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Oral Health Beliefs of Alaska Native Dental Patients

Cover Page Footnote

We wish to thank Maniilaq Association Dental Clinic for their cooperation and support.

Oral health beliefs influence oral health behavior, and culture is a crucial component of beliefs and subsequent health actions (Kiyak, 1993). Although the oral health beliefs of several population sub-groups have been investigated (see Kiyak, 1993; Nakazono, Davidson, & Andersen, 1997; Riley & Gilbert, 2005; Weissfeld, Brock, Kirscht, & Hawthorne, 1987), the Alaska Native population is largely unstudied in this realm. This study examines oral health beliefs of the unique Alaska Native population to better serve their dental needs.

This study includes a substantial portion of Iñupiat respondents, Alaska Natives who remained on the Pacific coast and reside in the remote region of Northwest Alaska (McGhee, 1996). Increased availability of goods and services has transformed the Alaska Natives' diet, subsequently affecting their oral health (Alaska Department of Health and Social Services [AK DHSS], 1993). Until the 1950s, the traditional Alaska Native diet consisted mostly of fish, caribou, seal oil, whale, and berries (Bang & Kristoffersen, 1972; Naske & Slotnick, 1987). This low-carbohydrate diet resulted in low risk of caries. However, increased trade and an influx of grocery and convenience stores resulted in greater availability and consumption of carbohydrate-rich foods. The modernized Alaska Native diet has half as much protein and nearly double the carbohydrates (Bang & Kristoffersen, 1972). Oral health deteriorated, with the number of caries-free individuals falling to 0% and a substantial increase in decayed, missing, or filled teeth (DMFT) (Bang & Kristoffersen, 1972).

Surveys conducted by the Indian Health Service (IHS) shed light on the oral health status of Alaska Natives. In 1999, 62.2% of young dental patients and about 50% of adult patients had untreated decay (IHS, 2001). In 2010, survey results indicated a substantial portion (46.7%) of Alaska Native preschoolers with active caries and a mean of 4.8 teeth with decay (IHS, 2013). These studies indicated a greater prevalence of dental disease among the American Indian/Alaska Native (AI/AN) population compared to other U.S. minority populations. Recommendations included an increase in dental practitioners employed by IHS and tribal clinics as well as early prevention programs (IHS, 2013).

In addition, the Alaska Native population faces unique challenges in accessing dental care. Each Alaska Native tribe coordinates the dental care of its members through the Alaska Tribal Health System. Dental care may be provided by a dentist employed by the tribe, a U.S. Public Health Service Commissioned Corps Officer, or a dentist contracted with IHS (AK DHSS, 1993). The 2010 IHS survey indicated a relative shortage of dental practitioners serving the AI/AN population, with 2800 AI/AN patients per dentist as compared to 1500 patients

per dentist in the general U.S. population (IHS, 2013). In addition, dental therapy is expensive and often inconvenient. The most effective long-term solution is to focus on patient education in order to prevent oral disease. This prevention-focused approach coincides with recommendations in the World Oral Health Report (Petersen, 2003). Prevention requires education, which must take existing beliefs into consideration.

Although some research has investigated the oral health of this population (Bang & Kristoffersen, 1972; IHS, 2001; IHS, 2013; Sekiguchi, Guay, Brown, & Spangler, 2005), there is a paucity of research exploring what Alaska Native adolescents and adults believe regarding the importance and efficacy of oral health care. This study addresses a call to target more specific areas of health using health belief questionnaires (Weissfeld et al., 1987). Additionally, as many area health care professionals are not native to Alaska, unfamiliarity with existing beliefs may result in decreased patient compliance, poorer health outcomes, and miscommunication. Increased understanding of oral health beliefs will hopefully lead to improved communication between dental health providers and patients with a corresponding improvement in oral health and disease prevention. Lastly, strategically designing and executing public health messages requires knowledge of existing beliefs (Kiyak, 1993; Nakazono et al., 1997). This study provides an introductory look at this population's oral health beliefs with the goals of aiding future researchers, Alaskan health care providers, and public health officials.

Method

Survey data was collected from patients of Maniilaq Association Dental Clinic, a subsidiary of the Northwest Alaska Native Association (NANA) Regional Corporation, in Kotzebue, AK (Maniilaq Association, 2003). This location was chosen because of the concentration of Alaska Natives and the opportunity afforded by the cooperation of Maniilaq Association. For one month, all dental patients were offered the survey. Although there are limitations associated with a convenience sample of dental patients, namely generalizability and a biased view of perceived barriers, this sampling method has been previously used to study oral health among Alaskans (IHS, 2001). Both the appropriate Institutional Review Board (IRB) and Maniilaq Association Board approved the study prior to data collection.

The survey comprised twenty-one items. Completion of the survey took approximately five minutes and was most often finished while patients waited to be seen by the dentist. A basic 4-point Likert scale with answers ranging from "strongly agree" to "strongly disagree" was employed. The survey concluded with three demographic questions: gender, age, and race. Patients returned all

completed surveys to an envelope at the front desk. Of the 142 patients offered the survey, 136 participated for a response rate of 96%.

Several widely used instruments are available for investigating health beliefs, which include personal perceptions, modifying variables, and an individual's propensity to seek care (Glanz, Rimer, & Lewis, 2002; Hochbaum, 1958). One study in particular demonstrated reliability of the Health Belief Model across population subgroups (Weissfeld et al., 1987), which is relevant given the nature of this study's sample. Other instruments have used the Health Belief Model as a foundation (Nakazono et al., 1997, Weissfeld et al., 1987; Hazavehei, Taghdisi, & Saidi, 2007). The selected instrument was deemed valid and reliable when previously tested on various ethnic groups, including Navajo and Lakota Native Americans served by IHS (Nakazono et al., 1997).

The oral health belief measure addressed seven perceptual components: seriousness of dental problems, importance of dental care, fear of dentists as a barrier, availability of care as a barrier, motivation to seek care, benefits of preventative care and plaque control, and efficacy of dental care. Each question had four answer choices ranging from "strongly disagree" to "strongly agree."

Results

One hundred thirty-six dental patients completed the oral health belief survey (96% response rate). Sixty-eight respondents self-reported as female and 65 participants indicated male gender. Participants largely self-identified as "Inupiat Alaskan Native" (n = 98) or "Alaskan Native not Inupiat" (n = 22). The remaining participants indicated ethnicity as White (n = 6), Other/Multiple (n = 5), or Native American (n = 2). For statistical analysis, only Alaska Natives 12 years and older were included. This age cut-off was chosen based on age group delineations utilized in a report on dental caries among rural Alaskan children (Centers, 2011). The average age of Alaska Native participants over 12 was 32 years (SD = 13.7).

First, Alaska Natives' general oral health beliefs were explored. When multiple items assessed a component, reliability tests were performed before averaging responses. Cronbach's alpha is a statistical tool that tests reliability and verifies that items do indeed "hang together" and measure the same component (Cronbach, 1951). Although prior work divides the "benefits" construct into two categories, prevention and plaque control (Nakazono et al., 1997), reliability analysis of this data resulted in a higher alpha value ($\alpha = 0.80$) when these items were combined into one "benefits" category. Table 1 summarizes items under each construct, resultant means, and reliability results.

Descriptive Results

The primary purpose of this study was to investigate the oral health beliefs of the Alaska Native population served by Maniilaq Association. The “importance” average was the highest reported score among the survey dimensions ($M = 3.33$, $SD = 0.43$). Respondents indicated strongest agreement with perceived importance of keeping natural teeth ($M = 3.43$, $SD = 0.55$). Respondents rated the two barrier items the lowest. Not surprisingly, given the remote environment, respondents did not view dentists as easily available ($M = 2.86$, $SD = 0.66$). The lowest mean was in response to the question assessing fear as a barrier ($M = 2.50$, $SD = 0.91$). All remaining responses fell on the higher end of the scale indicating moderate to strong agreement.

Relationships among Variables

A correlation matrix allowed further exploration of oral health beliefs and associated relationships. The strongest positive relationship was between perceived seriousness of dental problems and perceived importance of dental health ($r = 0.547$, $p < 0.001$). “Importance” was also strongly, positively related with both “benefits” ($r = 0.485$, $p < 0.001$) and “efficacy of dentists” ($r = 0.466$, $p < 0.001$). Of special interest, given the population’s unique challenges in accessing dental care, was the significant correlation between “availability” and “efficacy.” Respondents who were more likely to view dentists as available displayed higher efficacy scores ($r = 0.219$, $p = 0.021$). In other words, this relationship may be interpreted to mean that some perceive dental care as not easily available, but dental visits are not that effective anyway. Table 2 presents relationships among variables.

Demographic Predictors

The secondary purpose of this investigation was to determine if demographic factors predicted oral health beliefs of Alaska Natives. Therefore, gender and age were incorporated simultaneously into analyses. The general linear model technique explored relationships among this set of demographic predictors and each continuous outcome variable in question. Table 3 summarizes the findings for all constructs with regard to demographics. For brevity, only selected results are reported outside the table.

Seriousness average. The two demographic variables combined predicted approximately 17% of the variance in the outcome variable “seriousness average” (R Squared = .174). When analyzed in conjunction with gender, age emerged as the significant predictor, $F(1, 106) = 9.48$, $p = 0.003$. The slope indicated a positive relationship between age and perceived seriousness. For every one year

increase in age, when controlling for gender, the “seriousness average” scores increased by 0.009.

Importance average. Age and gender combined predicted approximately 14% of the variance in the outcome variable “importance average” (R Squared = .136). When controlling for age, gender was a significant predictor of importance average scores. Females reported significantly higher average scores (Adj M = 3.46) than did males (Adj M = 3.19), $F(1, 106) = 5.34, p = 0.023$.

Barriers. The analyses did not indicate any significant findings for the “barriers—fear of pain” question. When controlling for gender, age emerged as a significant predictor of “barriers-availability” scores, $F(1, 106) = 7.41, p = 0.008$. The negative slope indicated a decrease in perceived availability as age increased. Approximately 9% of variance in “barriers—availability” scores could be attributed to the combined demographic characteristics.

Motivation, benefits, and efficacy. The analyses did not indicate any significant findings for the “motivation” variable with regard to either gender or age. The analyses indicated significant findings for the “benefits” average with regard to age when controlling for gender, $F(1, 91) = 6.23, p = 0.014$. As age increased, perception of benefits did as well. The combination of variables explained approximately 14% of the variance in the “benefits” scores. Lastly, the analyses did not indicate significant findings for the “efficacy” average as a function of gender or age.

Discussion

Age is the common theme that predicts several oral health beliefs among Alaska Natives, including degree of perceived seriousness of dental problems and benefits of prevention. The older the participant, the more serious oral health is considered to be; relatedly, prevention is perceived to be more efficacious. There are several possible reasons for these relationships. Older participants are more likely to have personal experience with serious dental problems, resulting in greater familiarity with the consequences. Older patients also experienced the introduction of a fluoridated water supply during their lifetime and its associated benefits. The benefits of fluoridation may have been widely communicated during its Kotzebue introduction in 1986, which elderly patients are more likely to remember (Center for Disease Control [CDC], 2008). Lastly, older people may view health issues as generally more serious than their younger counterparts, as some research shows that people tend to engage in healthier behaviors with age (Renner, Knoll, & Schwarzer, 2000).

Age also predicts perceptions of care availability. Admittedly, perceived availability barriers for these dental patients may not be representative of the general Alaska Native population. Dental patients have successfully overcome whatever barriers there may be, with accompanying perception changes likely. The 1999 IHS survey of dental patients stated that such a sample's needs may be more serious, thus necessitating dental care (IHS, 2001). This may be the case here as well. However, perceived availability barriers among this sample may still provide insight.

Among this sample, older participants typically viewed dentists as being less readily available. Historically, healthcare was extremely difficult to access. As recently as the 1950s, the Department of Health and Human Services only served Alaskan communities as far north as Nome, 185 miles south of Kotzebue, AK. Now, Maniilaq Association in Kotzebue boasts a fully functioning hospital with dental and eye clinics. Clinics in eleven surrounding villages serve a total population of about 6,500 people (Maniilaq Association, 2003). Elderly Alaskans may be unfamiliar with these current care options.

However, transportation and not awareness may be the primary barrier. In the Northwest Arctic Borough, patients commonly fly to a larger clinic such as Maniilaq to receive dental treatment. Older individuals may be less familiar with the processes of travel arrangement or have fewer resources to fund the travel themselves. In addition, elders are generally less mobile than their younger counterparts due to physical and health restrictions. Lastly, as evidenced by the 2010 IHS Oral Health Survey sample, dental treatment and prevention coordinated by IHS may focus more on children than the elderly (IHS, 2013).

Indeed, Alaskan patients of all ages generally view access to dental care as a barrier. The population seems confident in the importance and efficacy of oral health care, so perceived availability appears to be a primary hurdle. Access barriers undoubtedly exist in this region, but the population may possibly be unaware of existing available oral health services. To increase perceived availability among elderly Alaskans specifically, dental programs should employ prior outreach measures shown to be successful. These include employing Native American practitioners, increasing community-based screening programs, and incorporating appropriate cultural and linguistic patient education and services (Moulton et al., 2005). In general, increased advertisement of the services offered by available clinics may help clarify care options. Additionally, Alaskans would benefit from the provision of logistical and informational support via local liaisons for navigating the processes of payment and travel, especially among the

older population. All of these options require resources, which is a significant hurdle.

Motivation to seek dental care for oral health problems was strongly correlated with perceived importance of oral health and efficacy of dentists, coinciding with prior findings that perceived need is an accurate predictor of dental service utilization (Kiyak, 1993). Education concerning dental procedure success rates and treatment options may increase motivation to seek care.

On average, women reported oral health to be more important than males. This reflects previous findings regarding utilization of healthcare services, as women seek health care more readily (Redondo-Sendino, Guallar-Castillón, Banegas, & Rodriguez-Artalejo, 2006), take greater care with overall health maintenance (Dean, 1989), and visit the dentist more often (Kiyak, 1993). This study's sample does reflect a slightly higher propensity for females to seek dental care, given that patient respondents were 51% female and females make up only 47% of the NANA population as a whole (First Alaskans Institute, 2013). Alaskan women responded most positively to the statement "it is important to keep natural teeth." The high rate of agreement with this statement may be partially related to esthetic concerns. Women are more critical when accessing facial esthetics and pay more attention to the details of facial and smile esthetics (Cross & Cross, 1971; Flores-Mir, Silva, Barriga, Lagravere, & Major, 2004).

Overall, "importance" elicited the most positive response. This is encouraging, given that prior research found perceived importance of oral health to be a key predictor of dental care utilization (Kiyak, 1993). At the foundation of oral health care is perceived value. If a population considers oral health important, oral health professionals can frame information around this existing belief to increase proper home care and regular office visits. The item "it is important to keep natural teeth" received more agreement than any other statement. This is valuable information for a practitioner, because it provides a common goal and framework for presenting oral health information, hygiene instructions, and treatment options. A common message focused on establishing and maintaining oral health as necessary for natural teeth retention may help Alaska Native patients value practices and treatments specifically aimed at prevention.

Alaskan dental patients generally view dentists as effective. Interestingly, patients perceive dentists as better for problem prevention than cure. This distinction informs two strategies for education and communication with the greater Alaskan population. First, dental professionals can build on the belief in the efficacy of preventative care to increase compliance with at-home oral

hygiene routines and regular office cleanings. Shared dentist and patient responsibility for prevention must be stressed. Second, patients should be educated regarding the dentist's capability to alleviate existing problems. There are several ways to accomplish this: providing statistics; sharing personal stories of similar experiences; visual aids such as models, pictures, or diagrams; and written materials explaining how common problems are improved with proper treatment.

This information would ideally be integrated into an existing program or institution. Incorporating a short program into the health or physical education courses taught to school-age children would provide a strong foundation. In order to reach adults, programs could target the incoming and orienting employees of NANA. NANA is the largest employer in this region, and it is the parent company of Maniilaq. This provides a prime opportunity to educate employees on maintaining and seeking treatment for their dental health. Dentists, dental health aids, and/or assistants working for the community's dental clinic could volunteer to help with these outreach programs.

This study has several limitations. First, only Alaska Natives over 12 years of age who visited a dental clinic were surveyed. These individuals' oral health beliefs are likely more favorable towards oral healthcare than those Alaskans who do not seek dental treatment. The primary reason for this limitation was participant accessibility. The Maniilaq Association dental clinic was very generous and cooperative in allowing their patients to participate in this survey. Possible target populations for further study include the employees and students of the local public school system and the employees of NANA, the area's largest employer. Second, the sample size precluded comparison between Alaska Natives and people of other races living in the area. It was also not possible to study a possible correlation between patients' oral health beliefs and the ethnicity of the dentist treating them. All of the dentists at the Maniilaq clinic during the data collection window were Caucasian females, and most of the dental assistants were Alaska Native. For Alaska Native patients, being treated and given oral health instruction by a dentist who is also Alaska Native may correlate with differing oral health beliefs. Further research is needed to determine the impact of the ethnicity of the dental care provider on the oral health beliefs of the Alaska Native population. Third, oral health beliefs are likely related to general health beliefs, which this study did not explore. Lastly, previous testing indicated lower reliabilities for the survey instrument's subscales among Navajo respondents when compared to other ethnic groups (Nakazono et al., 1997). This discrepancy may exist for Alaska Natives as well.

Further investigation is warranted to understand the nature of and reasons for perceived unavailability of care. Second, research should explore specific messaging strategies and distribution methods most effective in educating and informing Alaska Natives. Oral health interventions targeted to indigenous Canadian populations may help guide (Lawrence, 2010). Lastly, the oral health beliefs of the Alaska Native population as a whole should be explored so that people who refuse dental care are represented.

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Table 1 Reliability Summary and Descriptive Results of Oral Health Belief Measure

Demographic Factors		N	Adj. Mean	SE	F statistic	p value
<u>Seriousness</u>						
Gender					0.59	0.446
	Female	56	3.33	0.06		
	Male	54	3.05	0.07		
Age		110			9.48*	0.003*
Gender*Age					0.24	0.624
<u>Importance</u>						
Gender					5.34*	0.023*
	Female	57	3.46	0.05		
	Male	53	3.19	0.06		
Age		110			3.34	0.070
Gender*Age					1.13	0.290
<u>Barrier-Pain</u>						
Gender					0.40	0.530
	Female	63	2.42	0.11		
	Male	59	2.66	0.12		
Age		122			2.15	0.145
Gender*Age					1.72	0.192
<u>Barrier-Availability</u>						
Gender					0.28	0.595
	Female	57	2.82	0.08		
	Male	53	2.92	0.09		
Age		109			7.41*	0.008*
Gender*Age					0.83	0.364
<u>Motivation</u>						
Gender					0.52	0.472
	Female	58	3.21	0.08		
	Male	54	3.03	0.08		
Age		112			0.58	0.447
Gender*Age					0.01	0.939
<u>Benefits</u>						
Gender					0.14	0.706
	Female	47	3.28	0.06		
	Male	48	3.08	0.06		
Age		95			6.23*	0.014*
Gender*Age					0.41	0.525
<u>Efficacy</u>						
Gender					0.01	0.925
	Female	58	3.33	0.06		
	Male	54	3.18	0.07		
Age		112			0.71	0.402
Gender*Age					0.68	0.413

Survey answers ranged from 1 to 4, 1 = strongly disagree

SE, standard error; *Significant at p = .05

Table 2 Correlations among Oral Health Belief Components

		Seriousness	Importance	Barrier-Fear	Barrier-Availability	Motivation	Benefits	Efficacy
Seriousness	Pearson Correlation		0.547*	-0.168	-0.125	0.221*	0.334*	0.331*
	<i>p</i> value		< 0.001	0.081	0.195	0.021	0.001	< 0.001
Importance	Pearson Correlation			0.085	0.048	0.406*	0.485*	0.466*
	<i>p</i> value			0.337	0.621	< 0.001	< 0.001	< 0.001
Barrier-Fear**	Pearson Correlation				0.102	0.018	0.011	-0.076
	<i>p</i> value				0.291	0.851	0.913	0.431
Barrier-Availability	Pearson Correlation					0.070	-0.084	0.219*
	<i>p</i> value					0.469	0.425	0.021
Motivation	Pearson Correlation						0.300*	0.305*
	<i>p</i> value						0.003	0.001
Benefits	Pearson Correlation							0.409*
	<i>p</i> value							< 0.001
*Sig. at <i>p</i> = 0.05								
**Reverse-coded								

Table 3 Demographic Predictors of Oral Health Belief Components

Oral Health Belief Items	Mean	SD	Number of Items	Cronbach's Alpha (α)
<u>Items Assessing Seriousness</u>				
Tooth decay can make people look bad	3.13	0.74		
Dental problems can be serious	3.41	0.64		
Poor teeth will affect people's work or other aspects of their everyday life	3.10	0.77		
Having dental problems can casue other health problems	3.15	0.63		
<u>Seriousness Average</u>	3.20	0.51	4	0.71
<u>Items Assessing Importance</u>				
I place great value on my dental health	3.24	0.53		
It is important to keep natural teeth	3.43	0.55		
Dental disease is as important as other health problems	3.30	0.55		
<u>Importance Average</u>	3.33	0.43	3	0.70
<u>Items Assessing Fear as a Barrier</u>				
I am afraid of dental visits because of possible pain*	2.50	0.91	1	-
<u>Items Assessing Availability as a Barrier</u>				
Dentists are available when I have dental problems	2.86	0.66	1	-
<u>Items Assessing Motivation</u>				
I will visit the dentist when I have dental problems no matter how busy I am	3.13	0.57	1	-
<u>Items Assessing Benefits</u>				
Brushing teeth with fluoride toothpaste helps prevent tooth decay	3.34	0.50		
Drinking fluoridated water helps prevent tooth decay	2.94	0.55		
Using fluoride is a harmless way of preventing tooth decay	2.99	0.53		
Brushing teeth helps prevent gum problems	3.34	0.65		
Using dental floss helps prevent gum disease	3.25	0.59		
Eating sweet food causes tooth decay	3.29	0.60		
<u>Benefits Average</u>	3.18	0.39	6	0.80
<u>Items Assessing Efficacy</u>				
Going to the dentist will keep me from having trouble with my teeth, gums, or dentures	3.36	0.55		
Dentists are able to cure most dental problems that patients have	3.17	0.54		
<u>Efficacy Average</u>	3.26	0.49	2	0.74
Survey answers ranged from 1 to 4, 1 = strongly disagree				
SD, standard deviation				
*Reverse coded so higher mean = less barrier				

