ASSOCIATIONS BETWEEN ORAL HEALTH KNOWLEDGE, LOCUS OF CONTROL, AND CARIES RISK STATUS

by

Erik D. Anderson
Lieutenant Commander, Dental Corps
United States Navy

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Naval Postgraduate Dental School
Uniformed Services University of the Health Sciences
Bethesda, Maryland

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MASTER'S THESIS

This is to certify that the Master's thesis of

Erik D. Anderson

has been approved by the Examining Committee for the thesis requirement for the Master of Science degree in Oral Biology at the June 2019 graduation.

Research Committee:

[redacted]

Ling Ye, DDS, PhD
CDR, DC, USN
Research Committee Chair

[redacted]

Andrew Avillo, DDS, MS
CAPT, DC, USN
Program Director, Comprehensive Dentistry

[redacted]

Arthur George, DDS, MS
CAPT, DC, USN
Patient Assignment Officer, Comprehensive Dentistry

[redacted]

John Schmidt, PhD, MS
Chair, Department of Psychology

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Erik D. Anderson, DDS
Comprehensive Dentistry Graduate Program
Naval Postgraduate Dental School
05 Jun 2019

NAVAL POSTGRADUATE DENTAL SCHOOL
ERIK D. ANDERSON
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LIST OF ABBREVIATIONS

1. DMFT	Decayed, Missing, Filled Teeth (permanent teeth)
2. NHANES	National Health and Nutrition Examination Survey
3. IOM	Institute of Medicine
4. CDC	Center of Disease Control
5. ADA	American Dental Association
6. NIH	National Institute of Health
7. WHO	World Health Organization
8. AMA	American Medical Association
9. TOFHLA	Test of Functional Literacy in Adults
10. TOFHLA-s	Short version- Test of Functional Literacy in Adults
11. REALM	Rapid Estimate of Adult Literacy in Medicine
12. REALD-30	Rapid Estimate of Adult Literacy in Dentisty-30
13. CMOHK	Comprehensive Measure of Oral Health Knowledge
14. OHLi	Oral Health Literacy
15. TOFHLiD	Test of Functional Health Literacy in Adults Dentistry
16. SLT	Social Learning Theory
17. LOC	Locus of Control
18. HLC	Health Locus of Control
19. MHLC	Multidimensional Health Locus of Control
20. IHLC	Internal Health Locus of Control
21. PHLC	Powerful Others Health Locus of Control
22. CHLC	Chance Health Locus of Control

23. DHLC	Doctors Health Locus of Control
24. OHLC	Others Health Locus of Control
25. SOHKA	Survey or Oral Health Knowledge in Adults

CHAPTER 1: INTRODUCTION

Dental caries is the most common oral disease and a major cause of tooth loss (Frencken et al., 2017). It is a condition that afflicts all ages and races among the world's population. In a recent study completed by National Health and Nutrition Examination Survey (NHANES) in 2011-12, 91% the adult (Jones, Lee, & Rozier, 2007) population aged 20-64, had dental caries and 27% had untreated caries. In adults aged 65 and older, over 96% had caries (Dye et al., 2015). Dental caries is not exclusive to the civilian population, it also affects the military. In 2008, approximately 5,000 recruits were evaluated across all branches of the armed services. Data showed that 72% of all recruits needed fillings and 14% needed 7 or more fillings. On average, each recruit needed 3.4 dental restorations and fewer than 28% needed no dental work (Leiendecker, Martin, & Moss, 2011). Another study from 2012 performed at the Naval Academy showed that caries incidence increased significantly in all three caries risks groups (low, moderate, and high) while Midshipmen attended school. This included 25% who arrived at the Naval Academy disease free and developed caries by year four (Stratmeyer, et al., 2016).

Dental caries is an important oral health indicator for adults and a key measure for monitoring progress toward health promotion goals. Even with the alarmingly high numbers of adults with dental caries the rate of caries has been decreasing. In a study by Frencken and colleagues, they stated that over the last four decades, the prevalence and of carious lesions among 5- and 12-year-olds have declined (Frencken et al., 2017). One of the most influential advances in public health in regards to caries risk was the advent of fluoride added into public drinking water during the 1940s and 1950s. Follow up studies

after the introduction of fluoride in drinking water showed a significant decrease in the caries rate. One such example was observed in Grand Rapids, MI which showed a reduction of approximately 60% in the number of Decayed, Extracted, or Filled teeth (DMFT) over a 10 year period (Dean et al., 1950). In the 1990's there was a paradigm switch that led to a change from the surgical model to a disease prevention model regarding the treatment of caries (Anderson et al., 1993). Concurrently, other factors, such as health literacy, became important in understanding the determinants of oral health (Healthy People 2000).

Oral Health Literacy is defined as the degree to which people have the capacity to obtain, process, and understand basic oral and craniofacial health information and services needed to make appropriate oral health decisions (Firmino et al., 2017) Low levels of OHL have been associated with poor oral health knowledge, which may contribute to compromised self-care behavior. Thus, it would be realistic to conjecture that these patients are more likely to experience oral health problems such as dental caries when compared to patients with a high levels of OHL. Based on that information, knowledge could be important in improving health outcomes. Knowledge alone is insufficient to foster change in health outcomes. Behavior modification is also necessary to change and manage oral health.

Locus of Control provides practitioners with one potential determinant of behavior. Locus of Control is an expectancy-value theory where reinforcement or reward are necessary for an individual to learn and utilize specific skills (Wallston, 1992).

To date, no one has studied the associations among behavior, comprehensive oral health knowledge, and the disease specific Locus of control for oral health status. A better understanding of this relationship may result in a better understanding of the determinants of oral health which could ultimately result in better oral health outcomes. Therefore, the primary aim of this study to explore the associations among OHK and Locus of Control with oral caries status in active duty personnel.

CHAPTER II: REVIEW OF LITERATURE

Health Literacy

Health literacy is defined by Berkman as "the degree to which individuals have the capacity to obtain, process, and understand the basic health information and services needed to make appropriate health decisions." (Berkman et al., 2011). Over time and with new research, health literacy evolved into a multidimensional construct that included both system demands and complexities as well as the skills and abilities of individuals (Pleasant et al., 2016). More recent definitions focus on specific skills needed to navigate the health care system and the importance of clear communication between health care providers and their patients.

Both health care providers and patients play important roles in health literacy. The number of different definitions for health literacy demonstrate how the field has evolved. For example, Healthy People use this definition: "Health literacy is the degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions" (CDC, 2010). The Calgary Charter on Health Literacy defines it as "a use of a wide range of skills that improve the ability of people to act on information in order to live healthier lives. These skills include

reading, writing, listening, speaking, numeracy, and critical analysis, as well as communication and interaction skills (Coleman, et al., 2011). Poor health literacy relates to poorer performance of basic healthcare actions. An estimated 90 million Americans lack the functional literacy skills to use the U.S. health care system. (Institute of Medicine, 2004).

Low health literacy is a major source of economic inefficiency in the U.S. healthcare system. An initial approximation places the order of magnitude of the cost of low health literacy to the U.S. economy in the range of $106 billion to $238 billion annually (Vernon et al. 2007).

While the association between health literacy and health status has been studied extensively, it remains unclear if there a correlation between health literacy and oral health status. A 2018 study by Nafradi et al indicated that patients having adequate health literacy reported better health status compared to patients who had lower health literacy (Nafradi et al., 2018). However, it is not clear if the same association is true for oral health literacy and oral health status. According to National Institute of Dental and Craniofacial Research, low oral health literacy is hypothesized to be one of many barriers to optimal oral health care outcomes (NIDCR, 2005).

One of the challenges in health literacy research is the appropriate assessment in order to determine if an individual has the knowledge necessary to impact his or her own health care and outcomes. The instruments most commonly used in the health literature to measure health literacy are the Test of Functional Health Literacy in Adults (TOFHLA; Parker, et al., 1995) or short version (S-TOFHLA; Baker, et al. 1997); Wide Range Achievement Test (WRAT4; Wilkinson & Robertson, 2006); and Rapid Estimate of

Adult Literacy in Medicine (REALM; Davis, Long & Jackson, 1993). These tests measure health literacy by word recognition, reading comprehension and pronunciation. The most common measures of health literacy in dentistry are modeled after these same tests and include the Test of Functional Health Literacy in Dentistry (TOFHLiD; Gong, 2007), and two versions of the Rapid Estimate of Adult Literacy in Dentistry (REALD-30 and REALD-99; Lee, et al., 2007). However, there are no instruments to measure oral health literacy as a comprehensive set of skills that have been conceptualized as the components of health literacy (IOM, 2004) for oral health care.

Some studies have computed the prevalence of poor health literacy in the general population but the prevalence of low oral health literacy has yet to be extensively reported in the literature. Jones et al (2007) administered the Rapid Estimate of Adult Literacy in Dentistry-30 (REALD-30) to 101 patients in two private practices, and determined that 29% of the patients had low oral health literacy (Jones et al., 2007). Hom and colleagues (2012) administered the REALD-30 to 119 low-income patients who were pregnant for the first time and found that 23% of the participants' scores equated to low oral health literacy (Hom et al., 2012).

Most oral health literacy studies have measured individual intellectual capacities (e.g. reading fluency and vocabulary) and the influence of external/demographic factors (e.g. socioeconomic status, education, sex, and age), on literacy, rather than the modifiers of behavior (e.g. beliefs, self-efficacy, knowledge, motivation, and problem solving ability) that ultimately may strongly impact health status. One of the weakest relationships is between knowledge and oral health status (Citro, 2013), even though knowledge appears to play a large role in both general and oral health literacy models.

Several researchers have attributed knowledge as a key factor linked with improving patient's health outcomes (Baker et al., 1997; Macek, et. al 2010, Paasche-Orlow & Wolf, 2007)

Knowledge

Knowledge defined by the Merriam-Webster Dictionary is the "information, understanding, or skill that you get from experience or education." Within the framework of health or oral health, knowledge has been defined as "the confident understanding of a subject with the ability to use it for a specific purpose" (Sharda & Shetty, 2008). In a study by Savage, it was reported that individuals with poor oral health were not necessarily due to poor oral health knowledge. Study participants identified several sociocultural factors affecting their oral health, including lack of oral health prioritization among older generations, and risky health behaviors that competed with good oral health. These sociocultural factors create a context in which standard oral health recommendations are commonly seen as excessive (Savage et al., 2018). According to the National Institute of Dental and Craniofacial Research, among U.S. adults, 75% did not know the purpose of dental sealants and could not identify any signs of oral cancer, and nearly 33% did not know the purpose of water fluoridation (NIDCR, 2005).

In a study by Sabbahi et al. (2009) findings showed that oral health knowledge can be poor even in populations with high oral health literacy. In Sabbahi's study, 100 subjects were asked to match pictures of oral structures, oral disease, dental filings, a dental prosthesis, and oral hygiene aids with the correct word. 97% of patients had adequate functional health literacy as measured by TOFHLA, 89% had adequate oral health literacy as measured by the OHLI, but only 35% had adequate oral health

knowledge (Sabbahi et al., 2009). Despite these contradictory studies, the literature predominately reports positive correlations between oral health literacy and oral health knowledge. Jones et al. provided a survey to participants which contained the REALD-30, REALM, and a 23 question section measuring components of heath literacy. Dental knowledge was included within the questionnaire. Patients who answered one or more questions regarding dental caries or periodontal disease incorrectly were six times more likely to have low literacy than those who answered all questions correctly. The authors concluded that a significant number of patients may have a low level of oral health literacy, which possibly interferes with their ability to process and understand oral health information (Jones, et al., 2007).

Social Learning Theory and Locus of Control

Social Learning Theory (SLT) can be defined as "learning a behavior that is controlled by environmental influences rather than by innate or internal forces" (https://www.britannica.com/science/social-learning). This theory was extensively studied by Rotter and colleagues. In an article published in 1990, he discussed internal versus external control of reinforcement which is often referred to as locus of control. According to Rotter "Internal versus external control refers to the degree to which persons expect that a reinforcement or an outcome of their behavior is contingent on their own behavior or personal characteristics versus the degree to which persons expect that the reinforcement or outcome is a function of chance, luck, or fate, is under the control of powerful others, or is simply unpredictable" (Rotter 1990). Wallston also studied SLT and he described SLT as an 'expectancy-value theory,' meaning reinforcement

strengthens the expectancy that future reinforcement will occur if one holds value in the reinforcement or reward (Wallston 1992). For example, if a patient improves their oral hygiene and has zero cavities at their dental check-up, they will continue with the oral hygiene practices if they value not having cavities.

Form C of the Mulitdimensional Health Locus of Control (MHLC) was developed as a measure of condition-specific locus of control beliefs that could be readily adapted in a standardized manner for the study of virtually any pre-existing medical or health-related condition (Wallston 1994). Form C of the MHLC is broken down into four subscales: Internality; Chance; Doctors; and Other (powerful) People. The subscales are described by the following: Internality- which is the extent to which a person believes their health is a function of their own behavior; Powerful-the belief that one's own health status is due to the actions of "powerful" people (such as one's doctors, family members, or friends); and Chance-the belief that chance, fate or luck influences one's health. (Wallston 1994).

A study on 1200 adult participants in Turkey was designed to determine oral health control beliefs using the Multidimensional Oral Health Locus of Control (MOHLCS). Factor analysis results showed a new four-factor solution, namely Internal, Dentist, Chance, and Socialization agents. Multivariate analysis showed that female gender, younger age, higher socioeconomic status, more frequent daily tooth brushing, and regular dental check-ups were associated with higher Internal beliefs, while older age, lower educational level, lower socioeconomic status, low tooth brushing frequency, and symptom-orientated dental attendance were associated with higher Chance beliefs. Being unmarried and low tooth brushing frequency were associated with lower Dentist beliefs. Males and older subjects had lower socialization agents beliefs. Internal, Dentist

and Chance beliefs were significantly associated with self-rated oral health (Peker & Bermek, 2011).

CHAPTER III: MATERIALS AND METHODS

Methodology

This study surveyed current active duty personnel to assess the level of their knowledge of oral health utilizing a recently developed SOHKA, and correlate that knowledge with (1) their recent history of dental caries, (2) their oral health-related behaviors and (3) their current risk of dental caries. Individual risk status for dental caries was collected in accordance with US Navy Bureau of Medicine and Surgery Instruction 6600.16a (Oral Disease and Risk Management Protocols in the Navy Medical Healthcare System, Appendix A).

Additionally, active duty personnel were assessed on perceptions of health locus of control. Health locus of control was correlated with (1) their level of knowledge, (2) their oral health-related behaviors, (3) their recent history of dental caries, and (4) their current risk of dental caries.

The study consists of Phase I (pilot testing of the SOHKA to determine reliability and validity) and Phase II (validation of the SOHKA). Participants are active duty personnel. 312 volunteers were recruited during Phase I. Subjects were recruited when they presented for annual dental examinations or treatment at the Primary Care Dental Clinic (PCDC), WRNMMC. Participants took the survey containing 15 demographic and self-reported behavior questions (Appendix B), the 28-item SOHKA questionnaire (Appendix C), and the 18-item MHLC questionnaire specific for oral health (Appendix D). The dental records of 191 of the participants were then reviewed to determine if the

study variables predicted current oral health status, using the caries risk management protocol.

Study Design

During Phase I of this study, 312 participants were recruited to complete the study plan as described in the previous paragraph. Of the 312 subjects, 191 subject's records were reviewed and data was collected for disease status/risk. All other participants were only administered the survey to collect SOHKA and MHLC data. In Phase I participants had the option to provide informed consent to complete the survey and have their dental record assessed for oral health risks or they could elect to simply complete the survey and not have their dental record assessed (no subjects chose the latter).

During Phase II of the study, additional participants will be recruited to test the validity and reliability of SOHKA. To complete the study plan as described, an additional 244 surveys will be collected for a total of 556 total subjects to get the desired data. In Phase II participants will have the option to provide informed consent to complete the survey and have their dental record assessed for oral health risks or they could elect to simply complete the survey and not have their dental record assessed.

Study Population, Inclusion and Exclusion Criteria

Participants will be male and female active duty patients of the WRNMMC PCDC. All active duty personnel whose dental records are held at this facility will be eligible to participate in this study.

a. Inclusion Criteria

1) All male and female military active duty personnel whose dental records are held at WRNMMC PCDC were eligible to participate in this study.

2) Participants dental records must contain documentation of at least three annual dental examinations.

b. Exclusion Criteria

1) Subjects whose dental records are not held at WRNMMC Primary Care Dentistry.

2) Subjects whose dental records do not contain documentation of at least three annual dental examinations.

Sample Size Estimation

Phase I (pilot test, the present study): A sample of up to 312 subjects will be required to complete the SOHKA to allow for testing the internal consistency. Based on a 10:1 ratio of subjects: the number of questions for factor analysis, and a total of 28 questions in the SOHKA, 280 completed questionnaires will be required. To allow for a 10% dropout rate, up to 312 subjects will be surveyed. Complete data (i.e. health status from the dental record) will be collected for 100 subjects who complete the survey in the clinic in order to accrue at least 25 subjects who are at high dental caries risk (see chart below for assumptions)

Phase II (SOHKA validation, to be completed at a future date): To estimate the minimum number of subjects needed to detect an association between survey results and caries risk (rated as low, moderate, or high), the following distribution of subjects in risk categories is assumed based on past clinic experience.

High Risk Moderate Risk Low Risk

	High Risk	**Moderate Risk**	**Low Risk**
Dental Caries	25%	45%	30%

A sample size of 85 subjects would have 80% power to detect a correlation coefficient of at least r = 0.30 between the SOHKA and caries risk status, however with a sample of 194 subjects statistical power rises to 90%. The outcome category with the fewest number of potential subjects is the caries high risk category. The expectation is that at least 25% of the sample will fall into this category allowing exploration of multiple factors that may be associated with high risk status. This number will be robust enough to use a logistic regression analysis to test for predictors of high risk of periodontal disease. A properly developed model needs 10-20 subjects per predictive variable. A sample of 500 subjects would therefore provide 125 high risk subjects, allowing the assessment of up to 10-12 independent variables in a multivariate model for caries risk.

To allow for dropouts or incomplete medical records (e.g. ~10% loss rate), up to 556 subjects will be recruited for Phase II of this protocol (SOHKA validation, next phase of study to be completed at a future date). Based on current clinic caseload, there will be between 40-50 eligible subjects per clinic day, and therefore accruing up to 868 subjects (312 in Phase I + 556 in Phase II = 868 total subjects) is feasible.

Data Analysis Plan

1. For each phase (Phase I and Phase II) of the study, demographic and clinical characteristics of the sample of subjects in each Phase will be presented using means with standard deviations, medians with ranges or counts with proportions.

2. Phase I:

a. Data for the MHLC-Form C and SOHKA surveys were examined utilizing a T test and Wilcoxon Rank Sum Test. The mean and standard deviations were presented. Subscales for the SOHKA were explored (i.e. behavioral subscales and knowledge subscales) as well as total score. We explored possible subscales for the SOHKA (i.e. behavioral subscale and knowledge subscales) as well as a total score.

b. The MHLC-Form C survey results were scored for each subject on a scale from 6-36 for each of the three subscales for this survey: the IHLC, the CHLC and the PHLC. The PHLC is further categorized into two subscales scored from 3-18. These subscales for the PHLC are the OHLC and the DHLC. (see Appendix F for scoring methodology). Scores were summarized using means with standard deviations or medians with interquartile ranges.

c. Association of the MHLC-Form C subscales and SOHKA subscales were explored using Pearson's Chi-square test and Fischer's exact test. Association of the MHLC-Form C subscales and SOHKA subscales with caries risk status were explored using analysis of variance. Initial hypotheses will be generated from this pilot phase.

3. Phase II:

a. The MHLC-Form C and SOHKA surveys will be scored (subscales or a total score for the SOHKA will be determined from Phase I). We will generate descriptive statistics (mean, median, range) for each score by demographic characteristics (age groups, gender, race, education), tobacco use, caries risk

status, and periodontal disease risk status.

b. For each most recent caries risk category (Low, Moderate, High), we will calculate the following:

- Median (interquartile range (IQR) number of new caries lesions at each annual examination;

- Median (IQR) three-year caries incidence;

- Mean (± SD) MHLC-Form C subscale scores and SOHKA survey scores (total, behavioral subscales and knowledge subscales). Scores in the three risk groups will be compared using analysis of variance.

Further, we will estimate associations between the MHLC-Form C and SOHKA survey scores and Gender, Age, Race, Education, and Behavior (brushing, flossing, tobacco use, and snack consumption) based on the two sample t-test and Pearson's or Spearman's correlation coefficient.

Data analysis is primarily exploratory given the low incidence of high risk caries. Multivariate analysis of significant demographic indicators for survey scores will be explored using linear regression. We will calculate Pearson's correlation coefficient to measure the level of agreement between MHLC-Form C and SOHKA survey scores. To explore the association of demographic and clinical variables, oral health knowledge survey results and locus of control survey results with oral health status (caries), ordinal logistic regression analysis will be used with a model using caries risk as the dependent

variable. All statistical significance levels will be set at $\alpha = 0.05$. All data analyses will be completed using Statistical Package for the Social Sciences (SPSS) Version 24 software (IBM, Inc., Chicago, IL).

CHAPTER IV: RESULTS

Study participants completed 312 surveys and 191 dental records were reviewed. The population consisted of 210 males and 102 females. The largest constituency of surveys came from the enlisted ranks of E4-E6 (n=123, 39%) and officer ranks O1-O3 (n=87, 28%). The grouping of ages 25-39 made up 65% (n=204) of the collected surveys. In general there was no differences in knowledge between the high and low caries risk patients as measured by the SOHKA. The mean score for the low caries risk group (n=125) was 19.5 questions answered correctly with an average of 8.5 incorrect answers, whereas the moderate/high caries risk group (n=66) had a mean 19.5 correct answers and 8.2 average incorrect answers. (Asymptomatic Wilcoxon Rank Sum Test: 3910.5, p=0.804) (see Figure 1). To compare caries risk status group on the Locus of Control subscales, a t-test was run. There were no significant difference between groups on any of the LOC subscales. When comparing LOC subscales between high and low caries risk the p values were the following: Internal (p=0.726), Powerful (p=0.430), Doctors (p=0.895), Other People (p=0.691), and Chance (p=0.918) (see Figure 2).

Figures

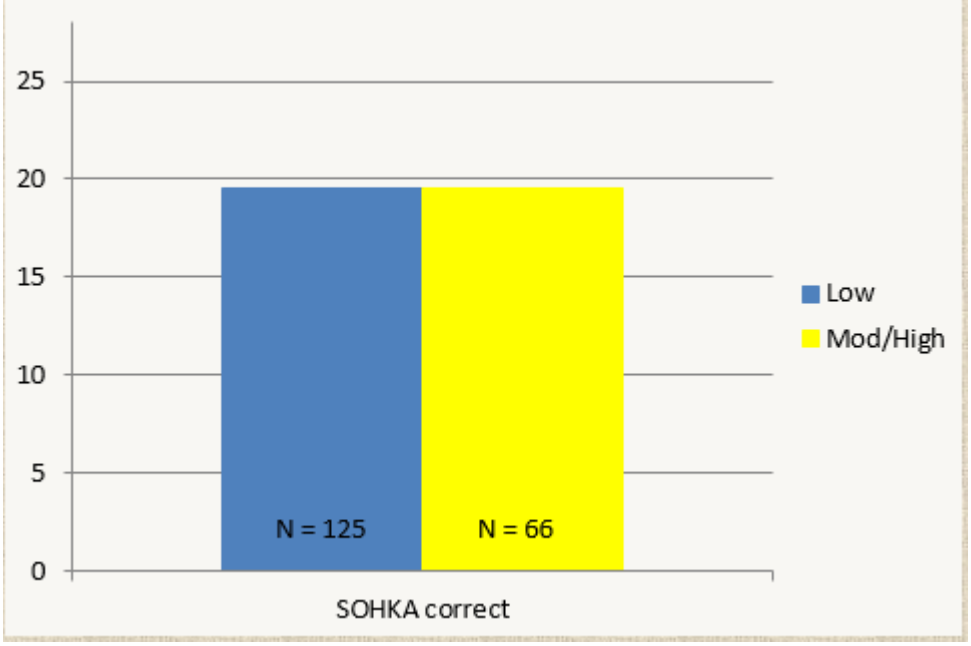

Figure 1 - Correct Responses on SOHKA by Caries Risk Status

LOC Scale	Low	Mod/High	P
Internal	28.9 (5.3)	29.1 (5.5)	0.726
Powerful	23.5 (3.6)	23.3 (3.4)	0.430
Doctors	16.0 (2.1)	15.9 (2.3)	0.895
Other People	7.5 (2.9)	7.4 (3.1)	0.691
Chance	10.3 (4.3)	11.0 (5.7)	0.918

Figure 2 - Locus of Control Scores by Caries Risk Status

CHAPTER V: DISCUSSION

91% of adults in the general population aged 20-64 either have or have experienced caries in their life. The caries disease process is just as prevalent in the military community as well. The purpose of this study was to explore the associations among OHK and Locus of Control with oral caries status in active duty personnel. Phase I of this study found that caries risk status was not associated with oral health knowledge as measured by the SOHKA. Only 1 question of 28 showed a statistically significant difference between caries risk groups. This result suggests that the SOHKA question items need further modification and refining to improve the validity of the overall measure. There were 6 questions out of the 28 included in the SOHKA that over 90% of the population in both risk categories answered correctly. Based on this data, a factor analysis should be run to determine which questions should be modified, revised, or discontinued in the SOHKA.

There were no significant difference between groups on any of the LOC subscales. Locus of Control was also not associated with caries risk status. This indicates that leaving your oral health up to yourself, your dentist, or chance has no bearing on your overall caries risk. This may show that Locus of Control, as a health behavior model, is not an appropriate model for research regarding oral health care and behavior and suggests that dental professionals need to do a better job educating patients on the importance of daily oral health care.

The first phase of this study's results did not show statistically significant data which suggests that the survey will require some modification. If the survey can be

shown to be reliable, a second phase will be initiated. The goal of Phase 2 will be to assess the validity and reliability of the SOHKA.

Study Limitations: Given the fixed order of the surveys, it is possible that the last survey may have less complete responses. Also, generalizability of this research is limited based on the specific characteristics of the study population**.**

CHAPTER VI: CONCLUSION

Research shows that caries prevalence is decreasing but unfortunately it far from being eradicated. The overall goal of this line of research is to develop a clinically useful assessment tool that can be used to identify those active duty members at risk for developing oral health disease. Contrary to our expectations, caries risk status was not associated with oral health knowledge as measured by the SOHKA. Locus of Control was also not associated with caries risk status. Due to the lack of statistically significant data, modifications need to be made to the SOHKA. Future goals of this research is to assess the validity and reliability of the SOHKA.

APPENDIX A: BUMED INSTRUCTION 6600.16A-Caries/Periodontal Risk

DENTAL CARIES RISK MANAGEMENT PROTOCOL

1. A Caries Risk Assessment will be performed on all active duty dental patients during the annual and periodic oral examination and recorded on the NAVMED 6600/13 Oral Exam. Patients will be classified as low, moderate, or high risk for future caries experience per the following Tri-Service criteria:

a. Low Caries Risk patients exhibit the following (must satisfy all criteria below):

(1) No new incipient or cavitated primary or secondary carious lesions during current exam.

(2) No factors that may increase caries risk. Factors increasing risk of developing caries may include, but are not limited to:

(a) Poor oral hygiene.

(b) Cariogenic diet.

(c) Presence of exposed root surfaces.

(d) Enamel defects or genetic abnormality of teeth.

(e) Many multisurface restorations.

(f) Restoration overhangs or open margins

(g) Active orthodontic treatment.

(h) High titers of Cariogenic bacteria.

(i) Chemotherapy or radiation therapy.

(j) Eating disorders.

(k) Physical or mental disability with inability or

unavailability of performing proper oral health care.

(l) Suboptimal fluoride exposure.

b. Moderate Caries Risk patients exhibit the following (demonstration of any single criterion necessitates an assessment of Moderate Caries Risk):

(1) One or two new incipient or cavitated primary or secondary carious lesions during current exam.

(2) No incipient or cavitated primary or secondary carious lesions during current exam but presence of at least one factor that may increase caries risk as outlined in paragraphs 1a(2)(athrough 1a(2)(l) above.

c. High Caries Risk patients exhibit the following (demonstration of any single criterion necessitates an assessment of High Caries Risk):

(1) Three or more new incipient or cavitated primary or secondary carious lesions during current exam.

(2) Presence of multiple factors that may increase caries risk as outlined in paragraphs 1a(2)(a) through 1a(2)(l) above.

(3) Xerostomia (medication-, radiation- or disease-induced).

2. Determination of caries risk classification will prompt treatment protocols specific to the risk category. Required educational and treatment protocols for each caries risk category are summarized in the following table on the next page, and must be uniformly implemented throughout Navy Dentistry

CARIES RISK MANAGEMENT PROTOCOL FOR NAVY DENTISTRY

Low Caries Risk	Moderate Caries Risk	High Caries Risk
1. Oral hygiene Instruction. 2. Fluoride Dentifrice.	1. Oral hygiene instruction and oral disease education using this instruction, enclosure (7) as an outline. 2. Fluoride dentifrice. 3. Caries elimination a. Sealants for pits and fissures judged at risk. b. Incipient caries remineralization. 4. Identification of patient specific dietary modification (nutritional counseling). 5. Professional topical fluoride treatment (at 6 month interval); may be accomplished concurrently with restorative treatment). 6. Home fluoride rinses (OTC) or home fluoride treatments using prescription dentifrices, gels or pre-fabricated trays. 7. Discuss benefits of Xylitol chewing gum and provide a sample if available.	1. Oral hygiene instruction and oral disease education using this instruction, enclosure (7) as an outline. 2. Fluoride dentifrice. 3. Caries elimination a. Sealants for pits and fissures judged at risk. b. Incipient caries remineralization. 4. Identification of patient specific dietary modification (nutritional counseling). 5. Professional topical fluoride treatment (four applications over 6-12 months; may be accomplished concurrently with restorative treatment). 6. Home fluoride rinses (OTC) or home fluoride treatments using prescription dentifrices/gels or pre-fabricated trays. 7. Discuss benefits of Xylitol chewing gum and provide a sample if available. 8. Antibacterial mouth rinses. 9. Bacterial testing (if available). 10. Evaluation of salivary flow.
One Year Recall	6-12 Month Recall	3-Month Recall

APPENDIX B: DEMOGRAPHIC AND BEHAVIOR QUESTIONS

1) Currently Active Duty?
    a. Yes
    b. No

2) Continuously Active Duty for the past 36 months or longer?
    a. Yes
    b. No

3) Branch of service:
    a. Army
    b. Navy
    c. Air Force
    d. Marines
    e. Coast Guard
    f. Public Health Service
    g. National Guard
    h. N/A

4) Rank (or final rank if retired)
    a. E1-E3
    b. E4-E6
    c. E7-E10
    d. O1-O3
    e. O4-O6
    f. O7-O10
    g. Non military

5) Age:
    a. 16-18
    b. 19-24
    c. 25-39
    d. 40-49
    e. 50-64
    f. 65 and older

6) Educational level:
    a. Less than high school
    b. Some high school
    c. High school graduate
    d. GED or high school equivalency
    e. Some college, less than 2 years
    f. Associates degree
    g. Some college, 2 or more years, no degree
    h. Bachelors degree

i. Some postgraduate training, no degree
j. Postgraduate degree

7) Gender:
a. Male
b. Female

8) What is your race/ethnicity? Please choose one or more
a. White
b. Black or African-American
c. Hispanic or Latino
d. Asian
e. Native Hawaiian or other Pacific Islander
f. American Indian or Alaska Native
g. Other

9) Reason for today's visit:
a. Annual exam
b. Hygiene appointment
c. Dental filling or other dental procedure appointment
d. Walk-in or sick call

10) How often do you brush your teeth?
a. Less than 1 time per week
b. 1-2 times per week
c. Most days but not everyday
d. At least 1 time every day
e. More than 1 time every day

11) How often do you floss your teeth?
a. Less than 1 time per week
b. 1-2 times per week
c. Most days but not everyday
d. At least 1 time every day
e. More than 1 time every day

12) Do you use tobacco products?
a. Yes. I smoke cigarettes or cigars or a pipe
b. Yes. I use smokeless tobacco
c. No. I quit using tobacco products more than 3 months ago
d. No. I quit using tobacco products less than 3 months ago
e. No. I have never been a regular user or tobacco products

13) How often do you drink regular soda or eat sugary snacks between meals?
a. Less than 1 time per week
b. 1-2 times per week

c. Most days but not everyday
d. At least 1 time every day
e. More than 1 time every day

14) Is your dental knowledge today greater than it was 3 years ago?
a. Yes
b. No
c. I don't know

15) Is your oral hygiene better that it was 3 years ago?
a. Yes
b. No
c. I don't know

APPENDIX C: SOHKA QUESTIONNAIRE

SURVEY OF ORAL HEALTH KNOWLEDGE IN ADULTS

The following survey is designed to help us understand what people know about their dental health.

All of the questions are true and false or multiple-choice. Please answer all questions and it is appropriate to answer with the choice "I don't know".

16) Bacteria that cause dental cavities can be spread from mother to child through contact with the mother's saliva by sharing food or kissing.

a. True
b. False
c. I don't know

17) Stimulating saliva flow protects your teeth.

a. True
b. False
c. I don't know

18) Snacks that are low in carbohydrates are less likely to cause dental cavities.

a. True
b. False
c. I don't know

19) Snacks like carrots and apples are as likely to cause dental cavities as snacks such as cake and cookies.

a. True
b. False
c. I don't know

20) Dry mouth, a side effect of many medications and chronic diseases, is a factor in

a. Developing dental cavities.
b. True
c. False
d. I don't know

21) Carbonated beverages that do not contain sugar (like Diet Coke) have no effect on teeth.

a. True
b. False
c. I don't know

22) Which of the following does not cause dental cavities?

a. table sugar
b. fruit juice
c. milk
d. artificial sweetener
e. corn syrup
f. I don't know

23) Dental cavities usually grow beneath the surface of the teeth before becoming a hole on the surface.

a. True
b. False
c. I don't know

24) Dental caries refers to

a. The decay (carious) process
b. The lesion that results from the decay process
c. both a and b
d. neither a and b
e. I don't know

25) Which of the following practices most increases your risk of getting dental cavities?

a. Sipping from a sugary soft drink all afternoon
b. Drinking a sugary soft drink at a meal
c. Both practices are equally risky
d. I don't know

26) Drinking tap water containing _____ may protect your teeth from getting dental cavities.

a. Fluoride
b. Iron
c. Vitamin C

27) Dental sealants prevent:

a. food particles from getting in between the teeth
b. teeth from getting stained
c. gum disease
d. dental cavities
e. I don't know

28) The ideal time to get dental sealants is:

a. When baby teeth first appear in the mouth
b. When enamel on permanent teeth is fully visible above the gum line
c. When enamel on permanent teeth has been visible above the gum line for 3-5 year
d. I don't know

29) Tooth brushing reduces dental cavities by breaking up plaque above the gum line.

a. True
b. False
c. I don't know

30) Tooth brushing with more force is a good practice because it leaves the teeth cleaner.

a. True
b. False
c. I don't know

31) Flossing controls gum disease by breaking up plaque below the gum line.

a. True
b. False
c. I don't know

32) If flossing makes your gums bleed, you should not floss.

a. True
b. False
c. I don’t know

33) The same kind of plaque that causes dental cavities causes gum disease.

a. True
b. False
c. I don't know

34) Smoking tobacco affects oral cancer but not gum disease.

a. True
b. False
c. I don't know

35) Smokeless tobacco has no effect on gum disease or dental cavities.

a. True
b. False
c. I don't know

36) Gum disease may make it more difficult for a diabetic patient to control their blood sugar.

a. True
b. False
c. I don't know

37) Gum disease may be more severe in people with poor nutrition.

a. True
b. False
c. I don't know

38) Some orally transmitted viruses may cause oral cancer.

a. True
b. False
c. I don't know

39) Stress may contribute to dental disease and mouth sores.

a. True
b. False
c. I don't know

40) Expert tooth brushing is enough to prevent dental cavities and gum disease.

a. True
b. False
c. I don't know

41) Skin replaces itself every 30 days. Soft tissue covering the inside the mouth replaces itself in 15 days.

a. Both statements are true
b. The first statement is true, the second statement is false
c. The first statement is false, the second statement is true
d. Both statements are false
e. I don't know

42) Sinus congestion can cause toothaches.

a. True
b. False
c. I don't know

43) Jaw muscle pain can cause toothaches.

a. True
b. False
c. I don't know

APPENDIX D: MHLC FORM C-ORAL HEALH QUESTIONNAIRE

MHLC FORM C-ORAL HEALH QUESTIONNAIRE

Instructions: Each item below is a belief statement about your health condition with which you may agree or disagree. Beside each statement is a scale which ranges from strongly disagree (1) to strongly agree (6). For each item we would like you to select the number that represents the extent to which you agree or disagree with that statement. The more you agree with a statement, the higher will be the number you select. The more you disagree with a statement, the lower will be the number you select. Please make sure that you answer **EVERY ITEM** and that you select **ONLY ONE** number per item. This is a measure of your personal beliefs; there are no right or wrong answers.

Strongly Disagree	Disagree	Slightly Disagree	Slightly Agree	Agree	Strongly Agree
1	2	3	4	5	6

Item #	Question	Score
44	If my oral health worsens, it is my own behavior, which determines how soon I will get better again.	
45	As to my condition, what will be, will be.	
46	If I see my dental professional regularly, I am less likely to have problems with my oral health	
47	Most things that affect my oral health happen to me by chance.	
48	Whenever my oral health worsens, I should consult a dentally trained professional.	
49	I am directly responsible for my oral health getting better or worse.	
50	Other people play a big role in whether my oral health improves, stays the same, or gets worse.	

Item #	Question	Score
51	Whatever goes wrong with my oral health is my own fault.	
52	Luck plays a big part in determining how my oral health improves.	
53	In order for my oral health to improve, it is up to other people to see that the right things happen.	
54	Whatever improvement occurs with my oral health is largely a matter of good fortune.	
55	The main thing, which affects my oral health, is what I myself do.	
56	I deserve the credit when my oral health improves and the blame when it gets worse.	
57	Following dentist's orders to the letter is the best way to keep my oral health from getting any worse.	
58	If my oral health worsens, it's a matter of fate.	
59	If I am lucky, my oral health will get better.	
60	If my oral health takes a turn for the worse, it is because I have not been taking proper care of myself.	
61	The type of help I receive from other people determines how soon my oral health improves.	

APPENDIX E: MHLC FORM C-ORAL HEALH QUESTIONNAIRE SCORING

SUBSCALE	POSSIBLE RANGE	ITEMS
Internal	6 - 36	44,49,51, 55,56,60
Chance	6 - 36	45,47,52, 54, 58, 59
Powerful Others	6 - 36	46,48,50, 53,57,61
Doctors	3 - 18	46,48,57
Other People	3 - 18	50,53,61

The score on each subscale is the sum of the values circled for each item on the subscale (i.e., where 1 = "strongly disagree" and 6 = "strongly agree"). No items need to be reversed before summing. All of the subscales are independent of one another.

APPENDIX F: DATA COLLECTION SHEET

Subject	1	2	3	4	5	6	7	8	…	500
Q1 *D										
Q2 *D										
Q3 *D										
Q4 *D										
Q5 *D										
Q6 *D										
Q7 *D										
Q8 *D										
Q9 *D										
Q10 *B										
Q11 *B										
Q12 *B										
Q13 *B										
Q14										
Q15										
New restorations needed year 1 caries										
New restorations needed year 2 caries										
New restorations needed year 3 caries										
Caries Risk Recent Exam										
Periodontal Risk Recent Exam										
Q16: 0 or 1										
Q17										
Q18										
Q19										
Q20										
Q21										
Q22										

Q23										
Q24										
Q25										
Q26										
Q27										
Q28										
Q29										
Q30										
Q31										
Q32										
Q33										
Q34										
Q35										
Q36										
Q37										
Q38										
Q39										
Q40										
Q41										
Q42										
Q43: 0 or1										
Q44: 1-6										
Q45										
Q46 *Doc										
Q47										
Q48 *Doc										
Q49										
Q50 *Other										
Q51										
Q52										
Q53 *Other										
Q54										
Q55										
Q56										
Q57 *Doc										
Q58										
Q59										
Q60										
Q61 *Other										
Knowledge Score: Sum Q16-43										
Total IHLC 6-36: Sum-										

Q:44,49,51, 55,56,60										
Total CHLC 6-36: Sum-Q:45,47,52, 54, 58, 59										
Total PHLC 6-36: Sum-Q:46,48,50, 53,57,61										
Total DHLC 3-18 Sum-Q:46,48,57										
Total OHLC 3-18 Sim-Q:50,53,61										

APPENDIX G: INFORMED CONSENT

WALTER REED NATIONAL MILITARY MEDICAL CENTER (WRNMMC)
BETHESDA, MARYLAND

This consent form is valid only if it contains the IRB stamped date

Consent for Voluntary Participation in a Research Study Entitled:
Correlations between Oral Health Knowledge, Locus of Control, and Oral Health Status

Principal Investigator: *CAPT Andrew J. Avillo, DC, USN*
Comprehensive Dentistry Resident
andrew.j.avillo2.mil@mail.mil

Study site: X WRNMMC, __ FBCH, __USUHS, ___WRAIR, ___NMRC, ___JPC, ___OTHER

1. INTRODUCTION OF THE STUDY
You are being asked to be in this research study because you are active duty military and have had at least 3 annual dental exams in the military.

Taking part in this study is voluntary. You may choose either to take part or not to take part in the study. If you decide to take part in this study, you may leave the study at any time. No matter what decision you make, there will be no penalty to you and you will not lose any of your benefits to which you are otherwise entitled. Leaving the study will not affect your medical care. Please read the information below, and ask questions about anything you do not understand, before deciding whether to take part in the study.

If significant new findings develop during the course of this study that may relate to your decision to continue participation, you will be informed.

2. PURPOSE OF THE STUDY:
The purpose of this study is to explore any associations of oral health knowledge and oral health beliefs with oral health status. In other words, this research will help us learn more about what our patients know about oral health and if our patients think that self-care or professional care is more important for keeping our mouths healthy. To be in this study you must be active duty and have had at least 3 annual dental exams in the military.

Other studies have shown that knowledge and locus of control (how much control over your health you have or think you have) are associated with behavior and potentially oral health status. No studies to date have looked at these factors utilizing an oral health disease specific questionnaire for locus of control.

3. PROCEDURES TO BE FOLLOWED:

If you decide to participate, please answer all 61 questions on the Survey of Oral Health Knowledge in Adults, the Locus of Control survey plus some questions on gender, age, education, rank, time in the military, etc. It takes about 20 minutes to answer all 61 questions. Your answers will be only identified by an individual study ID number.

Please do not ask other people for answers, or look up answers on your portable devices or share the questions with friends and colleagues. For this survey to benefit everyone, we need to know the baseline knowledge people have about these questions and not have anybody complete the survey twice.

After the survey, we will look in your dental record for information about your past dental cavity and gum disease experience. That is why at the end of the consent we ask you for your name and last 4 digits of your social security number. This information will be matched with your study ID number on a master list, and then it will be removed from your consent document that the investigators keep. After the cavity and gum disease information is collected, your name and last 4 digits of your social security number will be saved on the master list until all participant data has been collected. Then the master list will be destroyed.

You can elect to only complete the survey and not have your dental decay and gum disease risks assessed in your dental record. Your participation in the research will be finished following completion of the online survey.

4. ALTERNATIVES TO PARTICIPATION:
Choosing not to participate in this study (completing the questionnaire) is your alternative to participating for the study.

5. AMOUNT OF TIME FOR YOU TO COMPLETE THE STUDY
You will be finished with this study following completion of the survey.
After you consent, completing the survey takes about 20 minutes.

6. NUMBER OF PEOPLE THAT WILL TAKE PART IN THIS STUDY

A total of 868 patients will be enrolled in this study. It is only being conducted here at Bethesda.

7. POSSIBLE RISKS AND DISCOMFORTS FROM BEING IN THIS STUDY

There is no known health risk associated with completing the survey. There is a possible privacy risk is if master list that links your name and last 4 digits of your social security number were compromised. To prevent this from happening, the list containing this information will be protected by being kept in locked cabinets and on a password protected file on a CAC-enabled computer in the PI's office.

8. POSSIBLE BENEFITS FROM BEING IN THIS STUDY:

You may benefit from taking part in this study because your participation may increase your health knowledge. And your answers may help design future dental education programs that could improve dental health, reduce need for treatment, and save money. The information we collect may help us learn about further interventions to prevent and manage patients with dental disease. However, no benefit can be guaranteed.

9. CONFIDENTIALITY/PRIVACY OF YOUR IDENTITY AND YOUR RESEARCH RECORDS

The principal investigator will keep your research records. These records may be looked at by staff from the Walter Reed (WRNMMC) Department of Research Programs, the Walter Reed (WRNMMC) Institutional Review Board (IRB), the DoD Higher Level Review, and other government agencies.

These duties include making sure that the research participants are protected. Confidentiality of your records will be protected to the extent possible under existing regulations and laws but cannot be guaranteed. Complete confidentiality cannot be promised, particularly for military personnel, because information bearing on your health may be required to be reported to appropriate medical or command authorities. Your research records may be disclosed outside of WRNMMC, but in this case, you will be identified only by a unique code number. Information about the code will be kept in a secure location and access limited to authorized research study personnel.

By signing this consent document, you give your permission for information gained from your participation in this study to be published in medical literature, discussed for educational purposes, and used generally to further medical science. You will not be personally identified; all information will be presented as anonymous data. So, your name will not appear in any published paper or presentation related to this study.

This research study meets the confidentiality requirements of the Health Insurance Portability and Accountability Act (HIPAA).

10. CONDITIONS UNDER WHICH YOUR PARTICIPATION IN THIS STUDY MAY BE STOPPED WITHOUT YOUR CONSENT

Your taking part in this study may be stopped without your consent if remaining in the study might be dangerous or harmful to you. Your taking part in this study may also be stopped without your consent if the military mission requires it, or if you lose your right to receive dental care at a military hospital.

11. ELIGIBILITY AND PAYMENT FOR BEING IN THIS STUDY

You will not receive any payment for being in this study.

12. COMPENSATION IF INJURED AND LIMITS TO MEDICAL CARE

You will not receive any compensation (payment) if you are injured as a direct result of being in this study. You should understand that this is not a waiver or release of your legal rights. You should discuss this issue thoroughly with the study investigator before you enroll in this study.

Should you be injured as a result of your participation in this study, you will be given medical care for that injury at no cost to you.

Medical care is limited to the care normally allowed for Department of Defense health care beneficiaries (patients eligible for care at military hospitals and clinics). Necessary medical care does not include in home care or nursing home care. If you need to be hospitalized, you may have to pay the normal fees for subsistence (hospital meals), as per standard regulations.

If at any time you believe you have suffered an injury or illness as a result of participating in this research study, you should contact the Human Protections Administrator, Department of Research Programs, at Walter Reed National Military Medical Center at 301-295-8273.

13. COSTS THAT MAY RESULT FROM TAKING PART IN THIS STUDY

There is no charge to you for taking part in this study.

14. IF YOU DECIDE TO STOP TAKING PART IN THIS STUDY AND THE INSTRUCTIONS FOR STOPPING EARLY

You have the right to withdraw from this study at any time. If you decide to stop taking part in this study, you should tell the study investigator as soon as possible. By leaving this study at any time, you in no way risk losing your right to medical care and there will be no penalty to you and you will not lose any of your benefits to which you are otherwise entitled.

Should you choose to withdraw, you must tell the investigators that you do not want to complete the survey.

15. AUTHORIZATION FOR RESEARCH USE OF PROTECTED HEALTH INFORMATION

The Federal Health Insurance Portability and Accountability Act (HIPAA) includes a Privacy Rule that gives special safeguards to Protected Health Information (PHI) that is identifiable, in other words, can be directly linked to you. We are required to advise you how your PHI will be used. This authorization is effective until the end of the research study.

(1) What information will be collected?

For this research study, we will be collecting your name and the last 4 digits for your social security number so the investigators can match your dental decay and gum disease information from your dental record and the answers you provide on the survey.

(2) Who may use your PHI within the Military Healthcare System?

The members of the research team will have access to your health information in order to find out if you qualify to participate in this study, to administer research procedures, to monitor your progress, and/or to analyze the research data. Additionally, your PHI may be made available to groups such as the WRNMMC Department of Research programs and the WRNMMC Institutional Review Board.

(3) What persons outside of the Military Healthcare System who are under the HIPAA requirements will receive your PHI?

No data is expected to be shared.

(4) What is the purpose for using or disclosing your PHI?

PHI will be used to collect information about oral health status from your dental records.

(5) How long will the researchers keep your PHI?

The master list, linking your study number and personal identifying information, will be destroyed as soon as data collection is completed. This action deidentifies the data so that it cannot be linked to you. The research team at the Naval Post-graduate Dental School will keep de-identified data indefinitely.

This consent form and HIPAA authorization and individual data files will be maintained for a period of six years after the study is completed and then destroyed.

(6) Can you review your own research information?

You may look at your personal research information at any time before your identifiers are permanently removed from the data.

(7) Can you cancel this Authorization?

Yes. If you cancel this Authorization, however, you will no longer be included in the research study. The study information collected prior to this cancellation will be used by the research team. No further data will be collected.

If you want to cancel your Authorization, please contact the Principal Investigator in writing*:*

LCDR Erik D. Anderson, DC, USN
Naval Postgraduate Dental School
Walter Reed National Military Medical Center Building 1, 2nd Deck
8955 Wood Road
Bethesda, MD 20889-5628

(8) What will happen if you decide not to grant this Authorization?

If you decide not to grant this Authorization, you will not be able to participate in this research study. Refusal to grant this Authorization will not result in any loss of medical benefits to which you are otherwise entitled.

(9) Can your PHI be disclosed to parties not included in this Authorization who are not under the HIPAA requirements?

There is a potential that your research information will be shared with another party not listed in this Authorization in order to meet legal or regulatory requirements. Examples of persons who may access your PHI include representatives of the DoD Higher Level Review, the Food and Drug Administration, the Department of Health and Human Services (DHHS) Office for Human Research Protections (OHRP), and the DHHS Office for Civil Rights. This disclosure is unlikely to occur, but in that case, your health information would no longer be protected by the HIPAA Privacy Rule.

16. CONTACTS FOR QUESTIONS ABOUT THE STUDY:

If you have questions about the study, or if you think you have a study related injury you should contact LCDR Erik Anderson at 301-400-2776 or LCDR Ling Ye at 301-295-0565. For questions about your rights as a research subject, contact the Human Protections Administrator, WRNMMC Department of

Research Programs in Building 17 at 301-295-8273 or WRNMMC Staff Judge Advocate Office at 301-295-2215.

A signed copy of this consent form will be given to you

SIGNATURE OF SUBJECT

You have read (or someone has read to you) the information in this consent form. You have been given a chance to ask questions and all of your questions have been answered to your satisfaction
.

_____Yes, I give the study team permission to access my dental record to assess my dental decay and gum disease risks. Initial_____

_____No, I DO NOT give study team permission to access my dental record to assess my dental decay and gum disease risks. Instead I will only complete the survey. Initial_____

BY SIGNING THIS CONSENT FORM, YOU FREELY AGREE TO TAKE PART IN THE RESEARCH IT DESCRIBES.

_____

Printed Name of Subject

_____ _____ _____
Signature of Subject Date Time

SIGNATURE OF RESEARCH TEAM MEMBER OBTAINING CONSENT

My signature is intended to attest that the information in the consent document and any other information was explained to and apparently understood by the subject that questions and concerns were addressed and that informed consent was freely given.

_____
Printed Name of Person Obtaining Consent

_____ _____
Signature of Person Obtaining Consent Date (must be same as subject)

_____
Time

****

This sentence and the identifiers below will be removed from your consent as soon as the identifiers are entered on the master list.

Study #: _____
Your Name (please print):_____
Last 4: _____

APPENDIX H: PHASE I RECRUITMENT

"Correlations between Oral Health Knowledge, Locus of Control, and Oral Health Status"

This research will help us learn more about what our patients know about oral health and if our patients think that self-care or professional care is more important for keeping our mouths healthy. To be in this study you must be active duty.

Participation is voluntary. Not taking the survey is okay, and will not affect your access to treatment at this or any other treatment facility.

Your participation may increase your health knowledge. And your answers may help design future dental education programs that could improve dental health, reduce need for treatment, and save money.

Please answer every question. Please do not ask other people for answers, or look up answers on your portable devices. Please do not share the questions with friends and colleagues. For this survey to benefit everyone, we need to know the baseline knowledge people have about these questions

If you have questions about the study, or wish to see the answers, or if you think you have a study-related injury, use this page to contact Dr. Anderson, the Principal Investigator, at 301-400-2776. For questions about your rights as a research subject, contact the Human Protections Administrator, WRNMMC Department of Research Programs in Building 17 at 301-295-8273 or the WRNMMC Staff Judge Advocate Office at 301-295-2215.

THANK YOU FOR YOUR TIME. IT IS GREATLY APPRECIATED!

APPENDIX I: DESIGNEE RECRUITMENT SCRIPT

"While you are waiting for your appointment to start, may I give you some information to read about a research project we are conducting? If you decide to participate in the study, it will take about 20 minutes of your time, which in most cases is less than the time you will spend waiting for your appointment to start. If today is not a good day, you can choose to come back on another day. This is a voluntary study, if you choose not to participate; it will not affect your dental care."

If subject will participate and has not taken survey yet:

1) Give participant a Study ID #
2) Have participant fill out patient information on half sheet from consent
3) Return to PCD to receive completed survey from patient

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