Caries Experience amongst Somali Mother-Child Pairs: A Cross-Sectional Study

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BY

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Abstract

Purpose: Minnesota is home to the world's largest population of Somali refugees, yet little is known about their oral health. Multiple social determinants are known to affect oral health outcomes including a strong relationship between maternal-child caries experience in non-migratory populations. New evidence has shown that this relationship is disrupted in migrant populations. This study explores the correlation between caries experience of Somali immigrant mothers and their children. The study further investigated the association of oral health perceptions and caries experience of the mothers.

Methods: As part of a larger study using a community-engaged approach, 75 mother-child dyads were enrolled at nine urban day care centers. Clinical data were collected utilizing dmfs and DMFS scores for children and DMFS scores for mothers. A survey compiled from previously validated instruments designed specifically for this study was completed by each mother. Descriptive statistics, Spearman's correlation and linear regression modeling were used to analyze the data.

Results: The mean age of mothers and children was 33.8 and 8.2 years, respectively. Mothers had lived in the US an average of 9.6 years. Almost all mothers and children were insured, and 68.6% of children reported a dental visit within the past year. No correlation was found between Somali mother-child caries experience. There was a

statistically significant positive association between mother oral health perception and caries experience.

Conclusions: The oral health of a Somali child does not necessarily reflect that of the mother, contrary to results from previous studies. Somali mothers' self-perception of oral health reflects their caries experience. Practical applications include planning an intervention using a community-engaged process to prevent caries in children's primary teeth.

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SECTION 1: INTRODUCTION

Introduction

The World Health Organization found that 60-90% of children and almost 100% of adults globally have dental caries, making dental caries a global health issue (1). Multiple social determinants are known to affect the development of dental caries at the individual, environmental, provider and community levels (2). At the individual level, a growing body of research has found a positive correlation between caries experience of mothers and their children (3-6). However, recent evidence has suggested that this relationship does not occur in immigrant populations, one of which was a small pilot study of Somali mother-child dyads (7).

The National Institute of Dental and Craniofacial Research reports dental caries in women is greater than in men both in experience and incidence (8, 9). An explanation for these findings include factors that include multiple social determinants such as earlier eruption of teeth (10, 11), child bearing (12, 13), psychological, genetic differences (14-16), and differing saliva compositions (17) or a combination of these factors. Salivary composition is of particular interest due to the strong evidence supporting the lateral transmission of *Streptococcus mutans* from mothers to their children (18).

Purpose of study

There are social and financial impacts that affect a community when a large refugee population are settled into that community. Refugees settled in settled in Minnesota often qualify for state funded insurance (19). Therefore, deteriorating health incurs a cost to the state. The purpose of this study is to investigate the current health status of the refugees and prevent future health disparities.

Statement of the problem

Minnesota has the largest migrant population of Somalis in the U.S and little is known about their oral health. An initial study on Minnesota migrant populations has indicated no correlation between Somali mother- child caries experience (7). This information is needed for dental professionals to develop intervention measures for the Minnesota Somali population.

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Significance of the study:

The results of this study will determine if an intervention is necessary in preventing dental caries in Somali mothers and their children. This will allow clinicians to better understand the oral health of Somali mothers–child dyads, rather than making the assumption that the oral health of Somali migrant mothers–child dyads is the same as U.S. mothers–child dyads.

Research questions

The study is designed to answer the following questions:

A. Primary Question:

1. Is there a correlation between Somali mothers' caries experience and her first child?

B. Secondary Question:

1. Is there a relationship between Somali women's self-perception of oral health status and caries experience?

Limitations

The study utilized a convenience sample. As part of the community engaged approach, the University of Minnesota partnered with the Somali Family Life Center (SFLC) to arrange visits to the nine child care facilities. Therefore, this study cannot generalize its findings to the whole Somali population.

Another limitation to this study included working with a population where English is a second language. To address the language barrier the study offered both English and Somali versions of the oral health literacy scale and had two Somali interpreters available to the study subjects.

SECTION 2: REVIEW OF RELTED LITERATURE

Introduction

Dental caries is a dental disease that breaks down the enamel matrix by way of acid and bacteria that adhere to teeth (20). The cause of decay can also be affected by the strength, or mineral content, of the enamel and the bacteria present. Dental caries can have implications both localized and systemic complications and even death. The World Health Organization found that 60-90% of children and almost 100% of adults globally have dental caries, making dental caries a global health issue (1).

Multiple social determinants are known to affect the development of dental caries at the individual, environmental, provider and community levels (21). At the individual level, a growing body of research has found a positive correlation between caries experience of mothers and their children (3-6). However, recent evidence has suggested that this relationship does not occur in immigrant populations, one of which was a small pilot study of Minnesota migrant mother-child dyads including Somali immigrants. Flynn et al., found no correlation between Somali mother-child caries experience. Further, Somali women had the lowest caries of the five immigrant groups studied who were identified by primary language; Somali children had the highest caries experience compared to the other groups studies. Similarly, Geltman et al., found that Somali adults had lower caries experience upon resettlement compared to their U.S. counterparts. However, adult caries experience increased after 5 years of U.S. residence. Further, Cote et al., found that East African refugee children had comparatively low caries experience upon immigration. These findings are disparate from previous studies identifying intergenerational caries experience between mothers and their children. Social

determinants of health related to modifiable changes in diet, health behaviors and lifestyle may be associated with these results. With over 70,000 Somali immigrants in Minnesota (22), a larger study to evaluate the oral health status of Somali mother-child dyads in a community setting is needed to determine if a caries intervention is needed.

When investigating mother-child dyads oral health it is important to understand whether the mother's self-perception is an accurate indicator of dental caries. Self-perception of actual health has been established as an accurate predictor of health (23-25). Elder et al., found that 86% of individuals rating their heath on a five level scale were within one level of their physicians assessment (23). Additional studies have reported that poor health self-assessments are a strong predictor of mortality (24, 25). While there are fewer studies on self-perceptions of oral health however, Weintraub et al., found a relationship between poor oral health self-perceptions and untreated caries (26).

Finding whether there is a relationship between Somali women's self-perceived oral health and caries experience could further elucidate caries awareness and perhaps identify a modifiable factor to affect their child's caries development.

Background

Located on the horn of Africa, Somalia is bordered by the Indian Ocean on the east, Djibouti to the north, Ethiopia to the west, and Kenya to the south and west (27). In 1991, Civil war broke out in Somalia and the following year, an opposing militia overthrew the dictator Mohammed Siad Barre. The civil war continues today and as a result many Somalis have fled to refugee camps. While most Somali refugees continue to live in African refugee camps, the U.S. Census Bureau estimated in 2013 that by the year

2014 there would be roughly 115,829 first generation Somalis in the United States, with roughly 25,000 were resettled in Minnesota (28). Secondary migration occurs when a population of similar faith, language and beliefs cluster into an area to maintain a familiarity is common with Somali immigrants (29). Many Somali leaders estimate the Somali population in Minnesota to be closer to 70,000 due to the secondary migration (22).

Oral health status

Unlike many refugees, Somali refugees have fairly good oral health (30, 31). This is due to the use of a miswak (31). The miswak is a stick that comes from the arak tree found in many African countries and is used to clean teeth and gums. The miswak contains several antimicrobial agents and anti-cavity agents, making it a reasonable alternative to the toothbrush (32). In addition, most Somalis are Islamic and cleaning the mouth is a ritual before each of the five daily prayers. Cleanliness is deeply rooted in their faith, and cleaning the mouth and hands before prayer are embedded in the Islamic faith (33).

Dental caries among immigrants

Immigrant children are often, but not always found to have poorer oral health than that native populations. Children of immigrants both in Canada and Vienna demonstrated higher caries experience (33, 34). Studies of dental caries experience in children of immigrants living in the U.S. have provided mixed results. A study in New England, by Maserejian et al., discovered immigrant children were found to have 22.3 % more decayed surfaces than the children of native parents (34). Contrary to that study,

Cote et al., found that newly arrived African child immigrants and refugees had a lower caries experience than U.S. born children (35).

Less is known of adult immigrants' and refugees' dental caries experience. A study by Cruz et al. in New York City reported factors attributed to acculturation to a plateauing effect on DMFS scores between 5 and 14 years of residency in the U.S. but then increasing in the over 14 years category. Interestingly the unmet need of dental caries dropped after living in the U.S. for five years, then stabilized for the next 9 years before the next reduction in untreated caries at greater than 14 years of being in the U.S. (36). Another study in New York City found Haitian immigrants caries experience to be low, but untreated caries was high (37).

Mother-child caries incidence

Dental caries is an infectious and transmittable disease. Bacterial transmission of *Streptococcus mutans* (MS) has been studied since the mid 1970's (38) and continues to strengthen (39-42). The vertical transmission between mothers with high MS levels and their children occurs by sharing saliva. There is also evidence of transmission from sharing food and eating utensils (43).

In addition to bacterial transmission evidence, multiple studies have documented a correlation between dental caries experience of mothers and their children (3-6). In India, Retnakumari and Cyriac found a moderate association between mother-child caries incidence by conducting an epidemiological study measuring childhood caries by maternal and child characteristics (44). The study enrolled 350 mother/ child pairs, children between the ages of 12 and 36 months. Caries experience was measured with child defs (decayed, extracted due to decay, and filled surfaces) scores and mother DMFS

scores. Results indicate the relationship of the defs and DMFS scores to be statistically highly significant (*P*=0.001). Similar to the relationship between mother-child caries scores, a moderate correlation score of r= 0.339 (P=0.01) was found.

Dye et al., conducted a study among non-Hispanic whites, non-Hispanic blacks and Mexican Americans in the U.S. A correlation analysis was conducted among 1184 mother-child pairs to determine a relationship between mother active caries load and child caries experience between the ages of two and six years (5). A statistically significant correlation was found; As mothers- active caries load increased, the child caries load increased as well.

In a small cross-sectional study by De Souza et al., the association of Early Childhood Caries (ECC) and maternal caries status were evaluated (45). Seventy-seven mothers were clinically evaluated and caries were present in 44 mothers and 31 children presented with caries. Of the 31 children with caries one had a mother without caries and 30 had a mother with caries. The results showed a strong statistically significant P-value of <0.001 demonstrating a 22.5 times relative risk of caries for children of caries-positive mothers.

Shin and Park (46) studied the relationship between mother active caries and child caries experience. The study reported children in both the 6 to 11-year-old (n= 1451) and 12 to 18-year-old age (n=1310) groups were 2.4 times more likely to have caries experience when the mothers had active dental caries, compared to the children whose mothers had no caries. This study used mothers with active caries and compared it to their child's caries experience.

Strong evidence supports a relationship between poor maternal oral health and child caries for native populations (5, 44-46). Immigrant populations are rarely included in intergenerational studies due to language barriers and other factors, leaving a paucity of data on immigrant populations. Only one small pilot study was found reporting intergenerational caries among Somali immigrant populations (7). The study was conducted in a clinical setting and revealed deft and DMFT scores among the offspring of Somali speaking mothers in Minnesota was higher than English, SE Asian, and Spanish speaking mothers in Minnesota.

Perceived oral health

There is a high prevalence of dental caries among women in the U.S. (9). There is also a positive association between professionally determined and self-reported oral health status. However, these studies were conducted among English speaking Americans. There is a paucity of information when looking at self-perception and caries experience.

Weintraub et al. studied low income Hispanic women found high positive predictive values among those with current tooth decay and self-perceptions of fair or poor oral health (26). Pinelli and de Castro Monteiro Loffredo validated a questionnaire of self-perceived oral health conditions. Results were compared to a dentists' clinical examination, results showed a high correlation between oral self-assessment and clinical findings (47).

Martínez-Beneyto, et al. conducted a cross-sectional study of self–perceived oral health status among 282 pregnant European women (48). The study used DMFT scores and a 5-point Likert scale measurement of "excellent," "very good," "good," "poor," and

"very poor" to measure perceptions of oral health. The results of this study indicated that the better perceptions of oral health, the less decayed teeth and less missing teeth. As the perceived oral health scores declined, DMFT scores increased. This study did not link poor oral health perceptions to active decay, but rather correlated good oral health with better DMFT scores.

Conclusion:

Mother-child caries experience has been studied in many non-immigrant populations, and presents a positive correlation between the mother's caries experience and that of their children. Unlike children in the U.S., dental caries among immigrant children may not be related to the caries experience of their mothers (7, 34). Gap in the literature exists for intergenerational caries relationship between Somali mothers and their children. In addition, a gap exists for women oral health self-perceptions and their clinically evaluated caries experience for immigrant populations.

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SECTION 3: MANUSCRIPT

Abstract

Purpose: Minnesota is home to the world's largest population of Somali refugees, yet little is known about their oral health. Multiple social determinants are known to affect oral health outcomes including a strong relationship between maternal-child caries experience in non-migratory populations. New evidence has shown that this relationship is disrupted in migrant populations. This study explores the correlation between caries experience of Somali immigrant mothers and their children. The study further investigated the association of oral health perceptions and caries experience of the mothers.

Methods: As part of a larger study using a community-engaged approach, 75 mother-child dyads were enrolled at nine urban day care centers. Clinical data were collected utilizing dmfs and DMFS scores for children and DMFS scores for mothers. A survey compiled from previously validated instruments designed specifically for this study was completed by each mother. Descriptive statistics, Spearman's correlation and linear regression modeling were used to analyze the data.

Results: The mean age of mothers and children was 33.8 and 8.2 years, respectively. Mothers had lived in the US an average of 9.6 years. Almost all mothers and children were insured, and 68.6% of children reported a dental visit within the past year. No correlation was found between Somali mother-child caries experience. There was a statistically significant positive association between mother oral health perception and caries experience.

Conclusions: The oral health of a Somali child does not necessarily reflect their mother. Somali mothers' self-perception of oral health reflects their caries experience. Practical applications include planning an intervention using a community-engaged process to prevent caries in children's primary teeth.

Introduction

Caries is the most prevalent yet preventable childhood disease in the US with immigrants as refugees presenting with the highest prevalence of untreated dental disease. Caries etiology is complex with multiple social determinants identified at the individual, environmental, provider and community levels. At the individual level, bacterial transmission between mother and child has been linked to a strong correlation in caries experience.[1-4] Emerging evidence from a small study conducted among four immigrant groups identified by primary language, English, SE Asian, Spanish an Somali, in Minnesota found that this correlation does not exist in immigrant populations.[5] The primary purpose of this study was to correlate Somali mother-child caries experience in a community setting.

Further investigation relating women's self-oral health perceptions and mother active caries incidence could prove to be beneficial to designing interventions to prevent the spread of dental caries. A small pilot study of Somali immigrants in Minnesota found that Somali self- perceptions of oral health as related to caries experience is similar to that of the general population.[6] Understanding the relationship between oral health self-perceptions as related to clinically assessed dental caries experience may empowers dental health professionals to seek out interventions. Early interventions could include

increasing educating the Somali population on how to prevent decay, understand the physical signs that indicate dental decay. This could then reduce the costs of treatment and result in improved long-term oral health by catching decay in its early stages.

Methods

Research design

This cross-sectional study used a community-engaged approach to recruit Somali mother-child dyads at nine day care centers in Minneapolis-St. Paul, Minnesota. A Somali dentist and director of the community partner organization confirmed interest in participating in the study with each day care site and described the study to potential participants several days prior to the screening date. Interested women were asked to allow 30 to 45 minutes to participate in an orally administered survey and clinical oral screening. Women signed a written consent form available in both Somali and English for herself and her children the day of the study prior to participation. The study team was comprised of two calibrated dental hygienists conducting clinical screenings, and one dental hygienist and dentist fluent in both Somali and English administering the survey. The survey was designed specifically for a larger study and consisted of questions from previous surveys shown to have statistically significant relationships between the dependent variables of either adult or child caries experience and the independent variables. One question selected specifically for use in this study was the mother's self-perception of oral health. Additional variables known to affect caries experience were gathered and included age, employment, educational attainment, dental insurance, years lived in the United States and age at immigration. The clinical screenings were conducted in a classroom setting using additional light sources consisting of either loupes

or a hand-held flashlight, a disposable mirror, tongue depressors and gauze, as needed. The decayed, missing and filled surfaces index (DMFS for permanent and dmfs for primary teethninew[5] was used to quantify caries experience for all participants. Referral criteria established as part of the Basic Screening Survey (BSS) was used to classify each participant into one of three categories: urgent need for dental care, early dental care needed, no obvious problems.[6]

Remuneration for study participation was a fluoride varnish treatment for children and a $25 retail store gift card for mothers.

Analysis

Descriptive statistics were analyzed for each independent and dependent variable. Mother-child caries correlation was analyzed using the Spearman Correlation Coefficient with the p-value established at the level of 0.05. The relationship between mother's self-assessed oral health and caries experience used bivariate analyses between the dependent (DMFS), independent (mother's self-assessed oral health) and potential confounding variables (education, age, age at immigration, years in the U.S., and last dental visit in the last year). Results with significant p-values (<0.05) were then entered into three separate linear regression models expressing caries experience in 3 different variable types, different maternal caries variables (continuous, bivariate and a ratio of decayed/DMFS). A bivariate analysis was run to determine the relationship between the mothers with caries experience and mothers without caries experience, mothers' education level, mothers age, mothers' years in the U.S., mothers age at immigration, dentist in the last year, and mother's perceived her oral health.

The University of Minnesota Institutional Review Board reviewed and approved the study.

Results

The sample population consisted of 75 Somali mother-child dyads and demographic characteristics are displayed in Table 1. The mothers ranged in age from 21 to 61 years of age with a mean age of 33.8 years (SD 6.3). The children ranged in age from 1-12 years with a mean age of 8.2 years (SD 3.3). Children were categorized into two groups (0-5 and 6- 12) for further analyses. All subjects were born in Somalia of Islamic faith and nearly two-thirds having some education. The majority of mothers and their children had dental insurance, with slightly more mothers than children having been to a dentist in the last year.

Somali Mother- Child Caries Experience

Somali mothers in the study had a mean DMFS score of 20.6 (SD 19.9). The Somali children were broken down into age groups 0-5 and 6-12. Children 0-5 years old had a mean dmfs score of 1.8 (3.2). Children in the 6 to 12 years old had mixed dentitions, so both dmfs and DMFS scores were recorded. The 6 to 12 year-old dmfs score was 6.0 (12.7) along with the DMFS score of 1.3 (2.4). Using the Spearman correlation coefficient and controlling for age, Table 2 communicates there is no correlation between Somali mother-child dyads caries experience.

Mother self-perceived oral health and caries experience

A relationship between Somali mother perception and DMFS was discovered using both the simple linear regression model (p-value = 0.003) and simple linear

regression models (p-value = 0.04). These results indicate an association between Somali mother self-perceived oral health and caries experience.

< Insert Table 1>

< Insert Table 2>

Discussion

There is a growing body of evidence confirming a correlation between mother-child dyads caries experience. However, emerging reports have found that this is not always true for refugee populations. This study explores the relationship of dental caries experience between Somali immigrant mothers and their children. To our knowledge this is the first study exploring caries experience among Somali mother-child dyads conducted in a community setting. In addition to these findings the study further investigated Somali maternal oral health self- assessment and its relationship to dental caries.

The findings of this study found no relationship between Somali mothers' caries experience and that of their children. These findings differ from that of studies describing intergenerational caries in geographically stable populations that showed correlations between mothers and their children's caries experience.[1-3] In addition, studies in both Canada and in the US have found that children of mothers with a greater number of missing teeth surfaces and untreated decay were at a much higher risk for increased caries experiences.[2, 3] A prospective cohort study of 1037 children in New Zealand found mothers with poor oral health when the child is young results in greater caries experience as an adult.[7]

However, dental health professionals cannot assume that this correlation can be applied to immigrant populations because they are not included in these studies. Studying immigrant populations can be difficult due to barriers including, but not limited to, the subjects avoiding being identified as an immigrant due to the current public climate of restrictions on immigrants use of social and health services.[8] In addition, the Affordable Care Act excluding undocumented immigrants from accessing health insurance that reduces the likelihood of receiving dental care.[9]

This study confirms the findings of two small studies. Flynn et al.,[5] conducted a retrospective study at a Federally Qualified Health Center (FQHC) with a large immigrant and refugee patient base in Minnesota. No correlation was found between immigrant mother-child caries experience.[5] This retrospective study conducted in Minnesota categorized the mothers by primary language. The study identified immigrant groups by the mothers' primary language including Somali. Cvikl et al., [10] found that migration was an independent factor associated with child caries experience.

The mean age and caries experience of Somali mothers in both this study and the aforementioned study by Flynn et al., were consistent.[5] Caries experience in this study found Somali women with a mean age of 33.75 yielded a mean DMFS score of 20.6 (SD=19.9). Flynn et al., reported Somali women subjects with a mean age of 34.6 had a mean DMFS score of 20.3 (SD=14.8). These results are higher than the US adult female aged 20 to 64 years with a mean DMFS of 32.12.[11] Although the age ranges are somewhat different between these studies the general directions are similar.

When reporting decay prevalence with DMFT Geltman et al.,[12] found Somali women to have a lower score than that of the national average. Somali women in Massachusetts average DMFT score was 6.28 DMFT as compared to the U.S. population of 10.7.[11] The U.S. women's age ranged from 20 to 64, but the range of age in the Somali population was not specified. The Geltman et al. study had three age ranges of 18 to 24, 25 to 44, and 45 and greater including men.[12]

Comparisons of US national averages of child caries do not use the same indices as those used in this study. The National Institute of Health (NIH)[13] recorded dfs and DFS scores rather than dmfs and DMFS due to lack of information regarding the cause of missing teeth. However, the Somali children aged 0 to 5 years in this study had a mean dmfs score of 1.8 (SD 3.2) and the children aged 6 to 12 years had a dmfs of 6.0 (SD= 12.7) and a DMFS score of 1.3 (SD= 2.4). The dmfs scores compared to the US average 0 to 5 year old range was 2.58 and for 6 to 11 years of age is 4.4.[13] The DFS scores for 6 to 8 and 9 to 11 year olds in the U.S. were 0.29 and 1.06. These findings are of interest as they reveal a lower than average score in the 0 to 5 year-old range and a higher than average in the 6 to 12 and 6 to 11 year-old ranges.

The current study also indicated there is a strong association between Somali mother's oral health self-perceptions and caries experience. In addition to mother- child caries experience, this study also compared the relationship of mothers perceived oral health to her dental caries experience. Self-perception has been found to be an accurate indicator of general health.[14, 15] It is important to know if this theory includes oral health, because when self-perception matches actual health, interventions can be made to prevent disease or the spread of said disease.

Although measuring self-perception is newer to oral health than general health, one European study using the same five-point Likert scale also found similar results. Martínez-Beneyto et al., found that women with poorer self-assessed oral health had greater caries experience measured with DMFT scores.[16] While DMFT are not as specific as DMFS scores, the associations and direction of the comparisons indicate that women living in different geographic locations accurately described their level of oral health. Likewise, a pilot study in Minnesota on Somali refugees by Okunseri et al.,[6] found that as oral health self-perceptions improved caries experience was lowered. The study by Okunseri et al. study was not specific to Somali women.

Conclusion

While a strong body of evidence documents a substantial correlation between mother-child caries experience, this study found no correlation between Somali refugee mother–child dyads. This is important as the previously held belief that intergenerational caries was due to maternal-child bacterial transfer is not supported by these results. This study also found that Somali women's self-perceived oral health is accurate when compared to their clinically-assessed caries experience. This awareness is important when planning an intervention based on current knowledge of oral health. To improve this population's oral health, future research is needed to explore broader factors related to social determinants of health associated with the disruption in the relationship of mother-child caries experience.

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SECTION 4: TABLES

Table 1 Demographics

	Mean (SD)	
	Mother	**Child**
Age	33.8 (6.3)	8.2 (3.3)
DMFS (child age 6-12 years)	20.6 (19.9)	1.3 (2.4)
dmfs (ages 0-5)		1.8 (3.2)
dmfs (ages 6-12)		6.0 (12.7)
Age at immigration	24.1(8.1)	
Years in the U.S.	9.6 (5.3)	
	Proportion	
Educational attainment		
< high school diploma	26.6	
ESL only	37.3	
High school diploma	21.3	
College or more	14.6	
Dental Insurance	96.0	97.3
Dental visit in the past year	73.3	68.6
Self-reported oral health		
Much better than others	29.3	
Somewhat better than others	25.3	
Same as others	32.0	
Worse than others	9.3	
Much worse than others	2.6	

Table 2. Relationship Between Somali Mother-Child DMFS/dmfs Scores

acc	**Mother DMFS**	
	r	p-value
Child dmfs	0.034	p=0.7929
Child DMFS	-0.069	p=0.6164

P-values from ANOVA models.

SECTION 5: APPENDICES

Appendix A: Institutional Review Board Approval

UNIVERSITY OF MINNESOTA

Twin Cities Campus

Human Research Protection Program
Office of the Vice President for Research

D528 Mayo Memorial Building
420 Delaware Street S.E.
MMC 820
Minneapolis, MN 55455

Office: 612-626-5654
Fax: 612-626-6061
E-mail: irb@umn.edu or ibc@umn.edu
Website: http://research.umn.edu/subjects/

April 6, 2016

Jodie A Entinger
2223 Woodlyn Ridge Ct
Mound, MN 55364-1406

RE: "Intergenerational dental cavities of Somali mothers and children"
IRB Code Number: **1602P84105**

Dear Ms. Entinger

The Institutional Review Board (IRB) received your response to its stipulations. Since this information satisfies the federal criteria for approval at 45CFR46.111 and the requirements set by the IRB, final approval for the project is noted in our files. Upon receipt of this letter, you may begin your research.

IRB approval of this study includes the consent form received April 1, 2016 and recruitment materials received February 12, 2016.

The IRB would like to stress that subjects who go through the consent process are considered enrolled participants and are counted toward the total number of subjects, even if they have no further participation in the study. Please keep this in mind when calculating the number of subjects you request. This study is currently approved for 250 subjects. If you desire an increase in the number of approved subjects, you will need to make a formal request to the IRB.

On March 28, 2016 the IRB approved the referenced study through March 27, 2017 inclusive.

The Assurance of Compliance number is FWA00000312 (Fairview Health Systems Research FWA00000325, Gillette Children's Specialty Healthcare FWA00004003). Research projects are subject to continuing review and renewal. You will receive a report form two months before the expiration date. If you would like us to send certification of approval to a funding agency, please tell us the name and address of your contact person at the agency.

As Principal Investigator of this project, you are required by federal regulations to inform the IRB of any proposed changes in your research that will affect human subjects. Changes should not be initiated until written IRB approval is received. Unanticipated problems or serious

unexpected adverse events should be reported to the IRB as they occur. Notify the IRB when you intend to close this study by submitting the Study Inactivation Request Form.

The IRB wishes you success with this research. If you have questions, please call the IRB office at 612-626-5654.

Sincerely,

Clinton Dietrich

Digitally signed by Clinton Dietrich
DN: c=US, st=Minnesota, l=Minneapolis, ou=Human Research Protection Program, email=dietr006@umn.edu, o=University of Minnesota, cn=Clinton Dietrich
Date: 2016.04.07 16:23:16 -05'00'

Clinton Dietrich, MA
Research Compliance Supervisor
CD/bw

CC: Priscilla Flynn

Appendix B: Study Participant Information in English

Study Information for Participants:
Intergenerational dental cavities of Somali mothers and children

Why is this study being done?
You are asked to participate in a study of mothers and their young children to compare dental cavities. This study is being done because a recent very small study done in Minneapolis found that Somali mothers had very few cavities, but their children had a lot of cavities. This is different from what is usually seen in families and we want to find out if this is what is happening in general so we can help prevent cavities in Somali children.

What are we asking you to do?
Both you and your child will be asked to open your mouths so we can look to see if you have dental cavities, fillings, or missing teeth. We will not use any dental instruments and will not touch your teeth. You will also fill out a survey that will take about 10 to 20 minutes. You have the choice of filling out the survey yourself in either Somali or English, or we can ask you the questions verbally. The risk of participating will be the inconvenience of taking time out of your day and letting us look in your mouth and your child's. The benefit is that we will have a better idea of Somali family's risk of getting cavities, and can help improve oral health.

We need about 200 mothers and their children (i.e., a total of 400 people) for our study. All information that you provide will be confidential. Reports will be for all mothers and children as a group so no one person will be identifiable.

If we see any cavities that we think need to be treated, we will give you information to help you find dental care if you don't have a regular dentist.

How will you be compensated?
Each mother will receive a $25 Target gift card, and each child will get a fluoride varnish with your consent. Fluoride varnish helps prevent dental cavities. Only children who are allergic to tree resins should not get fluoride varnish. The value of the fluoride varnish is $38 at our dental school.

If you agree to participate, you may stop the study at any time and will still receive the gift card and/or fluoride varnish. We will come back to your day care center to share our results in about 3 to 6 months.

Your signature is needed on the consent form for you and your child. Keep a copy of this information for your records. A phone number and email address are included if you'd like to contact the researchers or the Institutional Review Board.

Appendix C: Study Participant Information in Somali

Warbixinta daarasadan ee loogu tala galay ka qayb-galayaasha

Suuska ilkaha isirwadaaga ah ee hooyooyinka iyo carruurta Soomaaliyeed

Waa maxay daraasaddan lagu sameeyey?
Waxaa lagu weydiinayaa in aad ka qayb qaadato Cilmibaaris la isku barbardhigayo suuska ilkaha ee hooyooyinka iyo carruurtooda yaryar. Cilmibaaristan waxaa loo sameeyey, maxaa yeelay waxa la ogaaday in hooyooyinka Soomaaliyeed aad ugu yaryahay suuska ilkaha laakin caruurtooda suuska ilkaha ku badan yahay kadib cilmibaaris aad u yar ee dhawaan lagu sameeyey Minneapolis.
Tani waa waxa la arkay in inta badan qoysaska kala duwan, waxaana dooneynaa si aad u ogaato haddii ay tahay waxa ka dhacaya guud si aan u caawin karaa kahortagga daloolada in carruurta Soomaaliyeed.

Waa maxay waxa aynu ku waydiinayno in aad samaysid?
Waxaa lagu weydiin doonaa adiga iyo ilmahaaga inaad afka furtaan si aan fiirino haddii ay jiraan suuska ilkaha, ilko la buuxshay, ama ilko maqan. Ma isticmaali doono qalabka ilkaha lagu baaro, mana taaban doono ilkahaaga. Sidoo kale waxaad buuxin doontaa baaritaan cilmiyeed kaas oo qaadan doono qiyaastii 10 ilaa 20 daqiiqo. Waxad leedahay inaad kala dooratid luuqada lagu buuxinayo baaritaanka sida Soomaali, Ingriiska, ama in aan su'aalaha afka ka waydiino. Kaqeybqaadashadan culesykeeda ayaa ah mid aan ku haabooneyn xiliga fasaxa aad soo qaadatay si aan ufiirino afkaaga iyo kan ilmihagaaba. Natiijada ayaa noqon donto mid aynu kahelno fikrad wanagsan qaabka suuska ilkaha u waxyeeleeyo qoysaska soomaaliyeed, isla markaana naga caawisa si aan uhormarino caafimaadka afka

Waxaan u baahanahay 200 hooyooyinka iyo carruurtooda (i.e., wadar ahaan 400 oo qof) daraasada cilmibaaristeena. Dhammaan xogta warbixintaan waxa loo xifidaya si qarsoodi ah. Warbixintu ay noqon doontaa mid a dhammaan hooyooyinka iyo carruurta isku meel kujiraan, mana jiri doonto in qof laga aqoonsado.

Haddii aan arko suuska ilkaha oo aynu u malayno u baahanyahayin la daweeyo, waxaan idin siin doonaa macluumaad kaa caawiniya inaad hesho daryeelka ilkaha haddii aadan haysan dhaqtar ilkaha ah..

Qaabke baa magdhow lagu siinaya?
hooyo kastaa waxa ay heli doontaa $ 25 kaarka hadiyadda Target, iyo ilmo kasta oo ay heli doonaan varnish a fluoride adiga ogolaanshahaaga darteed. varnish Fluoride waxay ka caawisaa inay ka hortagto suuska ilkaha. Marla laga reebo carruurta qaba xasaasiyada Tree Resin waa in aysan qaadan varnish fluoride. Iskuulkayaga ilkaha qiimaha ay VARNISH fluoride joogto waa $ 38.

Haddii aad ogolaato in aad ka qaybqaadatid , waxaa laga yaabaa waqti walba joojisid daraasadan climi-baarista, welina waxad heli doontaa kaarka hadiyadda iyo / ama varnish fluoride. Waxaan kusoo laaban doonaa xarunta daryeelka caruurta mudo 3 bilood ilaa 6 bilood gudahood si aynu idinkula wadaagno natiijada.
Saxiix ayaa laga baahan yahay warqada oggolaanshaha ee adiga iyo ilmahaagaba. Hayso nuqul ka mid ah macluumaadkan, kuna xifdi diiwaankaaga. Waxa lasocda Telefoon lambad iyo cinwaanka E-mail ah haddii aad jeceshahay in aad la xiriirto cilmi-baarayasha ama Guddiga Dib u eegista

Appendix D: Letter of Consent English Version

CONSENT FORM

Intergenerational dental cavities of Somali mothers and children

You are invited to be in a research study of the relationship of dental cavities between Somali mothers and their children. You were selected as a possible participant because you are a Somali mother with children aged 12 or under. We ask that you read this form and ask any questions you may have before agreeing to be in the study.

This study is being conducted by: Jodie Entinger, a graduate student in the Department of Primary Dental Care, Division of Dental Hygiene at the University of Minnesota

Background Information

The purpose of this study is: to determine the relationship between mother-child dental cavities. Results will be used to prevent dental cavities among Somali children.

Procedures:

If you agree to be in this study, we would ask you to do the following things:
Complete a survey and both you and your child(ren) present at day care today, aged 12 and under, will participate in an oral screening. The oral screening includes looking in your mouth with no instruments. Filling out the survey will take about 10 to 20 minutes and the oral screening will take about 2 minutes for each participant.

Risks and Benefits of being in the Study

The study has several risks: First, the survey takes time to complete so may be frustrating as it will take time out of your day; Second, if we see dental cavities as part of the oral screening, we will inform you that you should seek dental care which will take additional action on your part.

The benefits to participation are: helping us better identify Somali children at risk of developing dental cavities and reducing those risks in the future.

Compensation:

You will receive payment: $25 gift card to Target and a free dental varnish application, if desired, for participating children valued at $38.

Confidentiality:

The records of this study will be kept private. In any sort of report we might publish, we will not include any information that will make it possible to identify a subject. Research records will be stored securely and only researchers will have access to the records. Study data will be encrypted according to current University policy for protection of confidentiality.

Voluntary Nature of the Study:

Participation in this study is voluntary. Your decision whether or not to participate will not affect your current or future relations with the University of Minnesota or your day

care center. If you decide to participate, you are free to not answer any question or withdraw at any time without affecting those relationships.

Contacts and Questions:
The researchers conducting this study are: Jodie Entinger and Dr. Priscilla Flynn. You may ask any questions you have now. If you have questions later, **you are encouraged** to contact them at University of Minnesota School of Dentistry, 612-625-1369, flynn125@umn.edu.

If you have any questions or concerns regarding this study and would like to talk to someone other than the researcher(s), **you are encouraged** to contact the Research Subjects' Advocate Line, D528 Mayo, 420 Delaware St. Southeast, Minneapolis, Minnesota 55455; (612) 625-1650.

You will be given a copy of this information to keep for your records.

Statement of Consent:

I have read the above information. I have asked questions and have received answers. I consent to participate in the study.

Signature:_____ Date: _____

Signature of Investigator:_____ Date: _____

[Include a header or footer with IRB study code #, pagination (x of y) and consent form version date.]

Appendix E: Letter of Consent Somali Version

Oggolaansho Ka Qeybqaadasho Cilmi-Baaris

Waxaa lagaa codsanayaa inaad ka qeybqaadato daraasad cilmi-baaris ah. Intaadan oggolaan, cilmi-baaruhu waa inuu kuu sheegaa:

i. ujeeddada, habka la raacayo, iyo muddada ay qaadanayso cilmi-baarista;
ii. habkasta ee tijaabada loo isticmaalayo;
iii. wixii khatar ah oo ka imaan kara, dhibaatooyin kale, faa'iidada cilmi-baarista;
iv. hababka ama dawooyinka kale ee aad muhiim u ah;
v. sida xogtaada loo dhowri doono.

Kolkii ay noqotaba, cilmi-baaruhu waa inuu kuu sheegaa:

i. magta iyo daawada aad heli kartid haddii dhaawa kusoo gaaro;
ii. wixii khatar lama filaan ah ee kugu dhici kara;
iii. xaaladaha uu cilmi-baaruhu kaaga reebi karo ka qeybqaadashada;
iv. wixii qiimo ee kugu kacay;
v. waxa kugu dhacayo haddii aad go'aansato inaad joojisid ka qeybqaadashada;
vi. gorta laguu sheegayo natiijooyinka ka soo baxa cilmi-baarista taasoo laga yaabo inay saameeyso ka qeyb qaadashadaada; iyo
vii. tirada dadka cilmi-baarista ka qeybqaadanaya.

Haddii aad oggolaatid inaad ka qeybqaadato, waa in koobi lagaa siiyaa warqaddan iyo qoraal kooban oo cilmi-baarista ku saabsan.

Waxaad la xiriir kartaa DR. SHIREE teleefonka 612-735-5598 markasta ee aad qabtid su'aal cilmi-baarista ku saabsan.

Waxaad la xiriiri kartaa Research subjects advocate line teleefonka 612-625-1650 haddii aad qabtid su'aalo ku saabsan xuquuqdaada laxiriirta cilmi-baarista ama aad rabtid inaad ogaatid waxa aad sameyn laheyd haddii dhaawac ku soo gaaro.

Khasab ma aha inaad cilmi-baarista ka qeybqaadato; haddii aad diiddo ama aad markii aad rabto iska joojiso, cidna kuma ciqaabi karto ama wax aad heli jirtay laguuma diidayo.

Saxiixa warqaddan macnahiisu waa in laguu sharxay warbixinta cilmi-baarista sare, iyo inaad adigoon cidi ku khasbin dooratay inaad ka qeybqaadato.

Saxiixa Ka Qeybqaataha	Taariikhda
Saxiixa Markhaatiga	Taariikhda

Short Form Consent - SOMALI

Appendix F: Screening Form

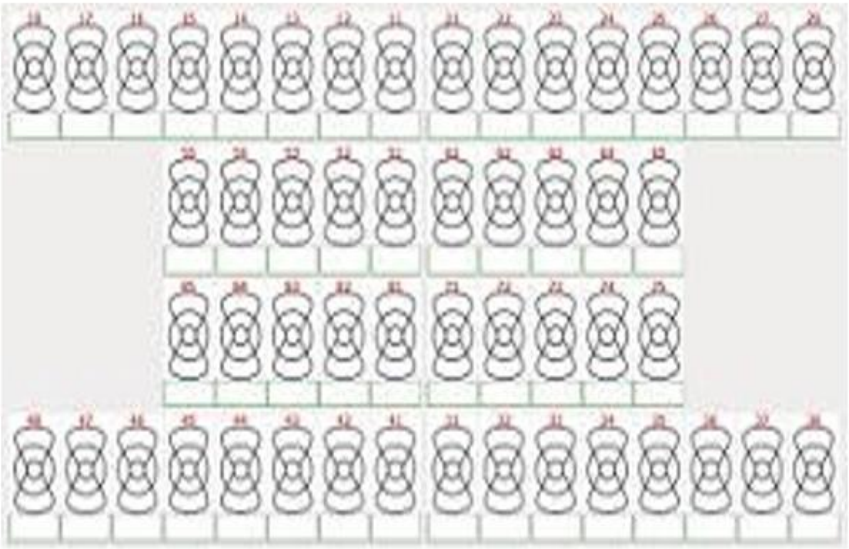
Screening Form

Site
Date _____
Screener ID _____

Mother's name _____ Survey ID _____

Child's name Child birthdate

Child's last dental visit: ☐ Never ☐ More than 1 year ago ☐ Within the last year
Child's brushing frequency: ☐ Never ☐ Once daily ☐ Twice daily or more



Screening Key:
X = tooth not present (unerupted or exfoliated)
Filled in Blue = treated surfaces (amalgam, composite, SSC)
"S" in Blue on occlusal = sealant
X in Red = erupted & missing tooth due to decay or recommended for extration
Filled in Red – apparent decay (d_2 or D_2)
Red "W" = white spot lesion (non-cavitated surface = d_1 or D_1)

BSS Referral Categories

0 = no obvious problem – next scheduled visit
1 = early care – next several weeks
2 = urgent care – within next week – pain or infection
Comments:

Frequent snacking?
☐ YES ☐ NO

Visible plaque?
☐ YES ☐ NO

Gingivitis or Perio?
☐ YES ☐ NO

CARIES EXPERIENCE

d_1=
d_2=
m=
f=

D_1=
D_2=
M=
F=

Appendix G: Oral Health Literacy Form English Version

Confidential

Mother Child Caries Incidence

Please complete the survey below.

Thank you!

Goormaad dhalatay? (Bil/Sanad) _____

Wadan kee ku dhalatay? _____

Sheeg goortii ugu horaysay oo aad timaatid Mareekanka? (Bil/Sanad) _____

Waa maxay xaaladaada guur? (Fadlan sax kaad u qalantid

- ◯ Doob Wali maguursan
- ◯ Furniin
- ◯ Carmalo
- ◯ Kala nool
- ◯ Marwo
- ◯ Diiday

Waa maxay Diintaada

- ◯ Islaam
- ◯ Kirishtan
- ◯ Waxba
- ◯ Kale, Fadlan caddee_____
- ◯ Diiday

Galaaskii ugu sareeyay ee aad Iskool kagaartay?

- ◯ Waligay Iskool ma'aadin
- ◯ Hoose/Dhexe (K-8)
- ◯ Qayb Dugsi Sare
- ◯ Barasho luuqadeed
- ◯ Shihaado Dugsi Sare (GED)
- ◯ Qayb Jaamacadeed
- ◯ Heer Jaamacad iyo wixii kasareeya
- ◯ Kale _____
- ◯ Diiday

Hadda waa maxay wax qabadkaaga ama xaaladdaada shaqo?

- ◯ Guri hagaajiye/Marwo
- ◯ Arday
- ◯ Baagamuundo
- ◯ Ka Shaqeeya hal shaqo ama kabadan
- ◯ Howlgab
- ◯ Kuwa kale
- ◯ Diiday

Inta badan Su'aalaha cilmi baaristan waxa ay ku saabsan yihiin xaalada guud ee caafimaad ee ilkahaaga iyo afkaaga

Cunuga Kowaad in Survey ID # _____

Taariiqda Dhalashada (Bisha/Maalinta/Sanadka? _____

What is the main reason that you take this child to a medical doctor?

- ◯ well-child check ups that include vaccines
- ◯ well-child check ups but I don't allow vaccines
- ◯ when the child is sick
- ◯ I only take this child to the emergency room when absolutely needed
- ◯ I don't take this child to a medical doctor
- ◯ refused

Second child in survey ID # _____

Second child's birthdate (MM/DD/YYYY) _____

Compared to your friends and family, would you say this child's oral health is...

- ◯ Much better than others
- ◯ Somewhat better than others
- ◯ About the same as others
- ◯ Somewhat worse than others
- ◯ Much worse than others
- ◯ Refused

What is the main reason that you take this child to a medical doctor?

- ◯ well-child check ups that include vaccines
- ◯ well-child check ups but I don't allow vaccines
- ◯ when the child is sick
- ◯ I only take this child to the emergency room when absolutely needed
- ◯ I don't take this child to a medical doctor
- ◯ refused

Third child in survey ID # _____

Third child's birthdate (MM/DD/YYYY) _____

Compared to your friends and family, would you say this child's oral health is...

- ◯ Much better than others
- ◯ Somewhat better than others
- ◯ About the same as others
- ◯ Somewhat worse than others
- ◯ Much worse than others
- ◯ Refused

What is the main reason that you take this child to a medical doctor?

- ◯ well-child check ups that include vaccines
- ◯ well-child check ups but I don't allow vaccines
- ◯ when the child is sick
- ◯ I only take this child to the emergency room when absolutely needed
- ◯ I don't take this child to a medical doctor
- ◯ refused

Self-assessed health

	Much better than others	Somewhat better than others	About the same as others	Somewhat worse than others	Much worse than others	Refused
Compared to your friends and family, would you say your general health is...	◯	◯	◯	◯	◯	◯

Compared to your friends and family, would you say your oral health is...	○	○	○	○	○	○

	Yes	No	Don't Know	Refused
Do you have insurance that helps pay for any routine dental care including cleaning.x-rays, and examinations	○	○	○	○
Does your child (or children) being screened today have dental insurance?	○	○	○	○

When you consider all the things you have to do to take care of yourself physically and emotionally, how important is your oral health?

- ○ the most important thing
- ○ very important
- ○ somewhat important
- ○ not very important
- ○ not important at all. I only tthink about it when I am having problems
- ○ Refused

KNOWLEDGE SECTION

What is the main purpose of fluoride?

- ○ makes toothpaste taste better
- ○ strengthens teeth to prevent cavities
- ○ sanitizes water
- ○ don't know
- ○ refused

Knowledge of children's oral hygiene (KOCH) & Oral Health Fatalism (OHF)

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree	Refused
Cavities in baby teeth don't matter, since they fall out anyway.	○	○	○	○	○	○
Keeping baby teeth is not very important; after all, they fall out.	○	○	○	○	○	○
There is not much I can do to stop my child from developing dental cavities	○	○	○	○	○	○
There is not much I can do to help my child have healthy teeth.	○	○	○	○	○	○
Children don't need to brush every day until they get their permanent teeth.	○	○	○	○	○	○

Children don't really need their own toothbrush until their teeth come in.	○	○	○	○	○	○
Most children eventually develop dental cavities. (OHF)	○	○	○	○	○	○

BEHAVIORS SECTION

During the past year, did you go to the dentist?
- ○ Yes
- ○ No

If YES, how much of a problem was it for you to get dental care?
- ○ a big problem
- ○ a small problem
- ○ not a problem
- ○ don't know
- ○ refused

If NO, what is the MAIN REASON you did NOT go to the dentist during the past year?
- ○ Couldn't find a dentist who would accept me as a patient
- ○ Couldn't get an appointment at a time I could go
- ○ Didn't need any dental care during the past year
- ○ Not sure if my insurance paid for dental
- ○ There is a different reason
- ○ Don't know
- ○ Refused

How often do you clean your teeth?
- ○ less than once a day
- ○ Once a day
- ○ Twice a day
- ○ Three times a day
- ○ Four Times a day or more
- ○ Refused

What is the main reason that you clean your teeth?
- ○ Part of cleaning before prayer (salat)
- ○ Prevent dental diseases (cavities and gum disease)
- ○ To make sure my breath is fresh
- ○ To make my teeth whiter
- ○ Other
- ○ Refused

How do you clean your teeth?
- ○ Brush
- ○ Miswak
- ○ Both
- ○ Other
- ○ Refused

What is your family's main source of drinking water?
- ○ tap water from the faucet
- ○ bottled water
- ○ about equal amounts of tap and bottled water
- ○ don't know
- ○ refused

When your child brings home paper forms from school for you to sign and return, what do you generally do?

- ◯ sign and return them
- ◯ it depends what they are for. I sign some and not others
- ◯ don't sign them as I'm not sure what they're for
- ◯ my children aren't in school
- ◯ I don't recall any forms sent home with my child
- ◯ don't know
- ◯ refused

ORAL HEALTH LITERACY

Select one answer choice for each of the following questions

	Unable to do	Very difficult	With some difficulty	Little difficulty	No difficulty	Refused
Are you able to pay attention to your dental or oral health needs?	◯	◯	◯	◯	◯	◯
Are you able to make time for things that are good for your dental or oral health?	◯	◯	◯	◯	◯	◯
Are you able to read written information such as leaflets given to you by your dentist?	◯	◯	◯	◯	◯	◯
Are you able to read dental or oral health information brochures left in dental clinics and waiting rooms?	◯	◯	◯	◯	◯	◯
Are you able to take family or a friend with you to a dental appointment?	◯	◯	◯	◯	◯	◯
Are you able to ask someone to go with you to a dental appointment?	◯	◯	◯	◯	◯	◯
Are you able to pay to see a dentist?	◯	◯	◯	◯	◯	◯
Are you able to pay for medication to manage your dental or oral health?	◯	◯	◯	◯	◯	◯
Do you know how to get a dentist's appointment?	◯	◯	◯	◯	◯	◯
Do you know what to do to get a dentist's appointment?	◯	◯	◯	◯	◯	◯
Are you able to look for a second opinion about your dental health from a dental health professional?	◯	◯	◯	◯	◯	◯

Are you able to use advice from a dentist to make decisions about your dental health?	○	○	○	○	○	○
Are you able to carry out dental instructions that a dentist gives you?	○	○	○	○	○	○
Are you able to use advice from a dentist to make decisions about your dental health?	○	○	○	○	○	○

ACCULTURATION

What do you consider your first language?

- ○ Somali
- ○ English
- ○ Other
- ○ Refused

How often do you speak your native language in general?

- ○ Always
- ○ Sometimes
- ○ Never
- ○ Refused

How often do you speak English with friends?

- ○ Never
- ○ Sometimes
- ○ Always
- ○ Refused

How often do you watch TV programs or movies from Somalia?

- ○ Always
- ○ Sometimes
- ○ Never
- ○ Refused

	Never	Sometimes	Always	Refused
How often do you listen to American music?	○	○	○	○
How often do you eat American food?	○	○	○	○
How often do you watch American TV shows?	○	○	○	○

Sometimes life is not as we really want it. If you could have your way, how would you like the following aspects of your life to be like?

	Completely from my culture	Somewhat from my culture	Completely American	Refused
Music	○	○	○	○
Neighborhood	○	○	○	○

Friends	○	○	○	○
Language	○	○	○	○

NEIGHBORHOOD ENVIRONMENT

Indicate how strongly you agree or disagree with each of the following statements

	strongly agree	somewhat agree	neither agree or disagree	somewhat disagree	strongly disagree	Refused
People in my neighborhood know each other	○	○	○	○	○	○
People in my neighborhood are willing to help one another	○	○	○	○	○	○
People in my neighborhood can be trusted	○	○	○	○	○	○
People in my neighborhood are afraid to go out at night due to violence	○	○	○	○	○	○
Children are safe in my neighborhood	○	○	○	○	○	○
People in my neighborhood generally get along with each other	○	○	○	○	○	○

Appendix H: Oral Health Literacy Form Somali

Confidential

Mother Child Caries Incidence

Please complete the survey below.

Thank you!

Goormaad dhalatay? (Bil/Sanad) _____

Wadan kee ku dhalatay? _____

Sheeg goortii ugu horaysay oo aad timaatid Mareekanka? (Bil/Sanad) _____

Waa maxay xaaladaada guur? (Fadlan sax kaad u qalantid
- ◯ Doob Wali maguursan
- ◯ Furniin
- ◯ Carmalo
- ◯ Kala nool
- ◯ Marwo
- ◯ Diiday

Waa maxay Diintaada
- ◯ Islaam
- ◯ Kirishtan
- ◯ Waxba
- ◯ Kale, Fadlan caddee_____
- ◯ Diiday

Galaaskii ugu sareeyay ee aad Iskool kagaartay?
- ◯ Waligay Iskool ma'aadin
- ◯ Hoose/Dhexe (K-8)
- ◯ Qayb Dugsi Sare
- ◯ Barasho luuqadeed
- ◯ Shihaado Dugsi Sare (GED)
- ◯ Qayb Jaamacadeed
- ◯ Heer Jaamacad iyo wixii kasareeya
- ◯ Kale _____
- ◯ Diiday

Hadda waa maxay wax qabadkaaga ama xaaladdaada shaqo?
- ◯ Guri hagaajiye/Marwo
- ◯ Arday
- ◯ Baagamuundo
- ◯ Ka Shaqeeya hal shaqo ama kabadan
- ◯ Howlgab
- ◯ Kuwa kale
- ◯ Diiday

Inta badan Su'aalaha cilmi baaristan waxa ay ku saabsan yihiin xaalada guud ee caafimaad ee ilkahaaga iyo afkaaga

Cunuga Kowaad in Survey ID # _____

Taariiqda Dhalashada (Bisha/Maalinta/Sanadka? _____

Marka la barbar dhigo saaxiibadaa iyo qoyskaaga , ma waxay dhahaan caafimaadka afka wiilkan waa...

- ◯ Inta badan waka wanaagsan yahay kuwa kale
- ◯ xooga ka fiican kuwa kale
- ◯ la mid ah sida dadka kale
- ◯ xoogaa ka xun dadka kale
- ◯ Wax badan ka xun dadka kale
- ◯ Diiday

Waa maxay sababta ugu weyn in aad ilmaha ugaysid dhakhtar caafimaad ?

- ◯ Baaritaan caafimaad iyo talaalka cunuga
- ◯ Baarintaan caafimaad lakin talaalka ma ogoli
- ◯ Marki ilmuhu jiran yahay
- ◯ Waxan ilamaha geeya gargaarka deg deg marki loo baahan yahay kaliya
- ◯ Uma geeyo ilmaha dhaqtar caafimaad
- ◯ Diiday

Cunuga Labaad in survey ID # _____

Taariiqda Dhalashada (Bisha/Maalinta/Sanadka? _____

Marka la barbar dhigo saaxiibadaa iyo qoyskaaga , ma waxay dhahaan caafimaadka afka wiilkan waa.....

- ◯ Inta badan waka wanaagsan yahay kuwa kale
- ◯ xooga ka fiican kuwa kale
- ◯ la mid ah sida dadka kale
- ◯ xoogaa ka xun dadka kale
- ◯ Wax badan ka xun dadka kale
- ◯ Diiday

Waa maxay sababta ugu weyn in aad ilmaha ugaysid dhakhtar caafimaad ?

- ◯ Baaritaan caafimaad iyo talaalka cunuga
- ◯ Baarintaan caafimaad lakin talaalka ma ogoli
- ◯ Marki ilmuhu jiran yahay
- ◯ Waxan ilamaha geeya gargaarka deg deg marki loo baahan yahay kaliya
- ◯ Uma geeyo ilmaha dhaqtar caafimaad
- ◯ Diiday

Cunuga Sadexaad in survey ID # _____

Taariiqda Dhalashada (Bisha/Maalinta/Sanadka? _____

Marka la barbar dhigo saaxiibadaa iyo qoyskaaga , ma waxay dhahaan caafimaadka afka wiilkan waa.....

- ◯ Inta badan waka wanaagsan yahay kuwa kale
- ◯ xooga ka fiican kuwa kale
- ◯ la mid ah sida dadka kale
- ◯ xoogaa ka xun dadka kale
- ◯ Wax badan ka xun dadka kale
- ◯ Diiday

Waa maxay sababta ugu weyn in aad ilmaha ugaysid dhakhtar caafimaad ?

- ◯ Baaritaan caafimaad iyo talaalka cunuga
- ◯ Baarintaan caafimaad lakin talaalka ma ogoli
- ◯ Marki ilmuhu jiran yahay
- ◯ Waxan ilamaha geeya gargaarka deg deg marki loo baahan yahay kaliya
- ◯ Uma geeyo ilmaha dhaqtar caafimaad
- ◯ Diiday

Self-assessed health

	Inta badan waka wanaagsan yahay kuwa kale	xooga ka fiican kuwa kale	la mid ah sida dadka kale	xoogaa ka xun dadka kale	Wax badan ka xun dadka kale	Diiday
Marka la barbar dhigo saaxiibadaa iyo qoyskaaga, ma waxay dhahaan caafimaadkaga guud waa.....	○	○	○	○	○	○
Marka la barbar dhigo saaxiibadaa iyo qoyskaaga, ma waxay dhahaan caafimaadka afkaaga waa.....	○	○	○	○	○	○

	Haa	Maya	Magaranayo	Diiday
Ma haysata Kaarka caymiska caafimaadka oo bixiya daryeelka ilkaha sida nadiifinta ilkaha, raajada ilkaha iyo baaritaanka ilkaha	○	○	○	○
Ma leeyahay ilmaha (caruurta) labaaray maantay kaarka caymiska caamifaamdka ilkaha	○	○	○	○

Ma tixgalisaa waxyaabaha aad is leedahay in la iska ilaaliyo jidh ahaan iyo maskax ahaan, taaso muhiim u yahay caafimaadkaaga afka ?

- ○ Shayga ugu muhiimsan
- ○ Aad u muhiim ah
- ○ Xoogaa muhiim ah
- ○ Aan aad muhiim u ahayn
- ○ Muhiim maahan . Waxaan kaliya ka fakiraa markii ay dhibaato ihaysato
- ○ Diiday

KNOWLEDGE SECTION

Waa maxay muhiimada ugu weyn ee isticmaalka fluoride?

- ○ Ka dhigaysa cadayga dhadhan wanaagsan
- ○ Xoojisaa ilkaha si looga hortago suuska ilkaha
- ○ Nadiifisa biyaha lacabo
- ○ Magaranayo
- ○ Diiday

Knowledge of children's oral hygiene (KOCH) & Oral Health Fatalism (OHF)

	Si aad ah udiidan	Diidan	Midkoodna waaafaqsanayn ama Diidanayn	Waafaqsan	Si aad ah uwaafaqsan	Diiday
Dhib malahan Suuska Ilkaha ilmaha,ilayn ilko caanoodka waa ay dhacayaan	◯	◯	◯	◯	◯	◯
Muhiim maahan Ilaalinta ilka caanoodka ilmaha, waa ay dhici doonaan waqti kadib	◯	◯	◯	◯	◯	◯

ACCULTURATION

Mana ay jiraan wax aan kaga caawin karo suuska ilkaha ee ilmahayga ku dhalanaya	◯	◯	◯	◯	◯	◯

How often do you speak your native language in general?

- ◯ Always
- ◯ Sometimes
- ◯ Never
- ◯ Refused

What do you consider your first language?

- ◯ Somali
- ◯ English
- ◯ Other
- ◯ Refused

	Si aad ah udiidan	Diidan	Midkoodna waaafaqsanayn ama Diidanayn	Waafaqsan	Si aad ah uwaafaqsan	Diiday
Mana ay jiraan wax aan wax kaga caawin karo caafimaadka ilkaha ilmahayga	◯	◯	◯	◯	◯	◯

How often do you speak English with friends?

◯ Never
◯ Sometimes
◯ Always
◯ Refused

	Si aad ah udiidan	Diidan	Midkoodna waaafaqsanayn ama Diidanayn	Waafaqsan	Si aad ah uwaafaqsan	Diiday
ilmaha uma baahna cadayga ilkaha ilaa inta ay so baxaan ilkaha joogtada ah	◯	◯	◯	◯	◯	◯

How often do you watch TV programs or movies from Somalia?

◯ Always
◯ Sometimes
◯ Never
◯ Refused

	Si aad ah udiidan	Diidan	Midkoodna waaafaqsanayn ama Diidanayn	Waafaqsan	Si aad ah uwaafaqsan	Diiday
Ilmaha uma baahna inay caday gaar ah yeeshan ila ilkaha ay uso baxaan	◯	◯	◯	◯	◯	◯

	Never	Sometimes	Always	Refused
How often do you listen to American music?	◯	◯	◯	◯

	Si aad ah udiidan	Diidan	Midkoodna waaafaqsanayn ama Diidanayn	Waafaqsan	Si aad ah uwaafaqsan	Diiday
ugu danbayntii ilmaha badankood waxa ku dhaca suuska ilkaha	◯	◯	◯	◯	◯	◯

	Never	Sometimes	Always	Refused
How often do you eat American food?	◯	◯	◯	◯

BEHAVIORS SECTION

Sanadki lasoo dhaafay ma utagtay dhaqtarka ilkaha?
◯ Yes
◯ No

	Lama samaynkaro	Aad u adag	Dhib ah qaarkood	Wax yar oo dhib ah	Dhib malahan	Diiday
Ma awooda inaad ka isticmaasho talo u kusiyey dhaqtarka ilkaha si aad ugaartid go'aamo ku saabsan caafimaadka ilkahaga	◯	◯	◯	◯	◯	◯

	Never	Sometimes	Always	Refused
How often do you watch American TV shows?	◯	◯	◯	◯

Hadi jawaabtadu HAA tahay, majirtaa wax dhibaato ah aad kala kulantid si aad u heshid daryeelka ilkahaaga
◯ Dhib weyn
◯ Dhib yar
◯ Dhib la'aan
◯ Magaranayo
◯ Diiday

Sometimes life is not as we really want it. If you could have your way, how would you like the following aspects of your life to be like?

	Completely from my culture	Somewhat from my culture	Completely American	Refused
Music	◯	◯	◯	◯

Hadi jawaabtadu MAYA tahay, waa maxay sababta ugu weyn ee aad ugu tagi wayday dhaqtarka ilkaha sanadki lasoo dhaafay
◯ Maheli karin dhaqtar ilkaha ah kaso ii aqbala bukaan ahan
◯ Meheli karin wax balan ah marki aan aado
◯ Uma baahnayn daryeelka ilkaha sanadki laso dhaafay
◯ Ma aanan ogayn inu bixiyo daryeelka ilkaha kaarka caymiska aan haysto
◯ Ma ay jiraan sababo kuwaan ka duwan
◯ Magaranayo
◯ Diiday

	Completely from my culture	Somewhat from my culture	Completely American	Refused
Neighborhood	◯	◯	◯	◯
Friends	◯	◯	◯	◯

Imisa jeer ayaad nadiifisa ilkahaaga?

- ◯ In ka yar Hal mar maalinti
- ◯ Hal mar maalinti
- ◯ Labo mar maalinti
- ◯ Sadex mar maalinti
- ◯ Afar mar maalintii ama kabadan
- ◯ Diiday

	Completely from my culture	Somewhat from my culture	Completely American	Refused
Language	◯	◯	◯	◯

Waa maxay sababta aad unadiifisid ilkahaaga

- ◯ ilko nadiifintu waa qeyb kamid ah salaada kahor
- ◯ Kahortag cudurada ilakaha (suuskka ilkaha iyo yiridka)
- ◯ Si uu afka u carfoonaado
- ◯ Cadayn ilkaha ah
- ◯ Kuwo kale
- ◯ Diiday

Qaabkee u nadiifisaa ilkahaaga

- ◯ Burushka
- ◯ Geed cadayga
- ◯ Labadaba
- ◯ Kuwo kale
- ◯ Diiday

NEIGHBORHOOD ENVIRONMENT

Indicate how strongly you agree or disagree with each of the following statements

	strongly agree	somewhat agree	neither agree or disagree	somewhat disagree	strongly disagree	Refused
People in my neighborhood know each other	◯	◯	◯	◯	◯	◯
People in my neighborhood are willing to help one another	◯	◯	◯	◯	◯	◯

Waa maxay ilaha ugu weyn ay ka helaan biyaha la cabbo qoyskaaga?

- ◯ Qasabada biyaha
- ◯ Caagaga yar yar ee biyaha
- ◯ Isku jir qasabadaha biyaha iyo caagaga yar yar
- ◯ Magaranayo
- ◯ Diiday

	strongly agree	somewhat agree	neither agree or disagree	somewhat disagree	strongly disagree	Refused
People in my neighborhood can be trusted	◯	◯	◯	◯	◯	◯

Maxaad guud ahaan samaysaa marka ilmahaagu keenan guriga waraaqaha lagaga soo dhiibo iskuulka si aad u saxiixdidi oo aad dib ugu celisid?

- ◯ Waan saxiixa, waana uceliyaa
- ◯ waxay ku xiran tahay waxa ay yihiin loogu talagalay. Waan saxiixaa qaar ka mid ah, qaarna ma saxiixo
- ◯ Masaxiixo dhamaantod, mana garanayo waxa loogu talagalay
- ◯ ilmahaygu iskuul ma dhigtaan
- ◯ Maxasuusan karo in ilmahayga ay keenen warqado looga soo dhiibay iskuulka
- ◯ Magaranayo
- ◯ Diiday

	strongly agree	somewhat agree	neither agree or disagree	somewhat disagree	strongly disagree	Refused
People in my neighborhood are afraid to go out at night due to violence	◯	◯	◯	◯	◯	◯
Children are safe in my neighborhood	◯	◯	◯	◯	◯	◯
People in my neighborhood generally get along with each other	◯	◯	◯	◯	◯	◯

SECTION 6: PRACTICAL APPLICATION

Immigrant children are at a higher risk for decay than native children. Understanding the risk factors associated with caries is imperative to early intervention. While many studies have correlated mother caries experience to that of her children, our study found no correlation between Somali mothers' caries experience and that of their children. Factors that could explain our findings include factors associated with acculturation.

Acculturation is the process in which an immigrant population takes on the new culture. High acculturation is associated with less caries and better oral health status in refugee populations (1, 2). However, moderate levels of acculturations had worse oral health than those with high acculturations (3). This could be due to adapting a western diet, but not adopting preventive measures, such as oral hygiene habits, and routine fluoride consumption and applications. Further research is needed to investigate the aforementioned factors related to acculturation.

Mothers self-assessed oral health status was proven to be an accurate predictor of caries experience in our study. Oral health literacy (OHL) level may contribute to our findings. Oral health literacy is defined as an individual's ability to gather information on oral health, accurately interpret the information and make appropriate decisions based on their knowledge (4). Although this is a new area of study a study in Brazil found that limited or low OHL was an accurate predictor of untreated caries (5). Therefore, a theory correlating low self-assessment with low oral health literacy should be investigated in the future. This would guide the researcher in the quest to find appropriate interventions to prevent future dental caries.

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