you use a special technique when brushing your teeth? (choose only one)
- a. I use my own technique
 - b. I use a technique taught to me at the dental clinic
 - c. I use no special technique
 - d. Other: _____
(specify)
11. Do you think that the toothbrushing technique that you use is effective?
(choose only one)
- a. Yes, 100% effective
 - b. Maybe
 - c. I'm not sure
 - d. No, I don't think so
12. What do you use to clean your teeth? (choose all that apply)
- a. Charcoal + salt
 - b. Miswak
 - c. Toothbrush
 - d. Toothpaste
 - e. Dental floss
 - f. Other: _____
(specify)

13. Regardless of the techniques used, how much time do you spend each day cleaning your teeth? (choose only one)
- Less than 1 minute
 - More than 1 minute but less than 2 minutes
 - More than 2 minutes but less than 3 minutes
 - More than 3 minutes but less than 4 minutes
 - More than 4 minutes but less than 5 minutes
 - More than 5 minutes
14. When do you clean your teeth? (choose all that apply)
- After waking up
 - After eating breakfast
 - After eating dinner
 - Before going out
 - Before going to bed
 - Prior to special occasions, e.g., parties, holidays
 - Other: _____
(specify)
15. What mouthwash do you use? (choose only one)
- I do not use a mouthwash
 - Salt + water
 - A mouthwash recommended by my dentist/hygienist
 - Any commercial mouthwash
 - Other: _____
(specify)
16. When you arrive late for a dental appointment, it is usually: (choose only one)
- To avoid oral care instructions
 - Because of another commitment
 - Because of a scheduling conflict
 - Others _____
(specify)
17. What is your reaction when you are given oral health instructions by a dentist or dental hygienist at each visit? (choose only one)
- I refuse the treatment and insist on having professional cleaning completed in one visit
 - I change to a new dental hygienist/dentist
 - I accept the treatment because it will improve my oral health
 - Other reaction: _____
(specify)

18. What is your reaction when the dentist or dental hygienist asks you to demonstrate how you clean your teeth at home? (choose only one)
- I refuse to show the dentist or dental hygienist my toothbrushing technique
 - Dentist or dental hygienist are not supposed to ask questions like this
 - I ignore the request
 - I demonstrate my toothbrushing technique because I want my gum to improve
19. What is your reaction when your oral hygiene is checked at each dental appointment? (choose only one)
- I refuse to have my teeth checked at each visit
 - I insist on having my teeth cleaned only
 - I want my oral hygiene progress checked only after my dental treatment is completed
 - I want my oral hygiene checked at each visit to monitor my progress
20. What is your reaction when you are asked to return to the dental clinic for several visits to have your teeth professionally cleaned? (choose only one)
- I do not like it; I want my teeth cleaned at one appointment
 - I would not return to the dentist/or dental hygienist for several visits just to have my teeth cleaned
 - I accept the treatment because it will improve my oral health

SECTION 3: Attitudes towards oral hygiene instructions

Read the following statements about oral hygiene and indicate how strongly you agree or disagree with each one

	Strongly agree	Agree	No opinion	Disagree	Strongly disagree
	1	2	3	4	5
21. I like it when my hygienist/or dentist teaches me oral hygiene methods in the dental clinic.	1	2	3	4	5
22. It is a waste of time having my oral hygiene status checked at every dental visit.	1	2	3	4	5
23. Checking my toothbrushing method at the beginning of each visit is a waste of time.	1	2	3	4	5
24. Learning to use dental floss at the beginning of each visit is a waste of time.	1	2	3	4	5
25. I feel embarrassed when the hygienist/dentist of the opposite gender tells me that my oral hygiene needs improvement.	1	2	3	4	5
26. I feel embarrassed if a hygienist/ dentist of the opposite gender teaches me oral hygiene techniques.	1	2	3	4	5
27. I trust the dental advice that I receive from my dentist/ hygienist.	1	2	3	4	5
28. Good oral health is something that I value.	1	2	3	4	5
29. I believe that I can keep my teeth healthy for a lifetime.	1	2	3	4	5

Read the following statements about oral hygiene and score each in terms of their importance to you:

	Very important 1	Somewhat important 2	Not important 3
30. Following the hygienist's/dentist's toothbrushing instructions	1	2	3
31. Attending all scheduled appointments for professional teeth cleaning	1	2	3
32. Accepting new oral hygiene concepts from the dentist/ dental hygienist	1	2	3
33. Brushing my teeth every day	1	2	3
34. Flossing my teeth every day	1	2	3
35. Learning effective toothbrushing techniques.	1	2	3
36. Thoroughly brushing all of the teeth	1	2	3
37. Following the dentist's/hygienist's flossing instructions	1	2	3
38. Using miswak	1	2	3
39. Being on time to have my teeth professionally cleaned	1	2	3
40. Visiting the dental hygienist/dentist for preventive dental care.	1	2	3

SECTION 4: Dental knowledge

41. What is the *primary* reason why people lose their teeth? (choose only one)
- Aging
 - Accident/ injury
 - Tooth decay
 - Gum diseases

42. What is your *primary* reason for coming to the dental clinic? (choose only one)
- a. Pain
 - b. Check up
 - c. Filling (s)
 - d. Cleaning
 - e. Extraction
 - f. Other: _____
(specify)
43. What is the *primary* cause of tooth decay? (choose only one)
- a. I don't know.
 - b. Bacterial plaque.
 - c. Accumulation of food debris
 - d. Poor oral hygiene
 - e. Eating a lot of sweets
 - f. Soft or weak teeth
44. What is the *primary* cause of periodontal disease? (choose only one)
- a. I don't know
 - b. Accumulation of the bacterial plaque
 - c. Accumulation of food debris.
 - d. Accumulation of calculus.
 - e. Not cleaning the teeth and gum daily
45. Why do you think your gums bleed? (choose only one)
- a. My gums do not bleed
 - b. I don't know.
 - c. Accumulation of bacterial plaque
 - d. Poor brushing technique
 - e. Poor flossing technique
 - f. Brushing too hard
 - g. It is normal for gums to bleed
46. How often do your gums bleed? (choose only one)
- a. Frequently
 - b. Sometimes
 - c. Seldom
 - d. I don't know
47. How would you rate the health of your gums? (choose only one)
- a. Very healthy
 - b. Somewhat healthy
 - c. Unhealthy
 - d. I don't know

48. How would you rate the health of your teeth? (choose only one)
- a. Very healthy
 - b. Somewhat healthy
 - c. Unhealthy
 - d. I don't know

Thank you for your participation in this survey. Please return your completed survey to the person who submitted to you.

With the investigator's compliment,

Najat Saleh, BSDH
Graduate Dental Hygiene Student
Old Dominion University

APPENDIX B

ARABIC TRANSLATION OF QUESTIONNAIRE

Appendix B

مدى أدراك واستجابة و اهتمام الشعب القطري بصحة الفم و الأسنان

إرشادات: أرجو الأجابه على الأسئلة التالية بوضع دائرة حول الأجابه المناسبه لك:

القسم الأول: معلومات عامة

٢. الجنس:

أ. ذكر

ب. أنثى

١. العمر:

أ. ١٨-٢٥ . ٥٦-٤٨ . ٥

ب. ٢٦-٣٢ . ٥٧-٦٤ . ٥

ج. ٣٣-٤٠ . ٦٥-٧٢ . ٥

د. ٤١-٤٨ . ٥

٣. أعلى مستوى تعليمي:

أ. أمي

ب. إعدادي

ج. ثانوي

د. جامعي

هـ. دراسات عليا (ماجستير أو دكتوراه)

٤. كم يبعد سكنك عن عيادة الأسنان؟

أ. تقريبا ٥ كم

ب. تقريبا ١٠ كم

ج. تقريبا ٣٠ كم

د. تقريبا ١٠٠ كم

القسم الثاني: السلوكيات المتبعة للاهتمام بالفم

٥. هل زرت من قبل عيادة الأسنان لعمل تنظيف لأسنانك؟

أ. نعم

ب. لا

٦. هل تعلمت في عيادة الأسنان طريقة المحافظة على نظافة الأسنان باستخدام الفرشاة؟

أ. نعم

ب. لا

٧. هل تعلمت في عيادة الأسنان طريقة المحافظة على نظافة الأسنان باستخدام خيط الأسنان؟

أ. نعم

ب. لا

٨. كم في العاده تزور أخصائي أو طبيب الأسنان؟ (أختر إجابة واحدة فقط)
- أ. لا أزور أخصائي أو طبيب الأسنان
 - ب. مره في السنه
 - ج. مرتين بالسنه
 - د. عندما أكون متألم
 - ه. عندما يتطلب مظهر أسناني ذلك

٩. كم مرة تنظف أسنانك مستخدماً فرشاة الأسنان؟ (أختر إجابة واحدة فقط)
- أ. لا أنظف أسناني (أذهب مباشرة للسؤال رقم ١٢)
 - ب. في المناسبات الخاصة
 - ج. مرة في الشهر
 - د. مرة في الأسبوع
 - ه. مرة في اليوم
 - و. أكثر من مرة في اليوم

١٠. هل تتبع طريقة معينة أثناء تفريش أسنانك؟ (أختر إجابة واحدة فقط)
- أ. أتبع طريقتي العاديه (الخاصة بي)
 - ب. أتبع الطريقة التي تعلمتها في عيادة الأسنان
 - ج. ليست هناك طريقة معينة
 - د. أخرى تذكر:

١١. هل تعتقد بأن طريقتك الخاصة لتفريش أسنانك صحيحة؟ (أختر إجابة واحدة فقط)
- أ. نعم صحيحة ١٠٠%
 - ب. ربما صحيحة
 - ج. لست متأكدا
 - د. لا أعتقد بأن طريقتي في التفريش صحيحة

١٢. ماذا تستخدم لتنظيف أسنانك؟ (أختر كل الذي يطابق)
- أ. أستخدم الملح والفحم
 - ب. المسواك
 - ج. فرشاة الأسنان
 - د. معجون الأسنان
 - ه. خيط الأسنان
 - و. أخرى تذكر:

١٣. بغض النظر عن الطريقة التي تستخدمها... كم من الوقت تستغرق في تنظيف أسنانك كل يوم؟ (أختر إجابة واحدة فقط)
- أ. أقل من دقيقة
 - ب. أكثر من دقيقة وأقل من دقيقتين
 - ج. أكثر من دقيقتين و أقل من ثلاث دقائق
 - د. أكثر من ثلاث دقائق وأقل من أربع دقائق
 - هـ. أكثر من أربع دقائق و أقل من خمس دقائق
 - و. أكثر من خمس دقائق

١٤. متى عادة تنظف أسنانك؟ (أختر كل الذي يطابق)
- أ. بعد النهوض من النوم
 - ب. بعد الفطور
 - ج. بعد العشاء
 - د. قبل الخروج من المنزل
 - هـ. قبل الذهاب للنوم
 - و. قبل المناسبات الخاصة أو الحفلات
 - ي. أخرى تذكر:

١٥. ما نوع المضمضة التي تستخدمها؟ (أختر إجابة واحدة فقط)
- أ. لا أستخد أي نوع من المضمضة
 - ب. أستخد الماء والملح
 - ج. أستخد المضمضة التي ينصحنى بها أخصائي/طبيب الأسنان
 - د. أستخد أي مضمضة تجاربه (تباع في الصيدليات)
 - هـ. أخرى تذكر:

١٦. عندما تحضر متأخرا الموعد تنظيف الأسنان... يكون ذلك: (أختر إجابة واحدة فقط)
- أ. لتفادي تعليمات رعاية الفم (كتعلم الفرشاة واستخدام خيط الأسنان)
 - ب. لوجود التزامات أخرى تعوقني من الحضور في الموعد المحدد
 - ج. لتعارض موعد الأسنان معي
 - د. أخرى تذكر:

١٧. ماذا تكون ردة فعلك عندما يشرح لك أخصائي/ طبيب الأسنان طريقة التفريش واستخدام خيط الأسنان عند كل زيارة؟ (أختر إجابة واحدة فقط)
 أ. أرفض العلاج وأصر على تنظيف أسناني في زيارة واحدة
 ب. سوف أغير مواعيدي لأخصائي/ طبيب آخر
 ج. سوف أقبل العلاج لأنه سوف يحسن من صحة فمي
 د. ردة فعل أخرى (تذكر):

١٨. ماذا تكون ردة فعلك عندما يطلب منك أخصائي/ طبيب الأسنان أن تشرح الطريقة التي تفرش أسنانك بها في البيت؟ (أختر إجابة واحدة فقط)
 أ. أرفض أن أشرح طريقة تفريش أسناني لأخصائي/ طبيب الأسنان
 ب. ليس من المفترض أن يسأل أخصائي/ طبيب الأسنان سؤال كهذا
 ج. سوف أتجاهل هذا الطلب
 د. سوف أشرح الطريقة التي أفرش بها أسناني في البيت لأنني أريد أن تتحسن لثتي

١٩. ماذا تكون ردة فعلك عندما تفحص مدى نظافة فمك وأسنانك عند كل زيارة؟ (أختر إجابة واحدة فقط)
 أ. سوف أرفض فحص أسناني عند كل زيارة
 ب. سوف أصر على أن تنظف أسناني فقط
 ج. سوف أطلب أن تفحص مدى تقدم صحة ونظافة فمي وأسناني في آخر زيارة
 د. سوف أطلب أن تفحص مدى صحة ونظافة فمي وأسناني عند كل زيارة لمعرفة مدى تقدمي

٢٠. ماذا تكون ردة فعلك عندما يطلب منك أن تعود لعيادة الأسنان على عدة زيارات لعمل تنظيف الأسنان؟ (أختر إجابة واحدة فقط)
 أ. لن يعجبني ؛ لأنني أريد أن تنظف أسناني في موعد واحد
 ب. لن أذهب عدة زيارات لأخصائي/ طبيب الأسنان لتنظيف أسناني فقط
 ج. سوف أقبل الرجوع عدة زيارات لأنه سوف يحسن من حالة فمي الصحية

القسم الثالث: الاستجابة والتقبل لإرشادات الفم والأسنان المقدمة في عيادة الأسنان
أقرأ الجمل التالية عن صحة الفم والأسنان ثم أذكر مدى موافقتك لها

غير موافق بشدة	غير موافق	لا رأي	أوافق	أوافق بشدة	
٥	٤	٣	٢	١	٢١. يعجبني أخصائي/ طبيب الأسنان عندما يعلمني طريقة تفريش الأسنان عند زيارتي لعيادة الأسنان
٥	٤	٣	٢	١	٢٢. إنه لمضيعة للوقت أن تفحص أسناني للتأكد من نظافتها عند كل زيارة
٥	٤	٣	٢	١	٢٣. إنه لمضيعة للوقت أن تفحص طريقة تفريشي لأسناني عند بداية كل زيارة
٥	٤	٣	٢	١	٢٤. إنه لمضيعة للوقت تعلم كيفية استخدام خيط الأسنان عند بداية كل زيارة
٥	٤	٣	٢	١	٢٥. أشعر بالإحراج عندما يخبرني أخصائي/ طبيب أسنان من الجنس الآخر بأن أسناني تحتاج إلى تنظيف أكثر
٥	٤	٣	٢	١	٢٦. أشعر بالإحراج عندما يعلمني أخصائي/ طبيب الأسنان من الجنس الآخر طريقة تفريش أسناني
٥	٤	٣	٢	١	٢٧. أنا أثق بالإرشادات المقدمة لي من أخصائي/ طبيب الأسنان
٥	٤	٣	٢	١	٢٨. أنا من يقدر حالة فمي الصحية
٥	٤	٣	٢	١	٢٩. أنا واثق من قدرتي على المحافظة على أسنان سليمة مدى الحياة

أقرأ الجمل التالية عن صحة الفم ثم ضع دائرة حول أهمية كل منها بالنسبة لك:

غير مهم	مهم بعض الشيء	مهم جدا	
٣	٢	١	٣٠. أتباع تعليمات الطبيب في طريقة تفريش الأسنان
٣	٢	١	٣١. المحافظة على حضور جميع مواعيد تنظيف الأسنان
٣	٢	١	٣٢. تقبل المفاهيم الجديدة من أخصائي/ طبيب الأسنان بخصوص صحة الفم والأسنان
٣	٢	١	٣٣. تفريش أسناني يوميا
٣	٢	١	٣٤. استخدام خيط الأسنان يوميا
٣	٢	١	٣٥. تعلم الطريقة المثالية لتنظيف (تفريش) الأسنان
٣	٢	١	٣٦. تنظيف الأسنان من جميع الاتجاهات
٣	٢	١	٣٧. أتباع إرشادات أخصائي/ طبيب تنظيف الأسنان لطريقة استخدام الخيط
٣	٢	١	٣٨. استخدام المسواك
٣	٢	١	٣٩. الحضور في الوقت المحدد للموعد لعمل تنظيف الأسنان
٣	٢	١	٤٠. زيارة أخصائي/ طبيب تنظيف الأسنان لأجراء الفحص الوقائي للأسنان

القسم الرابع: ماذا تعرف عن الأسنان

٤١. ما هو السبب الرئيسي لفقدان الناس أسنانهم؟ (أختر إجابة واحدة فقط)
- أ. كبر السن
 - ب. الحوادث (حادث سيارة ، حادث رياضي، وقوع من على مرتفع ،عراك)
 - ج. تسوس الأسنان
 - د. أمراض اللثة

٤٢. ما هو السبب الرئيسي لزيارة عيادة الأسنان؟ (أختر إجابة واحدة فقط)
- أ. الألم
 - ب. الفحص المستمر
 - ج. لعمل الحشوات
 - د. لتنظيف الأسنان
 - هـ. للخلع
 - و. أخرى تذكر:

٤٣. ما هو السبب الرئيسي لتسوس الأسنان؟ (أختر إجابة واحدة فقط)
- أ. لا أعلم
 - ب. البكتريا (الجراثيم الموجودة في الفم)
 - ج. تراكم بقايا الطعام
 - د. عدم تنظيف الأسنان
 - هـ. أكل الكثير من الحلويات
 - و. وجود أسنان ضعيفه

٤٤. ما هو السبب الرئيسي لمرض اللثة؟ (أختر إجابة واحدة فقط)
- أ. لا أعلم
 - ب. تراكم البكتيريا (الجراثيم)
 - ج. تراكم بقايا الطعام
 - د. تراكم الجير
 - هـ. عدم تنظيف الأسنان واللثة يوميا

٤٥. لماذا تعتقد أن لثتك تنزف؟ (أختر إجابة واحدة فقط)
- أ. لثتي لا تنزف (أذهب للسؤال رقم ٤٧)
 - ب. لا أعلم
 - ج. تراكم البكتيريا (الجراثيم)
 - د. خطأ في طريقة التفريش
 - هـ. خطأ في طريقة استخدام خيط الأسنان
 - و. تفريش الأسنان بقوة
 - ي. من الطبيعي أن تنزف اللثة

٤٦. كم في الأغلب تنزف لثتك؟ (أختر إجابة واحدة فقط)
 أ. مستمر (دائما)
 ب. بعض الأحيان
 ج. نادرا
 د. لا أعلم

٤٧. كيف تقيم حالة لثتك الصحية؟ (أختر إجابة واحدة فقط)
 أ. سليمة جدا
 ب. سليمة بعض الشيء
 ج. مريضه (غير سليمة)
 د. لا أعلم

٤٨. كيف تقيم حالة أسنانك الصحية؟ (أختر إجابة واحدة فقط)
 أ. سليمة جدا
 ب. سليمة بعض الشيء
 ج. مريضه (غير سليمة)
 د. لا أعلم

أشكرك على مشاركتك في هذا البحث. أرجو تسليم الأسئلة للشخص الذي سلمك إياها.

مع تحيات الباحثة

نجاه عبدربه جبران صالح الصلاحي، BSDH
 طالبة دراسات عليا- قسم صحة الفم والأسنان
 جامعة أولاد دمينيون

APPENDIX C
COVER LETTER

Appendix C

Dear Participant,

A research study is being conducted to assess the dental health attitudes, knowledge, and behaviors of Qatari people. This research will be the first attempt to focus on this subject. Your participation in this study will provide information presently unavailable to dental health professionals and the Qatari public.

Completing the questionnaire has nothing to do with your dental appointment today or in the future. Participation in this study is strictly voluntary. You will be one of about 1000 people who participate in this study.

The questionnaire will take about 10 minutes to complete. Try to answer all the questions accurately and honestly, and return the questionnaire to the person who distributed it to you.

I will be happy to share the result of the study with you after the investigation. If you leave your name and address, I will send you the results at the end of the study.

Thank you for your time, patience, and support in the conduct of this study.

Sincerely,

Najat Saleh, BSDH
Dental Hygiene Graduate Student
Old Dominion University
e.mail: nas100g@worldnet.att.net
Phone # : (757) 489-1017

APPENDIX D**ARABIC TRANSLATION OF COVER LETTER**

Appendix D

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

عزيزي المشارك

هذا البحث الميداني يعتبر الأول من نوعه لدراسة مدى استجابة و أدراك و اهتمام الشعب القطري بصحة الفم والأسنان.

إن إكمالك للاستبيان القادم ليس له علاقة بموعده في الأسنان اليوم أو في المستقبل، كما أن لك حرية المشاركة من عدمها. إلا أن مشاركتك في هذا البحث سوف يزود الباحثة والمهتمين من المهنيين بصحة الفم و الأسنان و كذلك المجتمع القطري بمعلومات غير متوفرة لديه حالياً. وللعلم فاتك ستكون واحد من ضمن ١٠٠٠ شخص يشاركون في هذا البحث.

رجاء إكمال الاستبيان الآتي بكل جميع أسئلته التي لن تأخذ غير عشر دقائق من وقتك. رجاء إكمال الأسئلة بصق و أمارة ثم إعلانها إلى الشخص الذي سلمك إياها.

إذا كنت من المهتمين بمعرفة نتائج هذا البحث فإنه لمن دواعي سروري إشراكك بنتائج البحث التي سترسل بالبريد على اسمك و عنوانك الذي تتركه للشخص الذي سلمك أسئلة البحث.

شكراً للوقت الذي قضيته في الإجابة على الأسئلة ولدعمك للبحث بالمشاركة فيه.

مع تحيات الباحثة:

نجاة عبد ربه جبران صالح الصلاحي

طالبة دراسات عليا- قسم صحة الفم و الأسنان

جامعة أولد دومينيون – فرجينيا

بريد إلكتروني: nas100g@worldnet.att.net

ت: 489-1017 (757)

APPENDIX E**LETTER TO THE DIRECTOR OF THE HAMAD MEDICAL
CORPORATION TO PERMIT QUESTIONNAIRE DISTRIBUTION**

Appendix E

Dr. Ghalia Al-thani
Director of Medical Corporation
Hamad Medical Corporation
P.O: Box: 3050
Doha-Qatar

Dear Madam,

I am a graduate student pursuing a Master's degree in dental hygiene from the Old Dominion University, Norfolk, Virginia, and a past employee at the Dental Department- Hamad Medical Corporation. I would like to distribute a questionnaire to Qatari dental patients who are attending the dental clinic. Enclosed is a "draft" copy of the questionnaire that I plan to use in my research. Feel free to make comments about it because it is still in development and I would welcome your suggestions.

My thesis topic is "*Oral Health Knowledge, Attitudes, and Behaviors of Qatari People.*" Answering the questionnaire will take no more than 10 minutes, and all of the patients' responses will remain confidential. If results are published, they will be presented in-group form. Of course, Hamad Medical Corporation will be acknowledged for its support of the research.

My research protocol will be reviewed by the Old Dominion University Institutional Review Board in February 1998. I need a letter from you indicating your permission for me to administer the questionnaire to patients at the Dental Department- Hamad Medical Corporation. If your permission is granted, please fax it to (757) 489-1017 or (757) 683-5239.

I would like to thank you in advance for your cooperation and support in facilitating the completion of my research. If you have any specific questions, please feel free to contact my faculty advisor, Michele Darby, mdarby@odu.edu or call at (757) 683-5232.

Sincerely,

Najat Saleh, BSDH
Dental Hygiene Graduate Student
Old Dominion University
e.mail: nas100g@worldnet.att.net
Tel: (757) 489-1017

APPENDIX F**PREMISSION SIGNATURE FROM THE HAMAD MEDICAL
CORPORATION**

Appendix F

Dr. Ghalia Al-thani
 Director of Medical Corporation
 Hamad Medical Corporation
 P.O: Box: 3050
 Doha-Qatar

Dear Madam,

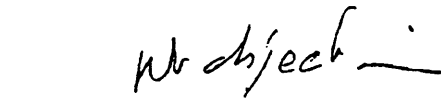
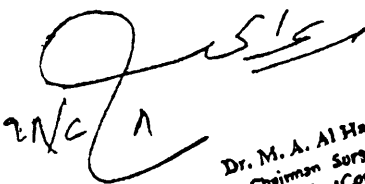
I am a graduate student pursuing a Master's degree in dental hygiene from the Old Dominion University, Norfolk, Virginia, and a past employee at the Dental Department- Hamad Medical Corporation. I would like to distribute a questionnaire to Qatari dental patients who are attending the dental clinic. Enclosed is a "draft" copy of the questionnaire that I plan to use in my research. Feel free to make comments about it because it is still in development and I would welcome your suggestions.

My thesis topic is "*Oral Health Knowledge, Attitudes, and Behaviors of Qatari People.*" Answering the questionnaire will take no more than 10 minutes, and all of the patients' responses will remain confidential. If results are published, they will be presented in-group form. Of course, Hamad Medical Corporation will be acknowledged for its support of the research.

My research protocol will be reviewed by the Old Dominion University Institutional Review Board in February 1998. I need a letter from you indicating your permission for me to administer the questionnaire to patients at the Dental Department- Hamad Medical Corporation. If your permission is granted, please fax it to (757) 489-1017 or (757) 683-5239.

I would like to thank you in advance for your cooperation and support in facilitating the completion of my research. If you have any specific questions, please feel free to contact my faculty advisor, Michele Darby, mdarby@odu.edu or call at (757) 683-5232.

Sincerely,

Mr. Saleh


 Dr. M. A. Al Harami
 Chairman Surgery
 Hamad Medical Corporation

Najat Saleh, BSDH
 Dental Hygiene Graduate Student
 Old Dominion University
 e.mail: nas100g@worldnet.att.net
 Tel: (757) 489-1017

APPENDIX G**LETTER TO THE HEAD OF THE PRIMARY HEALTH CARE
CENTRES TO PERMIT QUESTIONNAIRE DISTRIBUTION**

Appendix G

Dr. Yousef Abu-Alfaen
Director of Public Health Care
Ministry of Health-Primary Health Care
P.O: Box: 42
Doha-Qatar

Dear Sir,

I am a graduate student pursuing a Master's degree in dental hygiene from the Old Dominion University, Norfolk, Virginia, and a past employee at the Dental Department-Hamad Medical Corporation. I would like to distribute a questionnaire to Qatari dental patients who are treated at the Public Health Care centers-dental clinic. Enclosed is a "draft" copy of the questionnaire that I plan to use in my research. Feel free to make comments about it because it is still in development and I would welcome your suggestions.

My thesis topic is "*Oral Health Knowledge, Attitudes, and Behaviors of Qatari People.*" Answering the questionnaire will take no more than 10 minutes, and all of the patients' results will remain confidential. If results are published, they will be presented in group form. Of course, Primary Health Care Department will be acknowledged for its support of the research.

My research protocol will be reviewed by the Old Dominion University Institutional Review Board in February 1998. I need a letter from you indicating your permission for me to administer the questionnaire to patients at the Public Health Centres-Dental clinics. If your permission is granted, please fax us it to (757) 489-1017 or (757) 683-5239.

I would like to thank you in advance for your cooperation and support in facilitating the completion of my research. If you have any specific questions, please feel free to contact my faculty advisor, Michele Darby, mdarby@odu.edu or call at (757) 683-5232.

Sincerely,

Najat Saleh, BSDH
Dental Hygiene Graduate Student
Old Dominion University
e.mail : nas100g@worldnet.att.net
Tel: (757) 489-1017

APPENDIX H**PERMISSION SIGNATURE FROM THE HEAD OF THE PRIMARY
HEALTH CARE CENTERS**

Appendix H

Dr. Yousef Abu-Alfaen
 Director of Public Health Care
 Ministry of Health-Primary Health Care
 P.O: Box: 42
 Doha-Qatar

Dear Sir,

I am a graduate student pursuing a Master's degree in dental hygiene from the Old Dominion University, Norfolk, Virginia, and a past employee at the Dental Department-Hamad Medical Corporation. I would like to distribute a questionnaire to Qatari dental patients who are treated at the Public Health Care centers-dental clinic. Enclosed is a "draft" copy of the questionnaire that I plan to use in my research. Feel free to make comments about it because it is still in development and I would welcome your suggestions.

My thesis topic is "*Oral Health Knowledge, Attitudes, and Behaviors of Qatari People.*" Answering the questionnaire will take no more than 10 minutes, and all of the patients' results will remain confidential. If results are published, they will be presented in group form. Of course, Primary Health Care Department will be acknowledged for its support of the research.

My research protocol will be reviewed by the Old Dominion University Institutional Review Board in February 1998. I need a letter from you indicating your permission for me to administer the questionnaire to patients at the Public Health Centres-Dental clinics. If your permission is granted, please fax us it to (757) 489-1017 or (757) 683-5239.

I would like to thank you in advance for your cooperation and support in facilitating the completion of my research. If you have any specific questions, please feel free to contact my faculty advisor, Michele Darby, mdarby@odu.edu or call at (757) 683-5232.

Sincerely,

لدينا معكم
 نجات صالح
 ٩٨/٢/١٦

Najat Saleh, BSDH
 Dental Hygiene Graduate Student
 Old Dominion University
 e.mail : nas100g@worldnet.att.net
 Tel: (757) 489-1017

APPENDIX I

**LETTER TO THE ASSISTANT ACADEMIC DEAN OF THE
UNIVERSITY OF QATAR TO PERMIT QUESTIONNAIRE
DISTRIBUTION**

Appendix I

To Whom It May Concern

I am a graduate student pursuing a Master's degree in dental hygiene from Old Dominion University, in Norfolk, Virginia, and a past employee at the Dental Department-Hamad Medical Corporation. I would like to distribute a questionnaire to Qatari students, both women and men. Students from Qatar University are one of seven sample groups I would like to have participated in my thesis research. Answering the questionnaire will take no more than 10 minutes.

Enclosed is a copy of the questionnaire that I plan to use in my research. My thesis topic is "*Oral Health Knowledge, Attitudes, and Behaviors of Qatari People.*"

I need a letter from you indicating your permission for me to administer the questionnaire to Qatari students for both boys and girls.

I would like to thank you in advance for your cooperation and support in facilitating the completion of my research.

Sincerely,

Najat Saleh, BSDH
Dental Hygiene Graduate Student
Old Dominion University
e.mail : nas100g@worldnet.att.net
Tel: (757) 489-1017

APPENDIX J

**PERMISSION SIGNATURE ON THE ARABIC TRANSLATION OF
THE LETTER TO PERMIT QUESTIONNAIRE DISTRIBUTION
FROM THE ASSISTANT ACADEMIC DEAN OF THE UNIVERSITY
OF QATAR**

Appendix J

مكتب المدير الشؤون الإدارية	
رقم الوارد	٦٢٠
التاريخ	١٩٩١/٣/٢١

إلى من يهمه الأمر... الموقر

أنا طالبة في مرحلة الماجستير - جامعة أولد دومينيون بفرجينيا، وموظفة في مؤسسة حمد الطبية قسم صحة الفم والأسنان. أُرغب في توزيع استبيان عن مدى أدراك واستجابة واهتمام الشعب القطري بصحة الفم والأسنان.

إن جامعة قطر تعتبر إحدى سبع أماكن يشملها البحث. إن حل أسئلة الاستبيان لن يأخذ أكثر من عشر دقائق. مرفق إليكم نسخة من أسئلة الاستبيان للاطلاع عليها.

أحتاج إلى موافقتكم كتابيا على توزيع الاستبيان في جامعة قطر - قسم البنين والبنات. أشكركم على تسهيل الأمر بالموافقة على توزيع الاستبيان.

هذا وتفضلوا بقبول فائق الاحترام والتقدير...

الدكتورة نورا الصليبي
أستاذة
جامعة أولد دومينيون
١٩٩١/٣/٢٢

مع تحيات الباحثة:
نجاحة عبد ربه جبران صلاح الصلاحي
طالبة دراسات عليا - قسم صحة الفم و الأسنان
جامعة أولد دومينيون - فرجينيا
بريد إلكتروني: nas100g@worldnet.att.net
ت: (757) 489-1017

APPENDIX K**SUMMARY OF RESPONSES TO THE *ORAL HEALTH KNOWLEDGE,
ATTITUDES, AND BEHAVIORS OF QATARI PEOPLE
QUESTIONNAIRE***

Appendix K

DEMOGRAPHICS:Item 1. Age

	<u>Frequency</u>	<u>Percent</u>	<u>Valid Percent</u>	<u>Cumulative Percent</u>
a. 18-25	356	41.4	41.4	41.4
b. 26-32	262	30.5	30.5	71.9
c. 33-40	128	14.9	14.9	86.8
d. 41-48	66	7.7	7.7	94.5
e. 49-56	28	3.3	3.3	97.8
f. 57-64	10	1.2	1.2	99.0
g. 65-72	9	1.0	1.0	100.0

(n=859; valid cases=859; missing cases=0)

Item 2. Gender

	<u>Frequency</u>	<u>Percent</u>	<u>Valid Percent</u>	<u>Cumulative Percent</u>
a. Male	358	41.7	41.7	41.7
b. Female	501	58.3	58.3	100.0

(n=859; valid cases=859; missing cases=0)

Item 3. Highest level of education completed

	<u>Frequency</u>	<u>Percent</u>	<u>Valid Percent</u>	<u>Cumulative Percent</u>
a. No formal education	43	5.0	5.0	5.0
b. Elementary school	93	10.8	10.8	15.8
c. High school diploma	254	29.6	29.6	45.4
d. Baccalaureate	423	49.2	49.2	94.6
e. Graduate degree	46	5.4	5.4	100.0

(n=859; valid cases=859; missing cases=0)

Item 4. How far do you live from the dental care facility?

	<u>Frequency</u>	<u>Percent</u>	<u>Valid Percent</u>	<u>Cumulative Percent</u>
a. approximately 5 km	281	32.7	33.3	33.3
b. approximately 10 km	289	33.6	34.2	67.5
c. approximately 30 km	187	21.8	22.1	89.6
d. approximately 100 km	88	10.2	10.4	100.0

(n=859; valid cases=845; missing cases=14)

SECTION 2: ORAL HYGIENE BEHAVIORSItem 5. Did you ever visit the dental clinic for professional teeth cleaning?

	<u>Frequency</u>	<u>Percent</u>	<u>Valid Percent</u>	<u>Cumulative Percent</u>
a. Yes	639	74.4	74.4	74.4
b. No	220	25.6	25.6	100.0

(n=859; valid cases=859; missing cases=0)

Item 6. Did you ever received toothbrushing instructions at the dental clinic?

	<u>Frequency</u>	<u>Percent</u>	<u>Valid Percent</u>	<u>Cumulative Percent</u>
a. Yes	325	37.8	37.8	37.8
b. No	534	62.2	62.2	100.0

(n=859; valid cases=859; missing cases=0)

Item 7. Did you ever received flossing instructions at the dental clinic?

	<u>Frequency</u>	<u>Percent</u>	<u>Valid Percent</u>	<u>Cumulative Percent</u>
a. Yes	316	36.8	36.8	36.8
b. No	543	63.2	63.2	100.0

(n=859; valid cases=859; missing cases=0)

Item 8. How often do you visit the dentist or dental hygienist?

	<u>Frequency</u>	<u>Percent</u>	<u>Valid Percent</u>	<u>Cumulative Percent</u>
a. I never visit the hygienist or dentist	81	9.4	9.4	9.4
b. Once a year	91	10.6	10.6	20.0
c. Twice a year	106	12.3	12.3	32.4
d. When I'm in pain	419	48.8	48.8	81.1
e. Only when cosmetically desired	162	18.9	18.9	100.0

(n=859; valid cases=859; missing cases=0)

Item 9. How often do you brush your teeth with a toothbrush?

	<u>Frequency</u>	<u>Percent</u>	<u>Valid Percent</u>	<u>Cumulative Percent</u>
a. I do not brush my teeth	22	2.6	2.6	2.6
b. On special occasion	17	2.0	2.0	4.5
c. Once a month	7	0.8	0.8	5.4
d. Once a week	31	3.6	3.6	9.0
e. Once a day	251	29.2	29.2	38.2
f. More than once a day	531	61.8	61.8	100.0

(n=859; valid cases=859; missing cases=0)

Item 10. Do you use a special technique when brushing your teeth?

	<u>Frequency</u>	<u>Percent</u>	<u>Valid Percent</u>	<u>Cumulative Percent</u>
a. I use my own technique	449	52.3	52.3	52.3
b. I use a technique taught to me at the dental clinic	240	27.9	27.9	80.2
c. I use no special technique	141	16.4	16.4	96.6
d. Other	29	3.4	3.4	100.0

(n=859; valid cases=859; missing cases=0)

Item 11. Do you think that the toothbrushing technique that you use is effective?

	<u>Frequency</u>	<u>Percent</u>	<u>Valid Percent</u>	<u>Cumulative Percent</u>
a. Yes, 100%	229	26.7	26.7	26.7
b. Maybe	393	45.8	45.8	72.4
c. I'm not sure	200	23.3	23.3	95.7
d. No, I do not think so	37	4.3	4.3	100.0

(n=859; valid cases=859; missing cases=0)

Item 12. What do you use to clean your teeth?

a. Charcoal + salt

	<u>Frequency</u>	<u>Percent</u>	<u>Valid Percent</u>	<u>Cumulative Percent</u>
a. Yes	51	5.9	5.9	5.9
b. No	808	94.1	94.1	100.0

(n=859; valid cases=859; missing cases=0)

Item 12. What do you use to clean your teeth?

b. Miswak

	<u>Frequency</u>	<u>Percent</u>	<u>Valid Percent</u>	<u>Cumulative Percent</u>
a. Yes	180	21.0	21.0	21.0
b. No	679	79.0	79.0	100.0

(n=859; valid cases=859; missing cases=0)

Item 12. What do you use to clean your teeth?

c. Toothbrush

	<u>Frequency</u>	<u>Percent</u>	<u>Valid Percent</u>	<u>Cumulative Percent</u>
a. Yes	763	88.8	88.8	88.8
b. No	96	11.2	11.2	100.0

(n=859; valid cases=859; missing cases=0)

Item 12. What do you use to clean your teeth?

d. Toothpaste

	<u>Frequency</u>	<u>Percent</u>	<u>Valid Percent</u>	<u>Cumulative Percent</u>
a. Yes	756	88.0	88.0	88.0
b. No	103	12.0	12.0	100.0

(n=859; valid cases=859; missing cases=0)

Item 12. What do you use to clean your teeth?

e. Dental floss

	<u>Frequency</u>	<u>Percent</u>	<u>Valid Percent</u>	<u>Cumulative Percent</u>
a. Yes	227	26.4	26.4	26.4
b. No	632	73.6	73.6	100.0

(n=859; valid cases=859; missing cases=0)

Item 12. What do you use to clean your teeth?

f. Other

	<u>Frequency</u>	<u>Percent</u>	<u>Valid Percent</u>	<u>Cumulative Percent</u>
a. Yes	40	4.7	4.7	4.7
b. No	819	95.3	95.3	100.0

(n=859; valid cases=859; missing cases=0)

Item 13. Regardless of the techniques used, how much time do you spend each day cleaning your teeth?

	<u>Frequency</u>	<u>Percent</u>	<u>Valid Percent</u>	<u>Cumulative Percent</u>
a. Less than 1 minute	151	17.6	17.6	17.6
b. More than 1 min but less than 2 min	358	41.7	41.7	59.3
c. More than 2 min but less than 3 min	180	21.0	21.0	80.2
d. More than 3 min but less than 4 min	86	10.0	10.0	90.2
e. More than 4 min but less than 5 min	50	5.8	5.8	96.0
f. More than 5 min	34	4.0	4.0	100.0

(n=859; valid cases=859; missing cases=0)

Item 14. When do you clean your teeth?

a. After waking up

	<u>Frequency</u>	<u>Percent</u>	<u>Valid Percent</u>	<u>Cumulative Percent</u>
a. Yes	641	74.6	74.6	74.6
b. No	218	25.4	25.4	100.0

(n=859; valid cases=859; missing cases=0)

Item 14. When do you clean your teeth?

b. After eating breakfast

	<u>Frequency</u>	<u>Percent</u>	<u>Valid Percent</u>	<u>Cumulative Percent</u>
a. Yes	158	18.4	18.4	18.4
b. No	701	81.6	81.6	100.0

(n=859; valid cases=859; missing cases=0)

Item 14. When do you clean your teeth?

c. After eating dinner

	<u>Frequency</u>	<u>Percent</u>	<u>Valid Percent</u>	<u>Cumulative Percent</u>
a. Yes	270	31.4	31.4	31.4
b. No	589	68.6	68.6	100.0

(n=859; valid cases=859; missing cases=0)

Item 14. When do you clean your teeth?

d. Before going out

	<u>Frequency</u>	<u>Percent</u>	<u>Valid Percent</u>	<u>Cumulative Percent</u>
a. Yes	201	23.4	23.4	23.4
b. No	658	76.6	76.6	100.0

(n=859; valid cases=859; missing cases=0)

Item 14. When do you clean your teeth?

e. Before going to bed

	<u>Frequency</u>	<u>Percent</u>	<u>Valid Percent</u>	<u>Cumulative Percent</u>
a. Yes	485	56.5	56.5	56.5
b. No	374	43.5	43.5	100.0

(n=859; valid cases=859; missing cases=0)

Item 14. When do you clean your teeth?

f. Prior to special occasion, e.g., parties, holidays

	<u>Frequency</u>	<u>Percent</u>	<u>Valid Percent</u>	<u>Cumulative Percent</u>
a. Yes	228	26.5	26.5	26.5
b. No	631	73.5	73.5	100.0

(n=859; valid cases=859; missing cases=0)

Item 14. When do you clean your teeth?

g. Other

	<u>Frequency</u>	<u>Percent</u>	<u>Valid Percent</u>	<u>Cumulative Percent</u>
a. Yes	57	6.6	6.6	6.6
b. No	802	93.4	93.4	100.0

(n=859; valid cases=859; missing cases=0)

Item 15. What mouthwash do you use?

	<u>Frequency</u>	<u>Percent</u>	<u>Valid Percent</u>	<u>Cumulative Percent</u>
a. I do not use a mouthwash	419	48.8	48.8	48.8
b. Salt + water	134	15.6	15.6	64.4
c. A mouthwash recommended by hygienist/dentist	208	24.2	24.2	88.6
d. Any commercial mouthwash	79	9.2	9.2	97.8
e. Other	19	2.2	2.2	100.0

(n=859; valid cases=859; missing cases=0)

Item 16. When you arrive late for a dental appointment, it is usually:

	<u>Frequency</u>	<u>Percent</u>	<u>Valid Percent</u>	<u>Cumulative Percent</u>
a. To avoid oral care instructions	96	11.2	11.2	11.2
b. Because of another commitment	511	59.5	59.5	70.7
c. Because of a scheduling conflict	131	15.3	15.3	85.9
d. Others	121	14.1	14.1	100.0

(n=859; valid cases=859; missing cases=0)

Item 17. What is your reaction when you are given oral health instructions by a dentist or dental hygienist at each visit?

	<u>Frequency</u>	<u>Percent</u>	<u>Valid Percent</u>	<u>Cumulative Percent</u>
a. I refuse the treatment and insist on having professional cleaning completed in one visit.	65	7.6	7.6	7.6
b. I change to a new hygienist/dentist	33	3.8	3.8	11.4
c. I accept the treatment because it will improve my oral health.	701	81.6	81.6	93.0
d. Other reaction	60	7.0	7.0	100.0

(n=859; valid cases=859; missing cases=0)

Item 18. What is your reaction when the dentist or dental hygienist asks you to demonstrate how you clean your teeth at home?

	<u>Frequency</u>	<u>Percent</u>	<u>Valid Percent</u>	<u>Cumulative Percent</u>
a. I refuse to show the dentist or dental Hygienist my toothbrushing technique	52	6.1	6.1	6.1
b. Dentist or hygienist are not supposed To ask question like this	45	5.2	5.2	11.3
c. I ignore the request	38	4.4	4.4	15.7
c. I demonstrate my tooth brushing technique because I want my gums to Improve	724	84.3	84.3	100.0

(n=859; valid cases=859; missing cases=0)

Item 19. What is your reaction when your oral hygiene is checked at each dental appointment?

	<u>Frequency</u>	<u>Percent</u>	<u>Valid Percent</u>	<u>Cumulative Percent</u>
a. I refuse to have my teeth checked at each visit	29	3.4	3.4	3.4
b. I insist on having my teeth cleaned Only	67	7.8	7.8	11.2
c. I want my oral hygiene progress checked only after my dental treatment is completed if there is time	160	18.6	18.6	29.8
d. I want my oral hygiene checked at each visit to monitor my progress	603	70.2	70.2	100.0

(n=859; valid cases=859; missing cases=0)

Item 20. What is your reaction when you are asked to return to dental the dental clinic for several visits to have your teeth professionally cleaned?

	<u>Frequency</u>	<u>Percent</u>	<u>Valid Percent</u>	<u>Cumulative Percent</u>
a. I do not like it; I want my teeth Cleaned at one appointment	167	19.4	19.4	19.4
b. I would not return to the dentist/ or dental hygienist for several visits just to have my teeth cleaned	67	7.8	7.8	27.2
c. I accept the treatment because it will improve my oral health	625	72.8	72.8	100.0

(n=859; valid cases=859; missing cases=0)

SECTION 3: ATTITUDES TOWARDS ORAL HYGIENE INSTRUCTIONS

Item 21. I like it when my dentist/or hygienist teaches me oral hygiene methods in dental clinic

	<u>Frequency</u>	<u>Percent</u>	<u>Valid Percent</u>	<u>Cumulative Percent</u>
Strongly agree	471	54.8	54.8	54.8
Agree	310	36.1	36.1	90.9
No opinion	46	5.4	5.4	96.3
Disagree	17	2.0	2.0	98.3
Strongly disagree	15	1.7	1.7	100.0

(n=859; valid cases=859; missing cases=0)

Item 22. It is a waste of time having my oral hygiene status checked at every dental visit

	<u>Frequency</u>	<u>Percent</u>	<u>Valid Percent</u>	<u>Cumulative Percent</u>
Strongly agree	69	8.0	8.0	8.0
Agree	119	13.9	13.9	21.9
No opinion	70	8.1	8.1	30.0
Disagree	314	36.6	36.6	66.6
Strongly disagree	287	33.4	33.4	100.0

(n=859; valid cases=859; missing cases=0)

Item 23. Checking my toothbrushing method at the beginning of each visit is a waste of time

	<u>Frequency</u>	<u>Percent</u>	<u>Valid Percent</u>	<u>Cumulative Percent</u>
Strongly agree	82	9.5	9.5	9.5
Agree	170	19.8	19.8	29.3
No opinion	119	13.9	13.9	43.2
Disagree	315	36.7	36.7	79.9
Strongly disagree	173	20.1	20.1	100.0

(n=859; valid cases=859; missing cases=0)

Item 24. Learning to use dental floss at the beginning of each visit is a waste of time

	<u>Frequency</u>	<u>Percent</u>	<u>Valid Percent</u>	<u>Cumulative Percent</u>
Strongly agree	91	10.6	10.6	10.6
Agree	176	20.5	20.5	31.1
No opinion	131	15.3	15.3	46.3
Disagree	309	36.0	36.0	82.3
Strongly disagree	152	17.7	17.7	100.0

(n=859; valid cases=859; missing cases=0)

Item 25. I feel embarrassed when the hygienist/dentist of the opposite gender tells me that my oral hygiene needs improvement

	<u>Frequency</u>	<u>Percent</u>	<u>Valid Percent</u>	<u>Cumulative Percent</u>
Strongly agree	176	20.5	20.5	20.5
Agree	227	26.4	26.4	46.9
No opinion	122	14.2	14.2	61.1
Disagree	223	26.0	26.0	87.1
Strongly disagree	111	12.9	12.9	100.0

(n=859; valid cases=859; missing cases=0)

Item 26. I feel embarrassed if a dentist/hygienist of the opposite gender teaches me oral hygiene techniques

	<u>Frequency</u>	<u>Percent</u>	<u>Valid Percent</u>	<u>Cumulative Percent</u>
Strongly agree	146	17.0	17.0	17.0
Agree	182	21.2	21.2	38.2
No opinion	121	14.1	14.1	52.3
Disagree	286	33.3	33.3	85.6
Strongly disagree	124	14.4	14.4	100.0

(n=859; valid cases=859; missing cases=0)

Item 27. I trust the dental advice that I receive from my dentist/hygienist

	<u>Frequency</u>	<u>Percent</u>	<u>Valid Percent</u>	<u>Cumulative Percent</u>
Strongly agree	457	53.2	53.2	53.2
Agree	296	34.5	34.5	87.7
No opinion	45	5.2	5.2	92.9
Disagree	33	3.8	3.8	96.7
Strongly disagree	28	3.3	3.3	100.0

(n=859; valid cases=859; missing cases=0)

Item 28. Good oral health is something that I value

	<u>Frequency</u>	<u>Percent</u>	<u>Valid Percent</u>	<u>Cumulative Percent</u>
Strongly agree	168	19.6	19.6	19.6
Agree	177	20.6	20.6	40.2
No opinion	106	12.3	12.3	52.5
Disagree	275	32.0	32.0	84.5
Strongly disagree	133	15.5	15.5	100.0

(n=859; valid cases=859; missing cases=0)

Item 29. I believe that I can keep my teeth healthy for a lifetime

	<u>Frequency</u>	<u>Percent</u>	<u>Valid Percent</u>	<u>Cumulative Percent</u>
Strongly agree	131	15.3	15.3	15.3
Agree	215	25.0	25.0	40.3
No opinion	169	19.7	19.7	60.0
Disagree	235	27.4	27.4	87.3
Strongly disagree	109	12.7	12.7	100.0

(n=859; valid cases=859; missing cases=0)

Item 30. Following the dentist's/or hygienist's toothbrushing instructions

	<u>Frequency</u>	<u>Percent</u>	<u>Valid Percent</u>	<u>Cumulative Percent</u>
Very important	647	75.3	75.3	75.3
Somewhat important	184	21.4	21.4	96.7
Not important	28	3.3	3.3	100.0

(n=859; valid cases=859; missing cases=0)

Item 31. Attending all scheduled appointments for professional teeth cleaning

	<u>Frequency</u>	<u>Percent</u>	<u>Valid Percent</u>	<u>Cumulative Percent</u>
Very important	596	69.4	69.4	69.4
Somewhat important	228	26.5	26.5	95.9
Not important	35	4.1	4.1	100.0

(n=859; valid cases=859; missing cases=0)

Item 32. Accepting new oral hygiene concepts from the dentist/hygienist

	<u>Frequency</u>	<u>Percent</u>	<u>Valid Percent</u>	<u>Cumulative Percent</u>
Very important	592	68.9	68.9	68.9
Somewhat important	234	27.2	27.2	96.2
Not important	33	3.8	3.8	100.0

(n=859; valid cases=859; missing cases=0)

Item 33. Brushing my teeth every day

	<u>Frequency</u>	<u>Percent</u>	<u>Valid Percent</u>	<u>Cumulative Percent</u>
Very important	755	87.9	87.9	87.9
Somewhat important	76	8.8	8.8	96.7
Not important	28	3.3	3.3	100.0

(n=859; valid cases=859; missing cases=0)

Item 34. Flossing my teeth every day

	<u>Frequency</u>	<u>Percent</u>	<u>Valid Percent</u>	<u>Cumulative Percent</u>
Very important	193	22.5	22.5	22.5
Somewhat important	423	49.2	49.2	71.7
Not important	243	28.3	28.3	100.0

(n=859; valid cases=859; missing cases=0)

Item 35. Learning effective toothbrushing techniques

	<u>Frequency</u>	<u>Percent</u>	<u>Valid Percent</u>	<u>Cumulative Percent</u>
Very important	665	77.4	77.4	77.4
Somewhat important	172	20.0	20.0	97.4
Not important	22	2.6	2.6	100.0

(n=859; valid cases=859; missing cases=0)

Item 36. Thoroughly brushing all of the teeth

	<u>Frequency</u>	<u>Percent</u>	<u>Valid Percent</u>	<u>Cumulative Percent</u>
Very important	730	85.0	85.0	85.0
Somewhat important	98	11.4	11.4	96.4
Not important	31	3.6	3.6	100.0

(n=859; valid cases=859; missing cases=0)

Item 37. Following the dentist's/hygienist's flossing instructions

	<u>Frequency</u>	<u>Percent</u>	<u>Valid Percent</u>	<u>Cumulative Percent</u>
Very important	350	40.7	40.7	40.7
Somewhat important	379	44.1	44.1	84.9
Not important	130	15.1	15.1	100.0

(n=859; valid cases=859; missing cases=0)

Item 38. Using miswak

	<u>Frequency</u>	<u>Percent</u>	<u>Valid Percent</u>	<u>Cumulative Percent</u>
Very important	303	35.3	35.3	35.3
Somewhat important	330	38.4	38.4	73.7
Not important	226	26.3	26.3	100.0

(n=859; valid cases=859; missing cases=0)

Item 39. Being on time to have my teeth professionally cleaned

	<u>Frequency</u>	<u>Percent</u>	<u>Valid Percent</u>	<u>Cumulative Percent</u>
Very important	576	67.1	67.1	67.1
Somewhat important	248	28.9	28.9	95.9
Not important	35	4.1	4.1	100.0

(n=859; valid cases=859; missing cases=0)

Item 40. Visiting the dental hygienist/dentist for preventive dental care

	<u>Frequency</u>	<u>Percent</u>	<u>Valid Percent</u>	<u>Cumulative Percent</u>
Very important	517	60.2	60.2	60.2
Somewhat important	278	32.4	32.4	92.5
Not important	64	7.5	7.5	100.0

(n=859; valid cases=859; missing cases=0)

SECTION 4: DENTAL KNOWLEDGEItem 41. What is the primary reason why people lose their teeth?

	<u>Frequency</u>	<u>Percent</u>	<u>Valid Percent</u>	<u>Cumulative Percent</u>
a. Aging	73	8.5	8.5	8.5
b. Accident/injury	48	5.6	5.6	14.1
c. Tooth decay	552	64.3	64.3	78.3
d. Gum disease	186	21.7	21.7	100.0

(n=859; valid cases=859; missing cases=0)

Item 42. What is the primary reason for coming to the dental clinic?

	<u>Frequency</u>	<u>Percent</u>	<u>Valid Percent</u>	<u>Cumulative Percent</u>
a. Pain	432	50.3	50.3	50.3
b. Check up	150	17.5	17.5	67.8
c. Filling (s)	104	12.1	12.1	79.9
d. Cleaning	122	14.2	14.2	94.1
e. Extraction	24	2.8	2.8	96.9
f. Other	27	3.1	3.1	100.0

(n=859; valid cases=859; missing cases=0)

Item 43. What is the primary cause of tooth decay?

	<u>Frequency</u>	<u>Percent</u>	<u>Valid Percent</u>	<u>Cumulative Percent</u>
a. I do not know	77	9.0	9.0	9.0
b. Bacterial plaque	93	10.8	10.8	19.8
c. Accumulation of food debris	217	25.3	25.3	45.1
d. Poor oral hygiene	317	36.9	36.9	82.0
e. Eating a lot of sweets	114	13.3	13.3	95.2
f. Soft or weak teeth	41	4.8	4.8	100.0

(n=859; valid cases=859; missing cases=0)

Item 44. What is the primary cause of periodontal disease?

	<u>Frequency</u>	<u>Percent</u>	<u>Valid Percent</u>	<u>Cumulative Percent</u>
a. I do not know	230	26.8	26.8	26.8
b. Accumulation of bacterial plaque	109	12.7	12.7	39.5
c. Accumulation of food debris	52	6.1	6.1	45.5
d. Accumulation of calculus	196	22.8	22.8	68.3
e. Not cleaning the gum and teeth daily	272	31.7	31.7	100.0

(n=859; valid cases=859; missing cases=0)

Item 45. Why do you think your gums bleed?

	<u>Frequency</u>	<u>Percent</u>	<u>Valid Percent</u>	<u>Cumulative Percent</u>
a. My gums do not bleed	227	26.4	26.4	26.4
b. I do not know	173	20.1	20.1	46.6
c. Accumulation of bacterial plaque	84	9.8	9.8	56.3
d. Poor brushing technique	167	19.4	19.4	75.8
e. Poor flossing technique	30	3.5	3.5	79.3
f. Brushing too hard	127	14.8	14.8	94.1
g. It is a normal for gum to bleed	51	5.9	5.9	100.0

(n=859; valid cases=859; missing cases=0)

Item 46. How often do your gums bleed?

	<u>Frequency</u>	<u>Percent</u>	<u>Valid Percent</u>	<u>Cumulative Percent</u>
a. Frequently	49	5.7	7.2	7.2
b. Sometimes	265	30.8	38.7	45.9
c. Seldom	302	35.2	44.2	90.1
d. I do not know	68	7.9	9.9	100.0

(n=859; valid cases=859; missing cases=0)

Item 47. How would you rate the health of your gums?

	<u>Frequency</u>	<u>Percent</u>	<u>Valid Percent</u>	<u>Cumulative Percent</u>
a. Very healthy	190	22.1	22.1	22.1
b. Somewhat healthy	447	52.0	52.0	74.2
c. Unhealthy	66	7.7	7.7	81.8
d. I do not know	156	18.2	18.2	100.0

(n=859; valid cases=859; missing cases=0)

Item 48. How would you rate the health of your teeth?

	<u>Frequency</u>	<u>Percent</u>	<u>Valid Percent</u>	<u>Cumulative Percent</u>
a. Very healthy	146	17.0	17.0	17.0
b. Somewhat healthy	527	61.4	61.4	78.3
c. Unhealthy	89	10.4	10.4	88.7
d. I do not know	97	11.3	11.3	100.0

(n=859; valid cases=859; missing cases=0)

APPENDIX L**SUMMARY OF OTHER RESPONSES TO THE *ORAL HEALTH
KNOWLEDGE, ATTITUDES, AND BEHAVIORS OF QATARI PEOPLE
QUESTIONNAIRE***

Appendix L

Item 10: Do you use a special technique when brushing your teeth?

d. Other:

The responses are:

- I use a technique taught to me at the primary school
- I use a technique from television
- I follow the dental program instructions as the television
- I use to try any technique shown on the television
- I try to use a correct technique (as I think), but it is not 100% correct

Item 12: What do you use to clean your teeth?

f. Other

The responses are:

- Any regular paper to remove food debris
- Toothpicks
- Lemon and miswak toothpaste
- Ortho-dental toothbrush
- Sodium bicarbonate
- Whitening paste
- Interdental brush and mouthwash
- Floss threader and interdental brush and hydrogen peroxide mouthwash
- Super floss
- Mouthwash

Item 14: When do you clean your teeth?

g. Other

The responses are:

- After noon nap and before Al-Aser prayer
- Before prayer
- After lunch
- Almost after meals
- Before ablution
- After dessert
- Before going to dental clinic
- After eating food
- It depends on my mood
- After eating food has smell
- At any time

Item 15: What mouthwash do you use?

e. Other

The responses are:

- Only water
- Ordalin
- Hydrogen with water
- Hot Water

Item 16: When you arrive late for a dental appointment, it is usually:

d. Other

The responses are:

- I attend 95% of my appointments unless something urgent happens
- I never am late
- Dental appointments scare me to death
- I never went to dentist
- I do not like to visit dental clinic
- I do not have any appointment
- I will be late if something emergency occur
- This question does not apply on me
- I never received dental instructions from either governmental or private clinic
- If I'm late, I will not go
- I may forget my dental appointment
- No dentist ever explain to me anything about toothbrushing technique
- I come late because I know that I will wait for a long time to see the dentist
- I never go to receive dental cleaning
- I arrive late if I overslept
- No answer

Item 17: What is your reaction when you are given oral health instructions by a dentist or dental hygienist at each visit?

d. Other

The responses are:

- No dentist ever explained toothbrushing or flossing techniques to me because of the number of patients they are seeing everyday
- I never observed in my life a dentist who taught toothbrushing or flossing techniques
- After I well practice the technique, I will ask him/her to stop repeating the technique
- I have to ask the dentist to explain the toothbrushing or flossing technique, otherwise he/she will never explain it to me
- I never visit a dentist
- No answer
- I will do it if I can
- I do not think that he/she will explain the same technique at each visit
- This never happened to me

- I think the circling toothbrushing technique has no advantage
- I will tell him/her that I already know the procedure, I practice it everyday and no need to waste time
- I will not go at all
- No need for that at each visit
- Never happens
- You are dreaming, no dentist teaches the toothbrushing technique at each visit
- I will tell him that there is no need to repeat it at each visit, but if he insist, I will follow his instructions

Item 42: What is your *primary* reason for coming to the dental clinic?

f. Other

The responses are:

- All the above reasons
- For orthodontic treatment
- If I notice any beginning of tooth decay such as black dots, or when I feel pain I run to dentist so my situation will not progress

APPENDIX M
PERSONAL INTERVIEW QUESTIONS

Appendix M

1. What do think the reason behind using charcoal and salt by some Qatari people?
 - a. It is good for whitening teeth
 - b. It is an old traditional method, no body still use it
 - c. I never heard about it or I do not know

2. Why do you or some Qatari people use miswak?
 - a. Because it is recommended by religion
 - b. Because it contains fluoride
 - c. Because it is good for killing mouth bacteria (next to the toothbrush and toothpaste)
 - d. Because it provides mouth with a pleasant taste and smell

3. How do you differentiate between the dentist and dental hygienist?
 - a. I do not know
 - b. Hygienist is a nick name of dentist
 - c. Hygienist only available in the Western countries

4. How many do you think dental hygiene appointments need for just professional dental cleaning?
 - a. Only one visit
 - b. Two visit will be enough
 - c. I do not care

5. How many visits do you think are needed to complete dental fillings?
 - a. It depends on the dentist skills and time schedule
 - b. It can be done at one visit
 - c. I do not know
 - d. It depends on the number of teeth with cavities
