Self-reported Oral health and Oral health Practices among Bangladeshi Immigrants in Norway

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DEDICATION

To my Parents, my only sister, my only baby girl and to my beloved one, for being my greatest critic, for sharing my frustration and caring for me during my study period in Norway.

CLARIFICATION OF TERMS AND ABBREVIATIONS

WHO- World Health Organization

UNFPA- United Nations Fund for Population Activities

UN- United Nations

OR- Odds Ratio

CI-Confidence Interval

REK- Regional Committee for Medical and Health Research Ethics, Oslo

SPSS- Statistical Package for the Social Sciences

UiO- University of Oslo

HTN-Hypertension

DM- Diabetes Mellitus

HUBRO- Oslo Health Study

Innvandrer HUBRO- Oslo Immigrant health study

MOHFW – Ministry of Health and Family Welfare

BBS – Bangladesh Bureau of Statistics

ABSTRACT

Background: Although oral health is an important issue, people from developing countries often neglect it since they have lack knowledge and education about oral health. In addition, there is a general lack of dentists and oral health care is considered expensive and unaffordable for poor people. Oral health is a widely researched topic for people in developed countries, but there is very limited knowledge on oral health among Bangladeshi immigrants worldwide. Therefore, I did my research work on oral health among this ethnic group in Norway.

Objectives: The aim of the study was to investigate self-reported oral health and oral health related practices among the Bangladeshi immigrants (18-58 years) in Norway. This included assessing self-reported oral health, oral hygiene habits, food habits, and frequency of visits to a dentist among adult men and women from Bangladesh living in Norway.

Methodology: A cross-sectional study using a snowball sampling technique was carried out from September to December 2014 among 178 Bangladeshi subjects from Oslo, Bergen, Trondheim and Tromsø of which 56.2% were males and 43.8% were females. The study data was collected by a standardized paper-based questionnaire and also by an internet-based electronic version of the same questionnaire developed by the researcher. The researcher in Oslo area conducted interviews and internet-based electronic version of the questionnaire was used for respondents residing outside of Oslo.

Results: The response rate was 77.9%. Of the 178 participants, 63.95 % reported good dental health and fully dentate was reported by 66.0% males and 52.6% females. Tooth sensitivity (37.1%) was the most common problem and dental caries (29.2%) was second. Tooth sensitivity was significantly higher among participants who were taking at least one teaspoon of sugar in their tea/coffee (48.7%) compare to those who were not taking sugar in their tea/coffee (21.6%) (P=0.05). Study analyses showed that participants who did not clean the inter-dental space were 9.00 times more likely to develop dental caries compared to those who did this. Having a bachelor's degree decreased the risk of developing dental caries by 83%. A significant negative relationship between dental caries and years of staying in Norway was found.

Conclusion: It is important to reduce risk factors and the burden of oral disease and to improve oral health systems and the effectiveness of community oral health programs. Further research is needed as a basis for improving oral health of this minority group.

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1.0 INTRODUCTION

The World Health Organization has stated that "Oral health is essential to general health and quality of life" (1) and that "it allows an individual to speak, smile, touch, kiss, touch, smell, taste, chew, swallow, socialize and eat without any discomfort (2)." The most common oral diseases are dental cavities (dental caries), periodontal (gum) disease, oral cancer, oral infectious disease (Fungal, bacterial, viral infections with HIV), trauma from injuries and hereditary lesions. Worldwide, 60-90% of schoolchildren and approximately 100% of adults have dental cavities. Severe periodontal (Gum) disease, which is the leading cause of tooth loss worldwide, is found in 15-20% of middle-aged (35-44 Years) adults (3). Oral diseases are among the most prevalent non-communicable diseases and are a major component of the global burden of disease (4). Chewing tobacco, betel and areca nut are risk factors for oral cancer. People of South Asian origin frequently use these items. Major risk factors for human health are tobacco use, physical inactivity and a diet high in fat, salt and sugar. These are responsible for a range of chronic diseases such as obesity, diabetes, cardiovascular diseases as well as oral diseases. High consumption of sugar is the number one risk factor for tooth decay (dental caries) and for diabetes (5). Behavioral aspects play a major role in the prevention of both dental caries and periodontal (Gum) disease. Adequate oral hygiene habits and compliance with regular preventive dental visits are essential for the control of both diseases (6).

According to Statistics, Norway (1 January 2010), there were 459 000 immigrants and 93 000 immigrants parents in Norway. Immigrants constitute 11.4 percent of the total population. Three groups of people make up most of the migration from Bangladesh: asylum seekers and refugees, people coming for family reunification, and students. In June 2013, there were about 1026 Bangladeshi people living in Norway (7).There were very few Bangladeshis registered in Norway in 1970. The Bangladeshi community is mostly middle-class with relatively high levels of education compared to other migrant groups (8).

Water fluoridation is essential for preventing dental caries and also for good dental health. Fluoride concentration in ground water of Bangladesh is generally low, but in some rural areas, it is higher than the MPL (Maximum Permissible Limit). Regional distribution of fluoride

in tube wells in 19 districts of Bangladesh reveals that 61% of samples contain less than 0.5 mg/L, which is below the recommended lower limit (9).

This research was aimed at obtaining information about **"Self-reported oral health and about practices related to oral health among Bangladeshi immigrant people in Norway"**. The purpose is to increase the awareness among the people of this immigrant group about maintaining oral hygiene and about prevention of oral diseases.

1.1 Background / Research Gap

- To the best of my knowledge, there are very few studies of Oral health among Bangladeshi immigrants globally. The studies available are only about betel quid chewing, tobacco use, and its association to oral cancer and a study of Bangladeshi schoolchildren.
- Very limited amounts of data about oral hygiene habits, self-reported oral health, and oral health status are found from developing countries, like Bangladesh.

1.2 Rationale

Oral health is an important component of our health, but it is often neglected. People generally put less importance on care aimed at maintaining their oral health. Besides, little is known about these factors in low-income countries and the extent to which they are affecting by immigration to western high-income countries.

- As the WHO Commission on Social Determinants on Health (2008) expressed so clearly: '' in countries at all levels of income, health and illness follow a social gradient: the lower the socio-economic position, the worse the health''. This implies that low socio-economic condition indicates a higher risk of oral disease (10). In Norway Bangladeshis are highly educated and have a comparatively higher socio-economic status than most of the Bangladeshi people in their home country. According to Statistics Norway (2015), almost 39 % of the Bangladeshi immigrants' have the highest level of education (bachelor degree and above/ Tertiary education (i.e. university education) (11).

- Self- preventive oral health behavior and oral hygiene habits are influenced by several factors, including patient motivation, attitude, and value systems (12-14). Consequently, differences in oral hygiene habits have been shown to be related to culture and geographic region (15-18). For example, while 73-83% of school children in Norway, Germany, Sweden, Denmark and Austria brush their teeth twice daily (16), whereas such tooth brushing frequency was reported by only 19-46% in Lithuania, Saudi Arabia, and Japan (16-18).

Therefore, this study aimed at assessing the extent to which people from Bangladesh maintain their oral hygiene and the impact of this and their food habits on oral health. The research was also expected to help our understanding how consciously they considered their oral health.

1.3 Literature review

Literature review was conducted by searching various databases. It included Pub-Med, Google Scholar and Biomed Central. Several studies were found about immigrants' oral health worldwide, but few about immigrants from Bangladesh.

1.3.1 Oral health among Bangladeshi in home country and among Bangladeshi immigrant in western countries

A 2015 study by Hayet SMA et. al on knowledge about oral hygiene and oral health status among secondary school students in Bangladesh looked at the causes of poor dental conditions among secondary school children. It investigated the main causes of developing dental diseases, including improper tooth brushing and poor socio-economic status. This was a cross-sectional study, which used a structured questionnaire. Results showed that 93.76% believed that milk and vegetables were essential food for teeth, 97.92% believed that sweet were harmful for teeth, and 72% believed tooth decay was the main oral health problem. 50.08% said oral microorganism and food habits were the reason for tooth decay. 69.79% said unhealthy *gingiva* was the main reason for gum bleeding (19).

Another study by Ahmad MS et al. (2015) on knowledge and practices relating to oral hygiene by tribal people *(Orao)* in Bangladesh revealed that 64.8% believed brushing should be done after meal(s), more than half (57.2%) of the respondents replied that sweet food or chocolate

was harmful for teeth, 60.4% answered that an upward and downward direction was the proper brushing technique. 76.7% respondents brushed their teeth regularly/everyday, 59.5% respondents brush their teeth once a day, 35.8 % brushed their teeth twice a day (20).

Most of the Bangladeshi immigrants to western countries live in the UK, USA, Canada, Australia and Middle Eastern Countries. Few studies on oral health among Bangladeshi immigrants have been reported and the findings from these studies have not exclusively reported oral health issues among Bangladeshi immigrants. Findings from these studies have included oral health problems among Indian immigrants as well. However, articles that exclusively reported oral health problems among Bangladeshi immigrants only targeted children's oral health. In addition, most of these studies investigated the association between the use of betel quid and tobacco, and oral cancer. I did not find any study that investigated ''**self-reported oral health and Practices of oral health among Bangladeshi immigrants in Norway**'' and other Scandinavian countries.

In Canada, a study was done to investigate the deficiency in oral-health related knowledge and corresponding behaviors among Bangladeshi immigrant schoolchildren in all age groups and both genders. Overall, there was a lack of oral health related knowledge in all age groups and both genders. Oral health related life style practices did not differ between boys and girls except for the inter-dental cleaning behavior. Diet related knowledge was different among Bangladeshi children born inside and outside of Canada. There was lack of awareness about causes of Oral health (21).

Another study from Canada reported on caries related behavior among different ethnic groups of children. The ethnic groups had experienced caries in 57% of the cases, and in total 32% of children needed treatment. There were no satisfactory significant differences among different demographic groups regarding dental treatment needs or dental health status (22).

In Norway, a study from 1986 was done among Pakistani immigrants on dental health behavior, knowledge and beliefs about dental diseases. The study revealed that altogether 60% had visited the dentist during the last 3 years. People coming from cities were more conscious about having a dentist than those coming from rural Pakistan (23).

In Canada, a study was done in 2014 among immigrants' unmet dental care needs. The study revealed that approximately 32% of immigrants reported unmet dental care needs. Low income, lack of dental insurance and ethnicity predicted unmet dental care needs (24).

1.3.2 Changes that occur with immigration in life style (particularly smoking, tobacco chewing and diet)

In Europe, one oral health related study among Bangladeshi immigrants was found from UK. The study investigated the use of betel quid and cigarettes among Bangladeshi patients in an inner-city practice. In particular, the study investigated the knowledge of health hazards associated with betel quid and cigarettes use in East London. The prevalence of tobacco smoking among men was higher than in women. Over 80% of both male and female respondents identified the health risks of smoking, however only one third identified tobacco smoking as a risk factor for oral cancer (25).

Another study by Changrani J. et.al on *Paan* (betel quid) and *Gutka* (tobacco powder) use among Bangladeshi and Indian-Gujrati immigrants in New York City was conducted in the United States. Regular use of the *paan* was similar for the two groups. Less educated people from Bangladesh were more likely to chew *paan* and *gutka* compared to high school graduates. Indian-Gujrarati *gutka* users had larger family sizes compared with non-users. It was also reported from this study that those people who used tobacco with *paan* had higher tendencies to consume betel quid's daily (26).

In 2001, a study on dental health and treatment needs among Bangladeshi medical users aged 40 years and above living in Tower Hamlets, UK conducted by Pearson N. et.al revealed a considerable normative dental need among Bangladeshi medical users. The study was done by clinical examination and an interview schedule. The response rate was 74%. They reported that 85% of the participants were dentate. The mean DMFT (Decayed/ Missing/ Filled Teeth) score was 5.38 with missing teeth 3.81. The authors concluded that *paan* chewing correlated to aspects of the dental periodontal status among users surveyed (27).

1.3.3 Self-care of teeth and gums

A 2004 study by Nessa J. et.al in Bangladesh showed that the prevalence of gingivitis, a common preventable oral health problem was high (89%). The most prevalent age group was over 40 years. They also reported a significantly high prevalence of gingivitis (73.3%) among those who were both tobacco users as well as betel nut chewers. Most of the participants brushed their teeth in the morning rather than at night. The prevalence of gingivitis in this population significantly increased with decreasing social status (28).

I did not find any other study on the topic from Bangladesh. However, a relevant study from Kuwait on adults in 2007 by Shammari K.F et.al showed that 62% of the Kuwaiti participants reported brushing their teeth at least twice daily, but the use of dental floss was only done by 11.8%. Adequate tooth brushing habits were significantly associated with female gender, educational level, non-smoking status, and history of recent preventive dental visits (P= 0.001). The majority of subjects reported multiple oral health problems (29).

1.4 The Oral health and Health care system in Bangladesh

Bangladesh is a land of Southeast Asia. It gained its independence on 16 December 1971 from Pakistan. It is one of the World's most densely populated countries. However, Bangladesh has in recent years, reduced its population growth and improved in health and education. The low-lying country is vulnerable to flooding and cyclones. The primary industry is agriculture (30).

Administratively, Bangladesh is divided into 8 divisions, 64 districts, 595 *Upazilla* (sub-district), 6822 unions and wards. The health care services follow the general administrative division of country. The Ministry of Health and Family Welfare (MOHFW) is responsible for policy, planning and decision making on a national level. Under the Ministry, there are four directorates. There are two major implementation wings, the Director General of Health Services and the Directorate of Family Planning. The Director General of Health Services (DGHS) is responsible for planning and implementing health programs. The Directorate of Family Planning (DGFP) is responsible for family planning programs and implementing technical advice to the Ministry. The other two are the Directorate of Nursing Services (DNS) and the Directorate General of Drug Administration (DGDA) alongside the Health Engineering

Department (HED), the National Nutrition Program (NNP), the Transport & Equipment Maintenance Organization (TEMO), the National Electro-medical & Engineering Workshop (NEMEW) and the Essential Drugs Company Limited (EDCL).

The Directorate General of Health Services (DGHS) acts as the central point of all the health activities throughout Bangladesh. The Community Health Care Service (CHCS) oversees community clinics (CCs) at the ward level.

The Union-Level Health Care Facilities contain union health and family welfare centers (UHFWC) and union sub-centers are a useful part of the union health services (UHS).

Upazila-Level Health Facility Complexes ensures that primary health care services are reachable for the full rural population. Almost all *upazilla* have a health complex facility. All of these complexes are intended to provide specialized facilities for medicine, surgery, gynecology, anesthesia, and dentistry. But the facilities (which include a dental chair and instruments) are ill-equipped and cannot perform all of the necessary dental procedures onsite.

District-Level Health Facilities are the next tertiary level of public sector health care. Each of Bangladesh's 64 districts now has modern hospitals with a bed capacity ranging from 50 to 200 patients. Twenty-three government medical college hospitals and eight postgraduate specialized institutes, with attached hospitals, are incorporated into this level of health care. One government dental college and hospital and eight government medical colleges (dental units) have a course of study for a Bachelor of Dental Surgery (BDS), which takes five years with four years of classroom study and a one-year internship. People can get dental treatment for little to no cost.

Tertiary-Level Health Care Facilities are different types of special care centers. These include Infectious disease hospitals, tuberculosis hospitals, and leprosy hospitals. The medical college hospitals are on a regional level, one for several districts. They are associated with the medical colleges, and provide specialty care in many disciplines. These hospitals are also called tertiary hospitals. Tertiary hospitals also include the national-level super specialty

hospitals or centers that provide high-end medical care services in a specialized field and also have dental unit (31).

There are 3705 registered dentists in Bangladesh for a population of 150 million. Therefore, the ratio of dentists to population is as 46000:1. For that reason, the majority of patients, especially those in the remotest areas of the country, often can only use traditional (unqualified) dentists. The most common treatment is the extraction of teeth. Modern dentistry facilities are only available in the larger cities in Bangladesh (32).

According to the WHO data published in April 2011, oral cancer death in Bangladesh reached 11, 562 or 1.21% of the total deaths reported. The age-adjusted death rate of 12.52 per 100,000 of population ranks Bangladesh as number 4 in the World (33).

There is no national-level information about the distribution of oral diseases in Bangladesh. Only 1591 dental health technologists are available in the country and no primary oral health workers or oral hygienists (34).

1.5 Immigration from Bangladesh to Norway

In Norway, the period of 1825 – 1920 was characterized by the migration of almost 800, 000 Norwegians to North America. However, due to the buildup of the oil industry and the subsequent economic development, Norway became a country for labor migrants and also for refugees and asylum seekers as a result of the intensification of conflicts in Asia, Latin America and Africa (35).

Pioneer Bangladeshi migrants arrived in the 1970s, and by 1980, there were only 27 migrants from Bangladesh in Norway. They came one by one and did not know each other before immigrating. The Bangladeshis were both from rural and urban backgrounds. Three groups constitute the total of this migration: asylum seekers and refugees, those coming for family reunification/ formation and students. A fifth of the total migrants to Norway in the period of 1975-2009, came during 1987-1989. Most of the Bangladeshis came in the period between 1975 and 1990, because of military dictatorship and the terrible political situation during this period in Bangladesh. Students also came in this period. A number of students who had come to Norway and who later obtained a job or a partner have stayed here since. Norwegian

universities do not have tuition fees and foreign students from poor countries like Bangladesh are able to apply for scholarships.

Since the year 1997, the Bangladeshi population in Norway has grown gradually, up to 5 percent per year. Immigration from Bangladesh was the highest in 20 years in 2009. With 579 immigrants and 337 descendants in 2010, Bangladeshis nevertheless remain a small immigrant group in Norway.

The Bangladeshi community in Norway is mostly middle-class with a very high level of education compared to other immigrant groups. Bangladeshis are pretty active in various socio-cultural events; weddings, birthday parties, national day celebrations, religious festivals, and summer picnics. A number of these meetings are privately organized and also include some events from association's celebrations. This community is very interactive in communicating with each other (8).

1.6 Why choose Bangladeshi immigrants?

Bangladeshi culture is rich with a huge and amazing variety of foods. There is a well-known term of *'mase-bhate Bengali'* i.e. Bengalese with fish and rice. While rice is the main staple food, people from Bangladesh are also very fond of sweets and spices. Traditionally, most of the people from the country are also very fond of 'filling up the stomach'. They are not particularly concerned about nutrition. Therefore, most of the women and children in Bangladesh suffer from malnutrition, under nutrition and other health problems (36).

In India, most of the peoples prefer a high-vegetable diet with no beef. Most of the Indian do not eat beef because of their religious beliefs (37).

The Pakistani prefers foods that are basically spicy and oily. They are fond of meat and chicken. They eat fewer amounts of fish. (38). The Bangladeshi people have different cultural food habits and due to consuming an excessively sweet diet they may suffer from more dental diseases.

2.0 OBJECTIVES OF THE STUDY

The aim of my study was to focus on the neglected Oral health in the Bangladeshi community living in Norway. The dentistry profession has been kept abreast with scientific and technological advancements. As a multicultural country, Norway has many different ethnic groups. Oral health practices are not unique to each ethnic group, especially among the Asians. Therefore, it is important to know and their oral health status and oral health practices as well as the underlying sociodemographic and cultural factors. For example, every patient is different and a treatment that is effective for 90% of the patients may not be effective for the other 10% (39). The current study targeted a specific ethnic group to collect information on their thoughts/ perceptions about their oral health.

2.1 The Objectives of the Study are

1. To explore oral hygiene practices among Bangladeshi immigrants living in Norway.
2. To investigate self-reported oral health problems according to different socio-economic statuses and different educational statuses.
3. To assess types and numbers of visits to dental care services.
4. To identify eating and drinking habits and the associations to oral health.

2.2 Research Questions

1. How do Bangladeshi immigrants maintain their oral hygiene?
2. How do their food habits and intake of stimulants affect oral health?
3. How many Bangladeshi immigrants brush their teeth regularly and how long do they brush their teeth?
4. How many times do they visit the dentist after arriving in Norway?
5. How is their self-reported oral health?

3.0 RESEARCH METHODOLOGY

Research can be defined as collection, analysis and interpretation of data in a systemic way to find out the answer to questions (40, 41).Research methods depend on the research questions (42). This study was based on a questionnaire. The methodology used for data collection and analysis was entirely quantitative.

3.1 Research Sites

Most of the Bangladeshi immigrants in Norway live in Oslo, the capital city of Norway. The second largest community is living in Bergen. There are a number of Bangladeshi students in Trondheim. Very few Bangladeshi immigrants are living in Tromsø (8). I conducted my research work in these above-mentioned cities.

3.2 Study design

This study was a cross-sectional study. In a cross-sectional study on health, data is collected at a given single time point and the relationship between diseases or other indicators of health and social, economic and environmental factors, thought to be related to health, are examined. A cross-sectional study can be used for assessing the burden of disease or health needs of a population (43). This study was conducted from September 2014 to December 2014 in Norway.

3.3 Study Population

The study population was Bangladeshi immigrants who have resided in Norway for more than one year in the age range of 18-58 years.

3.4 Sampling Method

The sampling was done via a 'snow ball' sampling method. Snowball sampling may be defined as a technique for recruiting research subjects through identification of an initial subject who are asked to provide the names of other subjects. Thus, those recruited to the study may open up possibilities for an extended web of contacts and inquiry (44). The participants are likely to know others who share the characteristics that make them eligible for inclusion in the

study (45). I chose the snow ball sampling method, since this was a study that had to rely on the resources that I, as the only investigator, had available. Snowballing would mean that I could start with recruiting subjects I knew or could easily come in contact with and thus take advantage of the first respondents' networks to eventually include people that were outside my own network. This method may imply that the sample will be biased (45).

There are three organizations for Bangladeshis in Norway. They are the Bangladesh Association of Norway (BDAN), the Norsk-Bangla Forum and the AmaderJalsha (8). Most of the Bangladeshis are members of the Norsk-Bangla Forum and every year they arrange an Eid (Muslim's main religious festival) and a Bengali New Year celebration program. I started my research work by becoming a member of this association. I presented my research objectives at the Bengali New Year celebration program 2014.

3.4.1 Inclusion Criteria

- Immigrant people from Bangladesh, Age: 18-58 years.
- Bangladeshi immigrants who were willing and had consented verbally
- Bangladeshi immigrants who had been living in Norway for at least 1 year and were mentally sound.

3.4.2 Exclusion Criteria

- Bangladeshi immigrants who were not willing to participate.
- Bangladeshi immigrants who had been living in Norway for less than 1 year.

3.5 Sample size

The sample size was determined by a sample size calculation. In the majority of quantitative studies, pre-study calculation of the required sample size is warranted (46).

Here, the sample size was calculated based on the prevalence of dental caries, because it is the most common oral disease worldwide. A 95% confidence interval and significance level of 5% was used.

Equation, $n = (Z_{1-\alpha})^2 P \times (1-P) / D^2$

Significance level = 5%= 0.05

Prevalence of dental caries, P = 50% = 0.5

Confidence Interval, CI = 1-@ = 95%

Relative Precision = 15%

Sample size, n = 171

3.6 Data Collection in Oslo

In Oslo, the researcher first went through the "NORSK-BANGLA FORUM" and from the Managing Committee members I collected email addresses and cell phone numbers of the members. I sent an email with my research objectives and description about the questionnaire. After receiving a response, I made an appointment for the interviews. From these initial respondents, I collected the email addresses and cell phone numbers of their families and friends and contacted them later. I interviewed those who were interested in participating in the study. An anonymous questionnaire with oral health related questions, developed by the researcher, was used for data collection. At first, the researcher tested the questionnaire on 10 people and adjusted it according to feedback. All the participants preferred the English version of the questionnaire. I translated the questionnaire to Bengali (native language of Bangladesh) also. The researcher met the participants personally and conducted the interviews.

3.7 Data collection in other cities

For interviews outside Oslo, I made an electronic version of the questionnaire. It did not have the necessary funds and also deemed it too time consuming to travel and carry out interviews in the other cities.

For every city, the researcher contacted one person who would in turn select other possible participants that they knew, and their email addresses and phone numbers were obtained. Only those who had agreed to talk with the researcher provided their phone numbers. For example, in **Tromsø** the researcher contacted a Master's student that she knew at the University of Tromsø. After the research objectives were presented and data collected from her, she recruited subjects for the researcher. The interested students then provided their

contact details in the form of cell phone numbers and email addresses. The researcher contacted them and the questionnaires were sent to them.

The same approach was used in Bergen. The researcher first contacted a homemaker, who did not respond. Then contact was made with a person who had migrated to Norway for family reunification and was unemployed at the time. This participant recruited some other participants. Most of them were interested in participating.

3.8 Data Collection Instruments

The standardized questionnaire contained oral health related questions and socio-demographic data. I selected the questionnaire method because it was less expensive and it garnered more responses. The questionnaire was anonymous. There was no research assistant. As mentioned, the researcher met the participants one by one and conducted the interviews personally. Outside of Oslo, I sent the questionnaire electronically and collected data via email.

In the present study, dental awareness was operationally defined as self-care practices concerning oral health according to the following two questions:

1. "Do you think that you have better/poorer teeth than other people of your age?"

2. "Do you take care of your teeth?"

Possible answers were "Excellent ", "good", "poor", and "very poor" and don't know. For research purposes the answers "Excellent" and "good" were operationally combined and considered to indicate a "good" self-perceived assessment of oral health and the answers "very poor" ,"poor" and ''don't know'' indicated a "bad" self-perceived assessment of health (for both teeth and gums).

Study participants were also asked whether they take care of their teeth or not. Possible answers were "Yes, a lot", "Yes, a little", and "no". For research purposes the answers "Yes, a lot" and "Yes, a little" were operationally combined and considered to indicate a positive

answer ("yes") and the answer "no" indicated negative answer ("no") regarding take care of teeth.

3.8.1 Questionnaire

The questionnaire included following study variables

- Socio-demographic variables - Age, gender, living with family or not, having children or not, education, socio-economic status, employment status, origin in Bangladesh, having Norwegian friends or not, meeting with Norwegian friends or not, years lived in Norway, etc.

- Questions about food and drink habits - about sweetened drinks, which include fruit juice & soft drinks, tea/coffee with sugar, green vegetables, which include raw and cooked vegetables, fruits, etc.

- Questions about general health (Because some general health diseases have a strong relationship to oral health diseases), participants were asked to report their general health by answering two questions about heart disease, diabetes, hypertension, kidney disease, liver disease because of their relations to Oral diseases.

- Questions about dental health – participants were asked to write about their self-reported oral health state, tooth number, dental problems after coming Norway, reasons for going to the dentist in Norway, type of dental clinic, coping in case of any dental problem, etc.

- Questions about oral hygiene practices - frequency of teeth brushing, which tooth paste they used, how did they clean inter-dental spaces, how long they brush their teeth, use of mouthwash or not, how did they clean tongue, etc.

- Other habits- because of the south Asian population use of betel quid, betel nut and tobacco, information from participants included whether they had any deleterious habits like smoking, betel quid, tobacco chewing, etc.

3.9 Pilot Study with survey instrument

This survey instrument was pre-tested by 10 Bangladeshi immigrants before the fieldwork started. It showed that almost all the questions were understood and no change was required.

3.10 Data management

Data entry was done by the author of the research, questionnaires locked in a safe place by the author and also stored in a de-identified format with the author. The data was recorded into Excel and later exported into SPSS, version 24.

3.11 Data analysis & statistics

All analysis was done by using SPSS, significant level of <0.05 was used.

3.12 Cleaning of data

The first step was to detect variables that could have been missed or invalid.

3.13 Socio-demographic variables

Socio-demographic variables were age, sex, place of origin in Bangladesh, length of stay in Norway, number of children, living with family or not. Age was classified into groups: 18-25, 26-35, 36-45, and 45 or more. Place of origin in Bangladesh was classified according to the following: Village, District, and District/ Capital. Length of stay in Norway was classified according to the following year groups: 1-3, 4-6, 7-9, 10 years or more.

3.14 Socio-economic variables

Socio-economic variables included education, employment status, receiving benefits or not (Sick pay, pension, Disability, Unemployment). Education was categorized as having SSC O level, HSC/ A level, Bachelor, Masters, Academic/PhD. Employment status was categorized by following: No work, Part time and Full time. Receiving benefits included sick pay, pension, disability, unemployment and were classified as: yes or no.

3.15 Statistical methods

Descriptive analyses in the form of frequencies and proportions were used to describe the demographic characteristics of the participants. Tests of proportions were then used to compare differences in proportions between the groups. Associations between categorical variables were established from either Chi-square tests or Fishers' Exact tests. Binary

responses relating to whether or not the individual has dental caries, gum disease, and tooth sensitivity were analyzed using binary logistic regression models. The modeling processes proceeded in two steps. First, crude odds ratios were obtained from univariate binary logistic regression models. Secondly, variables that were significant in step 1 together with those we considered to be clinically relevant were used to fit multivariate (adjusted) binary logistic regression models. All analyses were performed using SPSS version 24 and statistical significance was set as $\alpha = 0.05$.

3.16 Missing data

Some information was missing in food and drink, dental health. In case of all descriptive analysis, only valid percentages were used after omitted data.

4.0 Research ethics

This research was only based on questionnaire administration. It had no clinical examination or physiological or laboratory testing. The results of this study can be used in public health personnel development. Data was collected by informed consent and there was no forced participation.

4.1 Informed consent

Researcher used snowball sampling to obtain sufficient sample size. Researcher asked the selected participants to nominate another possible participant, who might be known to him/her. Researcher informed them about the survey, objectives of the survey and collected cell phone numbers from those who agreed to talk with the researcher and participate. The researcher gave an informed consent form to all participants and received the signature/consent of all participants. All data was kept confidential. The collected data was anonymized and names did not appear on the questionnaire.

4.2 Ethical clearance & approval

Research protocol was submitted to the Regional Committee for Medical and Health Research Ethics (REK) in Norway, before the study took place. Ethical clearance was approved for both paper-based and electronic version of questionnaire. Approval was obtained from REK on

September 4, 2014 (REK no. 2014/1245). Data collection was started after receiving approval. Letter from REK is included at appendix.

4.0 RESULTS

4.1 Description of the sample

A total of 178 subjects from four different cities within Norway participated in this self-assessment of oral health and practices. The majority of the participants were from Oslo (98). The other participants were residing in Bergen (39), Trondheim (29) and Tromsø (12) as shown in Table 1. A few participants were busy and wanted to interview later but they could not   manage to find the time during the study period.

Table 2 shows the demographic characteristics of the participants by gender. There were 178 participants of which 100 (56.2%) were males and 78 (43.8%) were females. On average, males were aged 34.6 years and had lived in Norway for almost 8 years, whereas, the mean age for females was 32.5 years with almost identical years of stay in Norway. The majority of both males (50%) and females (37.2%) had received more than 17 years of education, which is an academic/PhD level. The proportions of females with SSC/O level and HSC/A Level were significantly higher than the males. 55.1% of the participants were originally from the Division/ Capital, 27.2% were from a District city and only 17.6% were from the villages of Bangladesh. The majority of the males (60%) were full-time employees whereas the majority of the females (57.7%) were not employed. This means that the proportion of females without work was significantly higher than males; conversely, the proportion of males with full-time employment was significantly higher than females.

Table 1: Number of respondents from different cities in Norway

Name of City	Oslo	Bergen	Trondheim	Tromsø	Total
Number of respondents	98	39	29	12	178

Table 2: Demographic characteristics of the study participants by gender (N=178, M= 100, F=78)

Demographic Factor	Proportion (%) of males and females			P-value
	Males	Females	Total	
Education				
*SSC/ O Level	2.0	12.8	6.7	0.01
*HSC/ A Level	6.0	19.2	11.9	0.01
Bachelor	26.0	15.4	21.5	0.12
Masters	15.0	15.4	15.3	1.00
Academic/ PhD	50.0	37.2	44.6	0.11
Place of origin				
Village	19.0	15.4	17.6	0.67
District city	32.0	20.5	27.2	0.12
Division/ Capital	48.0	62.8	55.1	0.06
Employment				
*No work	17.0	57.7	35.0	<0.01
Part time	22.0	16.7	19.6	<0.46
Full time	60.0	25.6	45.4	<0.01
Living with family				
Yes	60.6	85.9	71.8	<0.01
Children				
Yes	47.3	63.5	54.5	0.05
Norwegian friends				
Yes	85.0	79.5	82.6	0.45
Meeting with Norwegian friends				
Yes, Sometimes	38.8	32.1	35.8	0.44
Yes	49.0	35.9	43.2	0.11
Length of Stay in Norway				
1-3 Years	34.2	38.8	35.9	0.74
4-6 Years	27.8	20.4	25.0	0.46
7-9 Years	13.9	12.2	13.3	1.00
10 Years or above	24.1	28.6	25.8	0.72
Age				
18-25 Years	10.5	17.6	13.6	0.27
26-35 Years	53.7	54.1	53.8	1.00
36-45 years	25.3	18.9	22.5	0.43
46 or more	10.5	9.5	10.1	1.00
**Receiving benefits				
Yes	13.5	14.5	14.0	1.00

**Sick pay, pension, disability, unemployment

*SSC (secondary school certificate examination) is equivalent to O- level. HSC (higher secondary certificate education) is equivalent to A- level.

*No work also includes students.

There was no evidence to suggest that more males had more part-time work than females (P=0.46). The analysis also showed that the proportion of males without families here in Norway was significantly higher than the proportion among females (P < 0.01). 63.5% of the females had children compared to 47.3% of the males (P =0.05). I also found that more females (21%) did not have Norwegian friends compared to 12.2% of the males (P < 0.01). The majority of both males and females had been living in Norway for a period not exceeding 3 years. Most participants were in the age group 25 – 36 years. However, the evidence (P-values > 0.05) suggests that the age groups were evenly distributed between males and females. The percentage of male participants without children (52.7%) was significantly higher than females (36.5%). Although the proportion of females with either one child or two children was larger than that of males, the analysis showed that this could have been by chance (P-values > 0.05). 14% of the participants were on benefits, which includes sick pay, pension, disability, and unemployment compared to 86% who were employed. The proportion of beneficiaries was evenly distributed between males and females.

4.2 Self-reported Oral health

Table 3 shows the proportion of individuals with dental problems after coming to Norway. Tooth sensitivity was the most common dental problem affecting 37.1%, followed by dental caries, which affected 29.2% of the respondents.

Table 3: Dental/periodontal problems after coming to Norway in percent (N=176)

Dental problem	Yes	No	Do not know
Dental caries	29.2	56.7	12.4
*Gum disease	26.4	59.0	13.5
Bad breath	23.6	61.8	13.5
Mouth sores	15.2	73.6	9.0
Tooth erosion	11.8	61.8	24.7
Tooth sensitivity	37.1	55.1	5.6
Oral cancer	0.6	84.8	13.5
Dental trauma	2.2	96.6	-

*Gum diseases = Gum disease is an infection of the tissues that surround and support the teeth. It also referred to as periodontal disease. Advanced gum disease is called periodontitis[1].
www.mouthhealthy.organization[1]

Gum disease affected 26.4% of the respondents. The study also revealed that some respondents were not aware of their dental conditions. For example, 24.7% of the participants did not know whether they had experienced tooth erosion or not.

Table 4 and Figure 1 show what the respondents perceived the reasons why they developed dental caries and periodontal diseases. 53 of the respondents developed dental caries and 49 respondents had periodontal disease. The majority of the respondents did not know the reason(s) why they had developed dental caries (75.5%) or periodontal disease (89.8%). 18.9% suggested that they lacked oral hygiene, (here lack of oral hygiene includes 'Lack of proper cleaning', 'Food in the gap' (Inter-dental gap),'I should have taken more care of the teeth', "Maybe because of brushing teeth less often'' Not cleaning/brushing properly',' I didn't take care of my teeth', 'If we don't clean teeth after eating food, especially sweet food & drinks with sugar', 'For not brushing the correct way', 'Not completing teeth cleaning') which ultimately led to dental caries while 6.1% of those with periodontal disease also mentioned that oral hygiene (Here lack of oral hygiene includes 'Don't take proper care', 'Less oral hygiene maintenance', 'Bleeding') was possibly the reason why they developed periodontal disease. Consumption of sweet foods (here consumption of sweet foods includes 'Eating sweets at night', 'Because of excess intake of sweet foods', 'eating too much sweet foods') was only mentioned by 5.7% of those who developed dental caries.

One person among those who developed periodontal disease thought that tooth malformation (Here tooth malformation includes- 'Last tooth is malformed', 'Food gets stuck there', `had infection') possibly caused its development and another person thought that 'genetics' played a role.

Table 4: Knowledge about causes of dental caries and periodontal diseases in percent

	Dental caries (n =53)	Periodontal disease (n =49)
Do not know	75.5	89.8
Lack of oral hygiene	18.9	6.1
Sweet food	5.7	0.0
Tooth malformation	0.0	2.0
Genetics	0.0	2.0
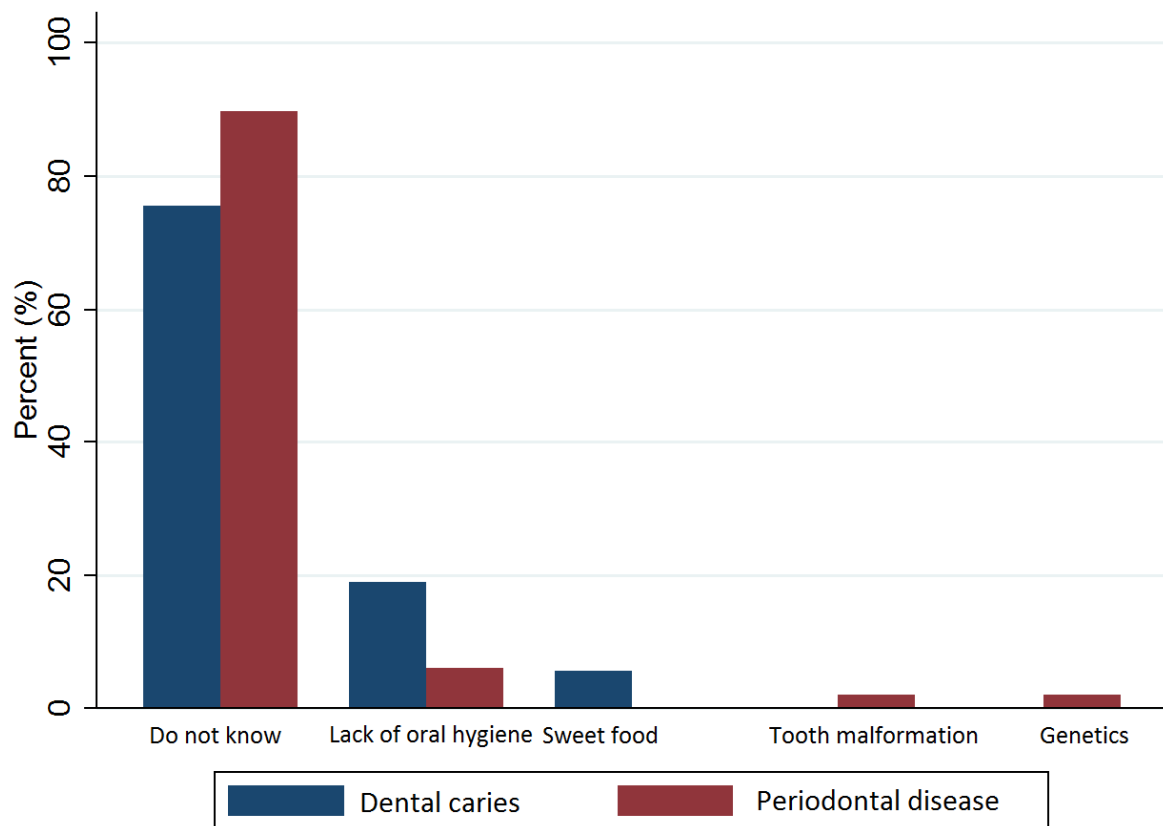
Figure 1: Knowledge about causes of dental caries and periodontal diseases among Bangladeshi immigrants

Table 5: Self-reported tooth condition & number of missing tooth

Dental Health	Gender		Total	*P*-value
	Males	Females		
	n (%)	n(%)	n(%)	
Tooth condition				
Very poor	-	-	-	
Poor	18(18.0)	12(15.4)	30(16.9)	0.43
Good	60(60.0)	53(67.9)	113(63.5)	0.19
Excellent	12(12.0)	7(9.0)	19(10.7)	0.33
Don't know	9(9.0)	6(7.7)	15(8.4)	0.47
Number of teeth lost				
0	66(66.0)	41(52.6)	107(60.1)	0.08
1	8(8.0)	10(12.8)	18(10.1)	0.37
2	8(8.0)	8(10.3)	16(9.0)	0.44
3	7(7.0)	3(3.8)	10(5.6)	0.42
4	3(3.0)	-	3(1.7)	-

Table 5 and Figure 2 show self-reported tooth condition and the number of missing teeth. 67.9% of females reported that their teeth condition was good compared to 60.0% of the males. 66.0 % of males had full dentition whereas 52.6 % of females had this. However, the findings were not statistically significant (P > 0.05) and could have been by chance.
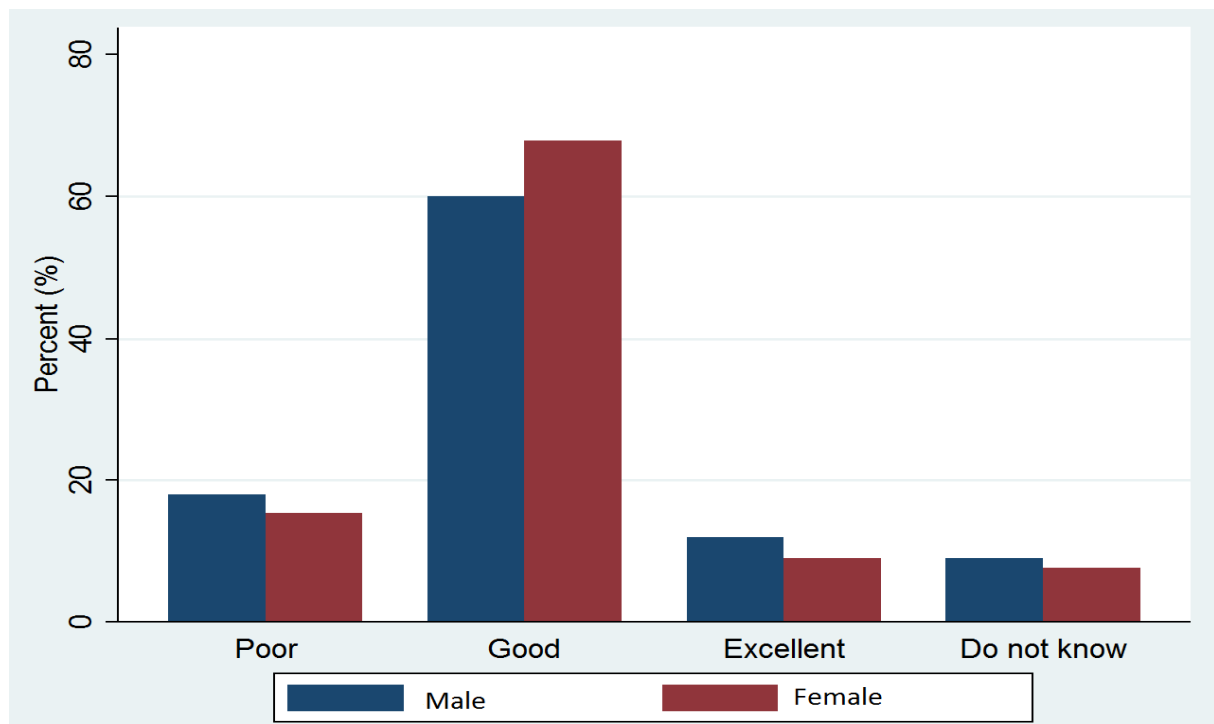
Figure 2: Distribution of self-reported teeth condition and number of missing teeth.

4.3 Dental health Practices

Table 6 is a comparison of oral hygiene practices between males and females. As shown in the table the proportion of females practicing any form of oral hygiene maintenance was not significantly different from the proportion of males (P-values > 0.05). However, females seemed to maintain oral hygiene practices more frequently than males. For example, 74.4% of the females brush their teeth 2 times per day compared to 64% of the males. Females also take much longer in brushing their teeth compared to males. The majority of the males (62%) and females (60.3) prefer white toothpaste compared to gel and herbal toothpastes. 37% of the males and 38.5% of the females do not use inter-dental cleaners after meals; 26% of males compared to 28.2% of females never use mouthwash after brushing their teeth. The proportion of males who do not rinse their mouths after eating or drinking sweetened products was 25% compared to 19.2% of females.

Males (49.0%) and females (43.6) do not clean their tongues when brushing their teeth. The study also showed that the majority of the participants use their toothbrushes for a period ranging from 3 to 6 months before disposing the tooth brushes. There was no significant difference in oral health practices between men and women, except a tendency for women to brush their teeth more often.

Table 6: Maintenance of oral hygiene by gender (N=176) (M= 99, F=77)

Maintenance of oral hygiene	Gender		Total n (%)	*P*-values
	Males n (%)	Females n (%)		
Tooth brushing per day				
1 time	31(31.0)	15(19.2)	46(25.8)	0.20
2 times	64(64.0)	58(74.4)	122(68.5)	0.11
More than 2 times	3(3.0)	1(1.3)	4(2.2)	0.39
Sometimes do not brush teeth	1(1.0)	3(3.8)	4(2.2)	-
Length of toothbrushing				
10-30 sec	18(18.0)	15(19.2)	33(18.5)	0.46
30 sec-1 min	31(31.0)	24(30.8)	55(30.9)	0.49
1-2 min	34(34.0)	32(41.0)	66(37.1)	0.30
More than 2 min	16(16.0)	6(7.7)	22(12.4)	0.33
Type of toothpaste using				
Gel tooth paste with fluoraide	28(28.0)	24(30.8)	52(29.2)	0.41
White toothpaste with fluoraide	62(62.0)	47(60.3)	109(61.2)	0.43
Herbal toothpaste with fluoraide	8(8.0)	5(6.4)	13(7.3)	0.26
Inter-dental cleaning				
Tooth pick	37(37.0)	24(30.8)	61(34.3)	0.31
Dental Floss	24(24.0)	23(29.5)	47(26.4)	0.34
Nothing	37(37.0)	30(38.5)	67(37.6)	0.45
Using mouthwash				
Regularly	6(6.0)	8(10.3)	14(7.9)	0.37
Weekly	12(12.0)	3(3.8)	15(8.4)	0.34
Monthly	5(5.0)	6(7.7)	11(6.2)	0.43
Sometimes	50(50.0)	38(48.7)	88(49.4)	0.45
Never use it	26(26.0)	22(28.2)	48(27.0)	0.43
Rinsing mouth after eating/ drinking sweetens drink/food				
Yes, always	32(32.0)	21(26.9)	53(29.8)	0.35
No	25(25.0)	15(19.2)	40(22.5)	0.34
Yes but sometimes	43(43.0)	41(52.6)	84(47.2)	0.19
Cleaning tongue				
Daily by tongue cleaner/brush	27(27.0)	16(20.5)	43(24.2)	0.32
Nothing use	49(49.0)	34(43.6)	83(46.6)	0.41
Sometimes by others thing	24(24.0)	26(33.3)	50(28.1)	0.77
Length of using one tooth brush				
3-6 months	72(72.0)	48(61.5)	120(67.4)	0.11
7-12 months	22(22.0)	19(24.4)	41(23.0)	0.43
1-2 year	6(6.0)	10(12.8)	16(9.0)	0.33
More than 2 years	-	-	-	-

4.4 Oral Health Seeking Practices

Table 7 presented the measures that are taken by both males and females in dealing with dental health problems. 37.0% of males compared to 34.6% of females have never been to a dental clinic before. However, more males (17%) compared to 12.8% females have been to a public clinic; 36% males compared to 34.6% have been to a private clinic.

This may either suggest that dental problems are more frequent in males compared to females or that more males are becoming health conscious. An almost identical proportion of males and females has never worn artificial dentures or tooth caps before. 38% of males and 37.2% of females consult dentists if they have dental problems.

Table 7: Dealing with dental health (N=166, M= 95 F= 71)

Dental health	Gender		Total (%)
	Males (%)	Females (%)	
Type of clinic visited			
Public Clinic	17.0	12.8	15.2
Private Clinic	36.0	34.6	35.4
EmergencyClinic	1.0	2.6	1.7
Odontology clinic of University	5.0	5.1	5.1
Wearing artificial denture/ tooth Cap			
Yes	15.0	9.0	12.4
No	79.0	79.5	79.2
Don't know (Tooth Cap)	4.0	9.0	6.2
Coping in case of any dental problem			
You consult with Dentist	38.0	37.2	37.6
Try self-medication and recover	20.0	19.2	19.7
Try to live with it	9.0	11.5	10.1
If condition is serious, I would go to Dentist	26.0	25.6	25.8
Have you visited dental clinic in Norway			
Yes	61.5	61.5	-
No	37.0	34.6	-

4.5 Dietary habits

Table 8 shows the consumption frequency of food, vegetables and drinks whereas Table 9 shows the consumption frequency of tea/ coffee and sugar by gender. As shown in Table 8, 48.9 % of the participants consume sweets (candy, chocolate and dessert) 1 - 3 times in a week, 12.4 % eat sweets 1 -2 times in a day.

Table 8: Consumption frequency of food, vegetables and drinks (N=177) (M= 100, N=77)

Food and Drink	Never/Seldom, (%)	1-3 times/ week, (%)	4-6 times/week, (%)	1-2 times /day, (%)	3 times or more/day, (%)
Food and vegetables					
Fruits	6.2	28.7	12.9	45.5	6.7
Cheese	41.0	34.3	6.2	15.7	1.7
Potatoes	7.9	40.4	22.5	21.9	6.7
*Cooked vegetables	2.8	29.8	30.9	29.8	6.2
* Raw vegetables	14.0	46.6	12.9	21.9	2.8
Fatty fish	16.3	61.8	9.0	9.0	2.2
Sweets (Candy, Chocolate, Dessert)	23.0	48.9	11.8	12.4	0.6
Type of drinks					
Sugar sweetened fruit juice	32.6	33.7	11.8	18.0	2.2
Milk	42.1	22.5	18.0	15.7	1.1
Yoghurt	30.9	44.4	12.4	9.6	1.7
Sugar sweetened soft drinks	44.4	18.0	18.0	8.4	28.1

The majority of the participants eat fruits at a rate of 1 - 2 times in a day compared to 6.2 % who rarely eat fruits. 18 % of the participants drink diluted fruit juice 1 - 2 times in a day whereas 8.4 % drink sugar sweetened soft drinks at the same rate, respectively.

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*'Cooked vegetables' means vegetables served with various spices or vegetables fried in oil. But Bangladeshi immigrants also eat vegetables with fish or meat. Those are not considered here as a 'cooked vegetables'. 'A raw vegetable 'means salads and other vegetables.

The maximum number of cups of tea/ coffee that males consume is 5 compared to 4 for females. However, there was no significant difference (P = 0.50) in average number of cups of tea/ coffee that males consume (1.96/day) compared to females (1.83/ day). The number of teaspoons of sugar in tea/ coffee varies between 0 to 3 for males and 0 to 4 for females. I also did not find any evidence that sugar consumption significantly varies between males and females.

Table 9: Tea/coffee and sugar consumption by gender (N=177) (M=100, F=77) in percent

Tea/ coffee and sugar	Gender		Total	P-value
	Males (%)	Females (%)		
Number of cups of tea/ coffee				
0	16.7	9.0	13.2	0.21
1-2	47.9	61.5	54.0	0.10
3-4	32.3	29.5	31.0	0.82
5 or more	3.1	-	1.7	0.32
Number of teaspoons sugar/ cup				
0	30.6	29.5	30.1	1.00
1	40.8	47.4	43.8	0.47
2	24.5	21.8	23.3	0.81
3 or more	4.1	1.3	2.8	0.51

Most participants drink 1-2 cups of tea/ coffee per day (47.9 % of the males and 61.5 % of the females). There were no females who drank 5 cups or more of tea/ coffee per day compared to 3.1% of the males. Although the proportion of males who did not drink tea/ coffee (16.7%) was higher than females (9.0 %), this difference was not significant (P=0.21). 4.1 % of the males use at least 3 teaspoons of sugar per cup compared to 1.3 % of the females. The proportion of males who do not use sugar in their tea/coffee was 30.6 % compared to 29.5 % of the females. The analysis also showed that there was no evidence to suggest that males use either more sugar or less sugar than females (all P-values > 0.05).

4.6 Smoking and chewing habits

Table 10 showed that 74.2 % of the male participants had never smoked and 81.5% of the total sample had never chewed betel. The proportion of daily smokers and daily betel users was estimated at 11.2% and 0.6% respectively. I did not find any female participants who smoked.

Table 10: Percentage distribution of smoking (only males) and betel use (both males and females).

Smoking and other habits	No, Never (%)	Yes, but I have stopped (%)	Yes, sometimes (%)	Yes, daily n (%)
Current / previous smoking habits (N= 99)	74.2	6.7	6.7	11.2
Current/ previous betel chewing habits (N= 176) (M= 99, F= 77)	81.5	5.1	12.9	0.6

4.7 Associations between Oral health and daily practices

Table 11 shows the distribution of dental caries, gum disease and tooth sensitivity according to frequency of food intake, types of drinks and oral hygiene practices. The proportion of participants with tooth sensitivity was significantly higher among those who were taking at least 1 tea spoon of sugar in their tea/ coffee (48.7%) compared to those who were not taking sugar in their tea/ coffee (21.6%), (P = 0.05).

There were no further statistically significant associations that were found between food intake, types of drinks, oral hygiene practices and all the three forms of dental disease (P-values > 0.05).

Table 11: Proportion of respondents with dental caries, gum disease and tooth sensitivity according to frequency of food and drink intakes and oral hygiene maintenance practices. Note that the totals do not add up to 178 because of non-responses.

	Dental caries		Gum disease		Tooth sensitivity	
	N	Yes, n(%)	N	Yes, n(%)	N	Yes, n(%)
Vegetable/Food						
Cookedvegetables						
Daily	55	18 (32.7)	59	12 (20.4)	62	22 (35.5)
Not daily	97	34 (35.1)	92	35 (38.0)	101	44 (43.6)
P-values		0.43		0.13		0.26
Raw vegetables						
Daily	34	14(41.2)	39	10 (25.6)	41	16 (39.0)
Not daily	116	38 (32.8)	110	37 (33.6)	120	50 (41.7)
P-Values		0.29		0.32		0.42
Sweets (Candy, Chocolate, Desserts)						
Daily	17	7 (41.2)	21	4 (19.4)	21	10 (47.6)
Not daily	132	43(32.6)	125	41 (32.8)	139	55 (39.6)
P-values		0.33		0.14		0.32
Drinks						
Sugar sweetened fruit juice						
Daily	30	14 (46.7)	30	8 (26.7)	29	13 (44.8)
Not daily	121	38 (31.4)	120	39 (32.5)	132	53 (40.2)
P-values		0.15		0.37		0.38
Sugar sweetened soft drink						
Daily	52	12 (23.1)	61	17(27.8)	61	23(37.7)
Not daily	100	40 (40.0)	90	30 (33.3)	102	43 (42.2)
P-values		0.39		0.35		0.36
Tea/coffee with sugar						
≥ 1ts	105	38 (36.2)	103	36 (35.0)	113	55 (48.7)
No sugar	48	14 (29.2)	49	11 (22.4)	51	11 (21.6)
P-values		0.32		0.22		**0.05**
Oral hygiene maintenance						
Toothbrushfrequency						
≥ 2 times/ day	110	39 (35.5)	110	35 (31.8)	115	44 (38.3)
< 2 times/day	43	13 (30.2)	42	12 (28.6)	49	22 (44.9)
P-values		0.36		0.42		0.30
Inter-dental cleaning						
Tooth pick/dental floss	95	36 (37.9)	98	30 (30.6)	97	40 (41.2)
Nothing	57	16 (28.1)	53	17 (32.1)	66	26 (39.4)
P-values		0.25		0.48		0.44
Wash mouth after eating/drinking						
Yes	121	38 (31.4)	121	36 (29.8)	128	53 (41.4)
No	32	14 (43.6)	31	11 (35.5)	36	13 (36.1)
P-values		0.21		0.36		0.36

Table 12 shows the odds ratios (OR) obtained by fitting binary logistic regression models to the data in order to identify oral hygiene and socio-demographic variables that are associated with risk of dental caries, gum diseases and tooth sensitivity. Crude estimates were used to select factors to be included in the adjusted analyses. The frequency of tooth brushing, mouth washing and inter-dental procedures were identified as clinically relevant variables in the adjusted models. The analyses showed that participants who did not clean the interdental space were 9.00 times more likely to develop dental caries compared to participants who did clean the interdental space. However this association was not significant in the adjusted model. Having more than a Bachelors' degree, decreased the risk of developing dental caries by 83%. The analysis also showed that the risk of having dental caries was at least 7-fold higher among participants who had been in Norway for at least 7 years, than participants who had been in Norway for less than 7 years. Participants who were employed on a part-time basis were 3.37 times more likely to develop gum diseases compare to participants who were employed on a full-time basis. The risk of developing tooth sensitivity decreased by 71% among participants who resided in the city/ urban areas, compared to those who resided in the rural areas in Bangladesh.

Table 12: Logistic regression Model of dental caries, gum disease and tooth sensitivity according to with oral hygiene and socio-demographic factors.

	Dental caries		Gum disease		Tooth sensitivity	
	Unadjusted	Model 2	Unadjusted	Model 2	Unadjusted	Model 2
	OR (95%CI)	OR (95%CI)	OR (95%CI)	OR (95%CI)	OR (95%CI)	OR (95%CI)
Oral hygiene						
Freq brush						
≥ 2 times	0.4 (0.1, 2.3)	0.98 (0.34, 2.81)	1.3 (0.4, 3.8)	1.12 (0.42, 2.99)	0.4 (0.1, 1.0)	0.62(0.30,1.32)
Washing mouth						
Yes	1.1 (0.2, 5.3)	1.27 (0,41, 3.94)	0.5 (0.2, 1.8)	0.69 (0.25, 1.91)	2.0 (0.7, 5.8)	1.58(0.68,3.64)
Interdental						
No	9.0 (1.6, 50.1)*	0.65 (0.22, 1.89)	0.8 (0.3, 2.5)	1.54 (0.57, 4.16)	1.8 (0.7, 5.8)	1.29(0.61,2.71)
Socio-demographic						
Sex						
Males (ref.)	1	1	1	1	1	1
Females	3.1 (0.6, 16.9)	1.25 (0.48, 3.25)	2.3 (0.7, 8.5)	2.62 (0.89, 7.72)	1.2 (0.4, 3.7)	1.64(0.82,3.27)
Age (Years)						
≤ 35 years (ref.)	1	1		1		1
More than 35 years	4.40 (2.11, 9.14)*	0.55 (0.14, 2.23)	1.56 (0.74, 3.29)	0.65 (0.17, 2.41)	1.61 (0.81,3.19)	1.79(0.83,3.90)
Education						
≤ Bachelor (reference)	1	1	1		1	
More than bachelor	0.18 (0.09, 0.37)*	0.17 (0.064, 0.44)*	0.63 (0.31,1.28)		0.75 (0.40,1.42)	
Length of stay (Years)						
≤7 years (ref)	1	1	1	1	1	
More than 7 years	5.95(2.56,13.81)*	7.17 (1.78, 28.78)*	2.29 (1.00, 5.24)*	3.05 (0.80,11.64)	1.09 (0.51, 2.32)	
Origin in Bangladesh						
Rural/ Village	1		1		1	1
City/ Urban	3.0 (0.4, 23.2)		0.9 (0.3, 3.3)		0.2 (0.1, 0.6)*	0.29 (0.11,0.74)*
Employment status						
Full time (ref)	1		1	1	1	
Part time	1.38 (0.70, 2.71)		2.31(1.14, 4.71)	3.37 (1.13, 10.08)*	0.68 (0.36, 1.28)	

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*Significant results at α = 0.05

5.0 DISCUSSION

This study assessed self-reported oral health and oral health practices among Bangladeshi immigrants in Norway. In the total sample, 56.2% of participants were males and 43.8% of participants were females. The participants were highly educated, the majority of both males (50%) and females (37.2%) had academic/PhD level of education. 60.0% of males reported a 'good' oral health condition and 67.9% of females reported the same. I found that almost 60.0% of male participants were full-time workers and almost 25.6% of female participants were the same. I also found that almost 58.0% of female participants were unemployed compared to 17.0% of males. These females might have been either students or were housewives. Tooth sensitivity was the most common dental problem (37.1%), followed by dental caries (29.2%) and gum diseases (26.4%).The proportion of participants with tooth sensitivity was significantly higher among those who were taking at least 1 tea spoon of sugar in their tea/coffee (48.7%) compared to those who were not taking sugar in their tea/ coffee (21.6%) (P=0.05). Having more than a bachelor's degree was reduced the risk of developing dental caries by 83.0%. Study analyses showed that the risk of having dental caries was at least 7-fold higher among participants who had been in Norway for more than 7 years. Participants who were working on a part time basis were more than 3 times likely to develop gum disease than participants who were working on a full time basis. Risk of developing dental caries was higher among participants who originated from rural areas in Bangladesh.

5.1 Discussion of the results

5.1.1 Oral hygiene practices and it association with oral health

Having poor oral hygiene can lead to development of dental and medical problems such as gum disease, infection, bone loss, heart disease and more. Regular visit of dental clinic and cleaning can prevent future oral disease, cavities, gum disease. Regular tooth brushing, flossing, avoid tobacco, limits sodas, coffee and alcohol, diet with calcium and other vitamins are the oral hygiene habits (47).

The study mainly focused on the three forms of dental diseases; dental caries, gum diseases and tooth sensitivity. Periodontal diseases/gum diseases are usually caused by the accumulation of plaque that hardens to form tartar. Evidence from different studies has

established the role of both local and systematic risk factors in the progression of periodontal diseases. The term "Local factors" refer to anything in the oral cavity that influences the periodontal health status by creating stagnation areas such as tooth malposition, tooth anatomy, overhanging restorations. The effect of the local factors allows the accumulation of more plaque because the areas are difficult to clean (48).

In this study, the role of the local factors in the development of periodontal diseases was understood from a prevention perspective, which concern measures such as inter-dental cleaning by flossing, tooth brushing, tooth picking and professional dental work that help to remove the plaque and tartar that would have accumulated. Our study showed that cleaning of interdental spaces was not significantly associated with dental caries in the full logistic regression model (model 2). This could be due to the fact that the sample consisted of highly educated participants, which would attenuate the effect on dental caries. Nevertheless, it is well known that interdental cleaning is a preventive measure in regard to periodontal diseases and is even a cheap method. Nearly 38 % of the participants were not practicing inter-dental cleaning. Dental caries occurs more frequently in the interdental spaces than on lingual and buccal smooth surfaces. Tooth brushing alone does not reach the interdental spaces of teeth, resulting in areas of teeth that remain unclean (49).

5.1.2 Food and other lifestyle habits and their association with oral health

Some of the systematic factors for periodontal/gum disease such as smoking and eating habits were investigated in this study (50). Information about eating habits (such as consumption of sweets), smoking, knowledge about the causes of these dental diseases, prevention measures, maintenance of oral hygiene and treatments were also extracted from the participants. Smoking contains chemicals that are responsible for 80-90% of Oral Cancers. Other consequences of smoking are increased risk of periodontal disease, bad breath, increased build-up of dental plaque and delayed healing following with tooth extraction (51).

The role of smoking in the development of periodontal diseases could not be established because there were few participants who smoked. In fact, all the female participants were non-smokers and had never smoked before, only 11.2% of male participants smoked daily. This is due to the fact that smoking habit among South Asian females is not common (52).

However, betel quid (*Paan)* chewing is common among south Asian people, also to some extent among women. In the current study, only 12.9% of the participants sometimes took betel quid (*Paan).* A possible reason for this low consumption of betel quid among Bangladeshi immigrants is that it is not commonly available in Norway.

The findings from this study showed that the majority of the participants did not know the causes of dental caries (75.5%) and periodontal diseases (89.8%). This may explain why oral hygiene is not a priority among a list of health problems that the Bangladeshi immigrants face. Understanding the causes and prevention of these diseases can be enhanced by frequent dental visits. It is at these visits that the dentists may explain the causes, prevention and treatment modalities. Dental visits are infrequent among immigrants due to the high costs associated with dental services. For example, it has been shown here that only 25.8% of the participants would visit the dentist if the condition is serious. Usually, these visits are precipitated by an urgent need for dental service. This may help to explain the knowledge gap for the causes and prevention of dental diseases.

One of the participants elaborated on the reason behind the answer to the question 'in the case of any dental problems, what do you do? There were four options in the close-ended questionnaire. The first option was 'You consult with a Dentist', the second option was 'Try self-medication and recover, the third option was 'Try to live with it', and the last one was 'When the condition is serious, then you would visit the Dentist'. This participant chose to confirm option no 2, i.e. 'Try self-medication and recover'. The participant explained further that dental treatment is very costly in Norway and thus to received treatment here, was not considered an option. If he had suffered any problem, he would have waited until his next visit to the home country. Another participant said that he generally goes to Poland for dental treatment. The treatment is not as costly in Poland as it is in Norway, according to that participant.

High cost was the main reason for unmet need for dental visit in Norway. During the period from 2005 to 2010, high cost has become the main reason for unmet need for dental examination in Norway. Almost 57% of peoples who reported the reason for unmet need for dental examination were the high cost. In the year 2010, the percentage of reported unmet

need for dental examination was highest among the unemployed peoples in Norway. Peoples with unmet needs for dental examination are unambiguously decreasing with rising income and the level of education (53).

It was also shown in the present study, that tooth sensitivity was the most prevalent dental problem among Bangladeshi immigrants. This is could be explained by the high consumption of sugar in tea/ coffee, sugar sweetened soft drinks and sweet foods. For example, 28.1% of the participants consumed sugar sweetened soft drinks more than 3 times in a day and 48.1% of the study participants consumed sweets (such as chocolate, candy, desserts) 1-3 times in a week. But the result was not significant. As mentioned earlier, the reason of this may be the participants of this study were very educated and they had overall maintained oral hygiene. Another reason may be the sample size was small.

It was found in the study that the proportion of participants with tooth sensitivity was significantly higher among those who were taking at least 1 tea spoon of sugar in their tea/ coffee (48.7%) compared to those who were not taking sugar in their tea/coffee (21.6%) (P= 0.05). Acid in the soft drinks cause damage to the enamel of the tooth and sensitivity had occurred. In addition, it has also been reported previously that breathing in cold air also causes a feeling of sensitive teeth. Study participants had a low frequency intake of vegetables. Only 29.8% of total participants had taken cooked vegetables 1-2 times/day and 21.9% of total participants had taken raw vegetables 1-2 times/day. The official recommendation is five times a day. However, I did not find any significant association between intake of vegetables and the three oral diseases/problems.

5.1.3 Socio- demographic factors and it association with oral health

In this study socio- demographic factors that are usually associated with dental diseases such as age, sex, education, socio-economic status (employment), place of origin in Bangladesh (rural/urban) were also studied.

It has been shown by numerous studies that females tend to have better dental health than males. Findings from the current study do not support this (Table 12). One surprising result in the current study is that the proportion of males with complete dentition was higher than the

proportion of females. However, this gender difference was only borderline significant. Possible reasons for this would include the following; females tend to visit dentists more frequently than males, hence among the treatment options could be tooth extraction. Secondly, this was a self-reported study; hence males could have under-reported to have incomplete dentition. The researcher was not able to verify the dentition of the study participants.

The logistic regression model on dental caries showed that Bangladeshi immigrants who were highly educated were less likely to develop dental caries compared to immigrants who were not as highly educated. A study from Finland by Lintula T. et al also showed that higher education offers protection against dental caries (54). A possible explanation for the importance of education is that highly educated are more knowledgeable about what constitutes healthy foods and how to take care of their teeth. Second is that education elevates the social status of a person by increasing income opportunities. This implies that highly educated people may have more money to spend on improving their health status, which may also include oral hygiene. Therefore, dental visits among the highly educated tend to be more frequent and prevention measures are more common among the highly educated compared to the less educated groups.

The current study also revealed that Bangladeshi immigrants who had been living in Norway for a longer period of time were more likely to develop dental caries than those who had been in Norway for only a short period of time. A possible explanation for this is that after living in Norway for years, they have more disposable income hence the consumption of food items that are strongly associated with dental caries also increases. It could also be that their food has become more westernized and contain less vegetables and fruits. The accumulative effect of being exposed to the risk factors over time increases the risk of dental caries development. It could be expected that the participants as they are getting older would be less likely to have good oral health. In the unadjusted model, those who were more than 35 years old had 5 times more risk of developing dental caries than those who were less than 35 years old. However, this effect was eliminated and was not significant in the adjusted model.

According to the Banglapedia (2006), more than 80% of the population in Bangladesh has at least one or more oral and dental diseases. Many suffer from periodontitis, gingivitis, dental

caries, pulpitis, alveolar abscesses, etc. Dental cysts and carcinoma of the oral cavity are also common oral health problems in Bangladesh. People from rural areas are comparatively more ignorant regarding oral hygiene (55). In the current study, the proportion having at least one dental disease or problem was 58%. This difference between the Bangladeshis in their home country and in Norway is most likely due to the fact that the study participants were highly educated and had good socio-economic status.

5.2 Methodological consideration

The study had a sample size of 178 participants and data was collected from September to December 2014. The Response rate was 77.9%. Most of the interviews were collected at weekly Bangladeshi community gathering places, such as the Norsk- bangla forum's Eid day event, but primarily from the participants place/home in Oslo. Most of the participants were co-operative and genuine during the interviews. According to the participants, it was first oral health related survey in Norway that they had participated in. Although the interview took 20-25 minutes, some participants were very interested in discussing matters that were not included in the questionnaire. One participant talked about her dental health from childhood. Another participant talked about his or her family dental history. Refusal was mostly from female participants, of which, most of those were housewives. From my study, I found almost 57.7% of female participants were unemployed (Housewives/ students). Possible reasons for refusals may include that they (Housewives) were comparatively less educated than others and they might have less confidence in and knowledge about research.

5.2.1 The sample being biased due to snowball sampling

The sample was not representative of the Bangladeshi community in Norway. That was due, in part, to the method of recruitment being used. The researcher achieved to recruit mostly highly educated study participants; almost 50.0% had academic/PhD level of education. Although, Bangladeshi community in Norway is highly educated, statistics from SSB showed that almost 38.0% of the Bangladeshi immigrants in Norway have tertiary level of education (long) (11).

The snowball sampling is a technique that uses initial informants to recruit participants through their social networks. This means that the participants are more likely to know others who share the same characteristics as themselves. Obviously, there are pros and cons associated with this sampling technique. Snowball sampling is commonly used when members of the study population are hidden and difficult to locate. This was indeed the case in the current study due to limited time and resources. The small communities of Bangladeshi immigrants currently living in Norway are spread unevenly throughout the country. The researcher had to use this technique to locate eligible study participants from four different cities within the country. Yet another practical implication of this technique from the researcher's point of view is that the researcher had limited money and time that was at her disposal for sampling. The snowball sampling technique does not require complex planning and no additional staffing was required. However, there were also cons that one has to consider. First, the researcher did not have control over who was recruited in the sample. As such, my initial contacts had a strong influence on the overall sample. Taking into account that they recruited eligible participants among their acquaintances with similar demographic characteristics such as education, it would explain the high literacy level achieved. This could also mean that the eligible participants usually share eating habits and life-styles. The form of bias that was obvious in the current study is selection bias. Study participants who had many friends were more likely to recruit additional participants from among their large pool of acquaintances. This makes it difficult to generalize the findings of this study to reflect oral health issues among Bangladeshi immigrants. It also means that the variation in exposure variables and confounding variables could be too small to get significant results in the assessment of associations with the dependent variables of oral health.

However, most of the participants were very interested in being interviewed and they were co-operative.

5.2.2 Self-reported questionnaire versus clinical oral health examination

This study data was collected by a self-reported survey from study participants. No oral clinical examination was conducted. Oral clinical examination require longer execution, incurs higher costs due to material and specialized personnel and increases the probability of refusals to do the examination. But most important was that the researcher didn't have

permission at that time to examine the oral cavity due to not having license. The self-reported questionnaire applied by interviewers, which, in contrast to the clinical examination, demands less time and resources to be performed. It does not require specialized examiners and such extensive arrangements. Only an expressive variety of data from the study participants about themselves is the only one administration (56, 57, 58, 59). However, it is necessary to assess the validity of the answers on oral health items included in the questionnaires. Some studies conducted in other countries demonstrate that self-reported information on some oral conditions is valid, such as the number of teeth (60, 61, 62, 63), the use of prostheses (59, 60, 61), especially when such measures are used to diagnose periodontal conditions (64).

The use of questionnaires for interviews is a common component in the collection of diagnostic data in the performance of oral health surveys (65-67). Comparisons of clinical oral health diagnoses versus self-perceived assessments may demonstrate the efficacy of the individual to evaluate personal health status and highlight fields in which self-perceived assessment are defined or indefinite. It has been suggested that the use of questionnaires should be used to further investigate with reference to self-assessed oral health status of communities (65-67).

5.2.3 The different data collection techniques (Face to face interview versus Internet based)

There was missing information in the self-administered questionnaires from the respondents outside of Oslo, especially from females and housewives. More missing information in the self-answered questionnaire was found in those from Bergen and Trondheim than from Tromsø. Most missing information was found from the questions about dental health, and food and drink intakes and oral hygiene maintenance part. Two questions about the reasons behind their dental caries and periodontal diseases were open-ended. Those participants who had dental caries and periodontal disease after coming to Norway had written reasons, but, not every participant answered these two questions from outside of Oslo.

 It was indicated in the invitation letter to contact the researcher if they had any problems during answering. But nobody contacted the researcher and no one used the 'Bengali' version of questionnaire during survey. It was remarked by the participants at the time of the pilot

survey before data collection that the questionnaire very easy to understand and to answer. Interviews taken by researcher in Oslo had no missing information.

5.3 Practical considerations

The study was carried out among Bangladeshi immigrants who lived in Norway for at least 1 year. This was based on self-reported oral health problems and practices, and there was no clinical examination. After interviewing 178 respondents, the researcher has the following considerations on the practical implications:

1. Only 61.5% of respondents had visited a dental clinic after coming to Norway, whereas 25.8% stated that they would visit a dental clinic only when the problem was severe. Therefore, it is important to encourage this immigrant group to visit a dental clinic when a problem arises.

For this purpose, there is a need to secure easily available information about the dental clinics and the benefits of getting early treatment.

2. It was concluded earlier that oral health is a neglected part of general health. People from developing countries pay less attention to it. For this reason, information about oral health related services should be delivered to newly arrived immigrants. If they know about their options from the beginning, it would be beneficial.

3. Health care providers should reflect on the difficulties to access oral health care services among immigrants related to language (newly arrived immigrant usually know only English as a their communication language) and cultural differences. There is a need for interpreters with a command of Bengali or more dentists who speak the language.

4. The study reveals that many Bangladeshi immigrants had taken dental treatment from outside of Norway (sometimes from their home country or sometimes from other countries).

Financial barriers appear to be one of the causes for less dental visits here in Norway or there is another cause. There should be less costly alternatives to dental services or subsidized services for immigrants. Further research is needed.

6.0 CONCLUSIONS

Very few studies have been conducted among Bangladeshi immigrants worldwide and also in their home country. Immigrants constitutes the minority group in most host countries However, globalization has increased immigration.

Further research is needed for providing the basis for identifying measures that could improve the oral health conditions of this minority group.

In addition, several oral diseases are linked to chronic disease, such as periodontal disease and diabetes, dental caries and obesity. The major diseases afflict people of all ages, they imply loss of school and work hours and they are a considerable economic burden to the individual and to society.

It is important to reduce risk factors and the burden of oral disease and to improve oral health systems and the effectiveness of community oral health programs. Maintaining of oral hygiene regularly and taking a healthy diet with less sugar can improve oral health condition. The strengths of proper research can improve the quality of these programs.

7.0 REFERENCES

1. World Health Organization- http://www.who.int/mediacentre/factsheets/fs318/en/

2. The World Oral Health Report2003.
   http://www.who.int/oral_health/media/en/orh_report03_en.pdf

3. Oral Health Surveys: Basic methods- 5th edition, World Health Organization.

4. The oral health Atlas – Mapping a neglected global health issue - Roby Beaglehole, Habib Benzian, Jon Crail, Judith Mackay, Published by FDI World Dental Federation 2009

5. Diagnostic Validity of Self-reported Oral health Outcome in Population Surveys: Literature review. Ramos RQ. Bastos JL. Peres MA.

6. Honkala E: Oral health promotion with children and adolescents; in Schou L, Blinkhorn A (eds): Oral health promotion. New York, Oxford University Press, 1993, pp 169-187.

7. SSB-   Statistics Norway - www.ssb.no/en/befolking

8. Immigration to Norway from Bangladesh, Brazil, Egypt, India, Morocco and Ukraine- Scoping Studies for the project 'Theorizing the Evolution of European Migration Systems (THEMIS) Cindy Horst, Jorgen Carling and Rojan Ezzati – Peace Research Institute Oslo (PRIYO)File.prio.no/publication_files/prio/Immigration%20to%Norway,%20PRIO%20policy%20Brief%202010.pdf-ISBN:978-82-7288-359-0 August 2010.

9. Fluoride levels in different drinking water sources in Bangladesh - AKM Fazlul Hoque, M Khaliquzzaman, MD Hossain, AH Khan, Dhaka Bangladesh- 38 Fluoride Vol. 36 No.1 38-44 2003 Research Report- www.fluorideresearch.org/361/files/FJ2003_V36_n1_P38-44.pdf

10. WHO commission on Social Determinants on Health (2008)

11. https://www.ssb.no/statistikkbanken/SelectVarVal/Define.asp?MainTable=Utniv07&KortNavnWeb=utniv&PLanguage=1&checked=true

12. Adair PM, Pine CM, Burnside G, Nicoll AD, Gillett A, Anwar S: Familial and cultural perceptions and beliefs og oral hygiene and dietary practices among ethnically and socio-economically diverse groups. Community Dent Health 2004; 21 (suppl): 102-111.

13. Camner LG, Sandell R, Sarhed G: The role of patient involvement in oral hygiene compliance. Br J Clin Psychol 1994; 33: 379-390.

14. Davidson PL, Rams TE, Andersen RM: Socio-behavioral determinants of oral hygiene practices among USA ethnic and age groups. Adv Dent Res 1997; 11:245-253.

15. Kuusela S, Honkala E, Kannas L, Tynjala J, Wold B: Oral hygiene habits of 11- year old schoolchildren in 22 European countries and Canada in 1993/1994. J Dent Res 1997; 76:1602-1609.

16. Almas K, Al- Malik TM, Al-Shehri MA, Skaug N: The knowledge and practices of oral hygiene methods and attendance pattern among school teachers in Riyadh, Saudi Arabia. Saudi Med J 2003; 24:1087-1091.

17. Morimoto T, Miyazaki H: 15 years of CPITN- a Japanese perspective. Int Dent J 1994; 44 (suppl 1): 561-566.

18. Peterson PE, Aleksejuniene J, Christensen LB, Eriksen HM, Kalo I: Oral health behavior and attitudes in adult in Lithuania. Acta Odontal Scand 2000; 58: 243-248.

19. Knowledge on Oral Hygiene and Oral Health Status among the secondary school students- International Journal of Dental Medicine, Published June 17, 2015,doi= 10.11648/j.ijdm.2015 0102.12

20. Knowledge and Practice About Oral hygiene by Tribal People (*Orao*) in Rangpur Region, Bangladesh- International Journal of Dental Medicine, Published : July 2, 2015 , doi= 10.11648/j.ijdm.20150103.12

21. THE ORAL HEALTH-RELATED LIFESTYLE OF VANCOUVER INNER CITY ELEMENTARY SCHOOL-AGED CHILDREN- Azadeh Shojael, March 2013- http://circle.ubc.ca/bitstream/handle/2429/44039/ubc_2013_spring_azadeh.pdf?sequence= .

22. DENTAL HEALTH NEEDS AND RELATED FACTORS IN INNER-CITY VANCOUVER ELEMENTARY SCHOOL AGED CHILDREN- Firoozeh Samim-February,2013- http://circle.ubc.ca/bitstream/handle/2429/43994/ubc2013spring%2520samim_firoozeh.pdf?sequence=1

23. Dental health behavior in a migrant perspective: use of dental services of Pakistani immigrants in Norway. Selikowitz HS. Holst D. Community Dent Oral Epidemiol. 1986 Dec, 14(6):297-301. PMID: 3466751 (PubMed-indexed for MEDLINE

24. Factors associated with unmet dental care needs in Canadian immigrants: an analysis of the longitudinal survey of immigrants to Canada- Paola Calvasina, Carles Muntaner and Carlos Quinonez. BMC Oral Health 2014, 14:145, http://www.biomedcentral.com/1472-6831/14/145

25. Use of betel quid and cigarettes among Bangladeshi patients in an inner-city practice: Prevalence and Knowledge of health effects" is written by Ahmed S, Rahman A, Hull S (published in British Journal of General Practice **,** July 1997,47,431-434)

26. Paan and Gutka use in the United States – A pilot study in Bangladeshi and Indian-Gujarati Immigrants in New York City.Journal of Immigrant & Refugee Studies. Volume 4, Issue 1, 2006. DOI:10.1300/1500 vo4 n01_07 Jyotsna Changrani MD, MPH; Gustavo Cruz DDS,MPH; Ross Kerr DDS, MPH; Ralph Katz DMD, PhD & Frascesca M, Gany MD,MS Published online 22 sep 2008

27. Dental health and treatment needs among a sample of Bangladeshi medical users aged 40 years and over living in Tower Hamlets, UK- Dr. Nicola Pearson, Ray croucher, wagner Marcenes and Mary O'Farrell. DOI: 10.1002/j.1875-595X.2001.tb00813.X; 2001 FDI/World Dental Press

28. Prevalence of gingivitis significantly increased with decreasing social status. Gingivitis: A common Preventable Oral Health Problem- Jebun Nessa, SR Choudhury. ISSN 1019-8555, The Journal of Teachers Association, RMC, Rajshahi.

29. Self-Reported Oral Hygiene Habits and Oral Health problems of Kuwaiti Adults- Al-Shammari K.F, Al-Ansari JM, AL-Khabbaz AK, Dashti A , Honkala EJ, Med Princ Pract 2007;16 (1): 15-21

30. Central Intelligence Agency (US) https: // www.cia.gov/library/publications/the-world-factbook/geos/bg/.html

31. MOHFW- Ministry of Health and Family Welfare, Bangladesh.

32. The Dental Situation in Bangladesh- www.dentalghar.com/article/41

33. World Health Organization- WHO Health Data 2011

34. WHO Oral Health: Formulating Oral Health Strategy for South- EastAsia, www.searo.who.int/entity/noncommunicable_diseasea/documents/sea_ned_81/en/

35. Brochmann G, Kjeldstadli K. A history of immigration: the case of Norway 900-2000. Oslo: Universitetsforl.; 2008

36. Traditional Food Culture & Food Secuirity in Bangladesh- Md. Shahidul Islam – July 2012- http://www.ifsn.info/index.php/publications/ifsn-ii-publications/year-3/bangladesh/264-report on...

37. Eating habit in the Indian culture/ ettow – http://www.ehow.com/info_8308329_eating-habits-indian-culture-html).

38. Customs and Traditions of Pakistan-tigers.towson.edu/ bjaved 1/customs_and_traditions _of_pakist.htm).

39. Role of Research in Oral Health Care-Editorial journal of dentistry- Jan-Mar 2012 Vol 2 issue1-www.ejournalofdentristy.com/articles/e-JOD7BD5F6F930-02FB-4209-8A09-D82537.pdf 39.

40. Evan G. DeRenzo, Joel Moss(ed). Writing Clinical Research Protocol: ethical considerations, Elsevier Academic Press 2006.Book

41. Miller LW, Crabtree BF. Clinical research: A multimethod Typology and qualitative Road map. In Crabtree BF, Miller LW editor Doing qualitative research, London: Sage Publications, 1999

42. Varkervisser C, Prathmanathan I, Browlec A. Designing and Conducting Health System Research Project: Proposal Development and Field Work. http://www.idrc.ca/en/en-3301-201-1-DO_TOPIC.html

43. Health Knowledge-EDUCATION, CPD AND REVALIDATION FROM PHAST (www.healthknowledge.org.uk/public-health-textbook/research-methods/1a-epidemiology/cs-as-is/cross-sectional-studies

44. Snowball Sampling-Row land Atkinson & John Flint :The SAGE Encyclopedia of social science Research Methods- Michael S. Lewis- Beck & Alan Bryman & Tim Futing Liao Pub.date:2004 DOI:http://dx.doi.org/10.4135/9781412950589

45. "The Participants are likely to know others who share the characteristics that make them eligible for inclusion in the study." (David L, Morgan 2008). The SAGE Encyclopedia of Qualitative Research Methods. SAGE   Publications

46. Sample size calculations: basic principles and common pitfalls. Marlies Noordzij, Giovanni Tripepi, Friedo W Dekker, Carmine Zoccali, Michael W Tanck and Kitty J Jager, ndt.oxfordjournals.org/content/25/5/1388.full

47. Victor M. Rosales, DDS, INC. 10 Great Dental Hygiene Tips. April 9, 2011. Available from : https:// www.arrowsmiledental.com/blog/10-great-dental-hygiene-tips/

48. Genco RJ, Borgnakke WS. Risk factors for periodontal disease. Periodontal 20002013; 62:59-94).

49. GA Van de Weijden, DE Slot. Interdental Oral Hygiene: The evidence (Chapter 3). 2012 Asian Pacific Society of Periodontology. Available from: http://www.parodontologie-utrecht.nl/media/boeken/boekintraoralhygieneevidence.pdf

50. Oppermann V.R, Weidlich P, Musskopf L.M- Brazilian Oral Research on -line Version. ISSN 1807- 3107- Perodontal disease and systemic complications. Available from-http://www.scielo.br/scielo.php?script=sci_serial&pid=1806-8324&lng=en&nrm=iso

51. Smoking & your dental health. Dental Health Foundation, Ireland. Available From: http://www.dentalhealth.ie/dentalhealth/causes/smoking.html

52. Smoking among Women. The TOBACCO ATLAS. Available From: http://www.tobaccoatlas.org/topic/smoking-among-women/.

53. (Quality indicators in Oral health care: A Nordic Project, Published on: 02/2013, Norwegian Directorate of Health – www.helsedirektorate.no)

54. Lintula T, Laitala V, Pesonen P : Self-reported oral health and association factors in the North Finland 1966 birth cohort at the age 31. BMC Oral Health. 2014; 14:155. Published online 2014 Dec 16. Doi: 10.1186/1472-6831-14-155.

55. Banglapedia: 2006. Available from: http://en.banglapedia.org/index.php?title=Oral_Health .

56. Miller K, Eke PI, Schoua- Glusberg A. Cognitive evaluation of self-report questions for surveillance of periodontitis. J periodontal 2007; 78 (7 suppl):1455-62.

57. Ho Aw, Grossi SG, Dunford RG, Gene RJ. Reliability of a self-reported health questionnaire in a periodontal disease study. J periodontal Res 1997;32 (8): 646-50.

58. Levin L, Behor R, Sandler V, Samordonitzky – Naveh G. Association of Self-Perceived Periodontal status with Oral hygiene , Probing depth and alveolar bone level among young adults. N Y state Dent J 2011; 77(1): 29-32.

59. Joshipura KJ, Pitiphat W, Douglass CW. Validation of self-repoted periodontal measures among health professionals. J public Health Dent 2002; 62 (2): 115-21.

60. Gilbert GH, Chavers LS, Shelton BJ. Comparison of two methods of estimating 48 months tooth loss incidence. J public Health Dent 2002; 62(3): 163-9.

61. Allen F, Burke F, Jepson N. Development and evaluation of a self-report measure for identifying type and use of removable partial dentures. Int Dent J 2005; 55(1): 13-16.

62. Pitiphat W, Garcia RI, Doughlass CW, Joshipura KJ. Validation of self-reported oral health measures. J public Health Dent 2002; 62(2): 122-8.

63. Palmqvist S,Soderfeldt B, Arnbjerg D. Self –assessment of dental conditions : Validity of a questionnaire . Community Dent Oral Epiodemiol 1991:19(5): 249-51.-

64. Blicher B, Joshipura K, Eke P. Validation of Self-reported periodontal disease: a systematic review. J Dent Res 2005; 84 (10): 881-90.

65. Robinson PG, Nadanovsky P, Sheiham A. Can questionnaires replace clinical survey to assess dental treatment needs of adults? Public Health Dent. 1998; 58:250–253. doi: 10.1111/j.1752-7325.1998.tb03002.x. [Pub Med] [Cross Ref]

66. Gilbert AD, Nuttall NM. Self-reporting of periodontal health status. Brit Dent J. 1999; 186:241–244. doi: 10.1038/sj.bdj.4800075a. [Pub Med] [Cross Ref]

67. Heloe LA. Comparison of dental health data obtained from questionnaires, interviews and clinical examination. Scand J Dent Res. 1972; 80:495–499. [Pub Med]

APPENDICES

Appendix A

RESEARCH PROPOSAL

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M.Phil Student
International Community Health 2013
University of Oslo, NO

Supervisor: Prof. Gerd Holmboe- Ottesen

Graduation Date: June, 2015

Contents

Attachment:

- Thesis working schedule

- Research questionnaire

1.0 Introduction

The World Health Organization has stated that "Oral health is essential to general health and quality of life" (1) and "it allows an individual to speak, socialize and eat without any discomfort (2)." The most common oral diseases are dental cavities (dental caries), periodontal (gum) disease, oral cancer, oral infectious disease, trauma from injuries and hereditary lesions. Worldwide, 60-90% of school children have dental cavities and approximately 100% of adults have dental cavities. This causes pain and discomfort but most people are neglecting this problem (3). Oral diseases are among the most prevalent non-communicable diseases and are major components of global burden of disease (4). Severe Periodontal (gum) disease, which may result in tooth loss, is found in 15-20% of middle aged 35-44years) adults (1). Chewing tobacco, betel and areca nut are risk factors for Oral Cancer. People from Indian-Subcontinent frequently take those items.

Major risk factors for human health are tobacco use, physical inactivity and a diet high in fat, salt and sugar. These are responsible for a range of chronic diseases such as obesity, diabetes, cardiovascular diseases as well as oral diseases. High consumption of sugar is the number one risk factor for tooth decay (dental caries) and for diabetes. Approximately 80% of diabetes deaths occur in low-and middle- income countries (5).

According to Statistics, Norway (1 January, 2010), there were 459 000 immigrants and 93 000 people with immigrants parents in Norway. An immigrant constitutes 11.4 percent of the total population in Norway. In June 2013, there were about 1026 Bangladeshi people living in Norway (6).

Three groups of people make up most of the migration: asylum seekers and refugees, people coming for family reunification, and students. There were very few Bangladeshis registered in Norway in 1970. The Bangladeshi community is mostly middle-class community with relatively high levels of education, comparing with other migrant groups (7).

Water fluoridation is essential for preventing dental caries and also for good dental health. Fluoride concentration in ground water of Bangladesh is generally low, but in some rural areas it is higher than the MPL (Maximum Permissible Limit). Regional distribution of fluoride in tube well in total 19 districts of Bangladesh reveals that 61% of samples contain less than 0.5 mg/L. In 84% of the samples, the fluoride content is lower than the maximum permissible limit (MPL) of 1 mg/L set for Bangladesh drinking water (8).

This research is aiming at obtaining information about oral health status and about knowledge, attitude and practice of oral health among Bangladeshi immigrant people in Norway. The purpose is to increase the awareness among people about maintaining oral health hygiene and about prevention of oral diseases.

2.0 Rationale

Oral health is an important component of our health. But it is often neglected and peoples put less importance on maintaining their oral health care.

- As the WHO Commission on Social Determinants on Health (2008) expressed so clearly: "In countries at all levels of income, health and illness follow a social gradient: the lower the socio-economic position, the worse the health.". this implies that low socio-economic condition indicates higher risk of oral disease (9).

- There are few studies on immigrant oral health in western countries and I have found no study among Bangladeshi Immigrants oral health in Norway.

- Dental treatment is costly and people of developing countries cannot put effort to this all the time.

- I want to know if people from Bangladesh maintain their oral hygiene properly or not, if their food habits are good for oral health or not. I want to know how much they care or are conscious about their oral health.

3.0 Research Gap/ Knowledge Gap

- To the best of my knowledge, there are very few studies of Oral health among Bangladeshi immigrants. The studies available are only about betel quid chewing and tobacco use and it association to Oral Cancer.

- Although Oral health has great importance to general health, very limited amount of data are found from developing countries, like Bangladesh.

- Food habits (mainly sugar and fat consumption) are responsible for Obesity and have consequences many diseases like diabetes, heart disease etc and it also responsible for most common Oral disease – i.e. dental caries. Oral hygiene maintenance is an

important issue. There are many studies on diabetes and relation to Oral health. But no combination study has been found that deals with knowledge, attitude and practice in regards to oral health among Bangladeshi immigrants.

4.0 Objectives

The aim of my research is to focus on the neglected Oral health in community. The Profession of dentistry is kept abreast in scientific and technological advancements. As a multicultural country, Norway has different ethnic groups of population. They have dissimilar understanding and concepts of health. So it is important to know their knowledge and attitudes on these matters. Every patient is different and some treatment is effective for 90% of the patients but may not be effective for the other 10% (10).

This is a study which will be done on a specific group of population to collect information on what is known, believed and done about oral health.

"Knowledge is a set of understandings, knowledge and of "science." It is also one's capacity for imagining, one's way of perceiving. Knowledge of a health behaviour considered to be beneficial, however, does not automatically mean that this behaviour will be followed. The degree of knowledge assessed by the survey helps to locate areas where information and education efforts remain to be exerted." (11).

"Attitude is a way of being, a position. These are leanings or "tendencies to….". This is an intermediate variable between the situation and the response to this situation. It helps explain that among the possible practices for a subject submitted to a stimulus, that subject adopts one practice and not another. Attitudes are not directly observable as are practices, thus it is a good idea to assess them. It is interesting to note that numerous studies have often shown a low and sometimes no connection between attitude and practices." (11).

"Practices or behaviours are the observable actions of an individual in response to a stimulus. This is something that deals with the concrete, with actions. For practices related to health, one collects information on consumption of tobacco or alcohol, the practice of screening, vaccination practices, sporting activities, sexuality etc." (11).

Oral disease in children and adults is higher among poor and disadvantaged population groups (3). High relative risk of Oral disease relates to socio-cultural determinants such as poor living

conditions, low education and lack of traditions, beliefs and culture in support of oral health. Communities and countries with inappropriate exposure to fluorides in drinking water run higher risk of dental caries. Poor access to safe water or sanitary facilitates are environmental risk factors to oral health as well as general health (12). Oral disease may result in general health problems, low self-esteem, dental anxiety and poor quality of life (2).

The objectives of the study are:

- To assess the oral health related knowledge among Bangladeshi Immigrants living in Norway.

- To identify their attitudes towards maintenance of oral hygiene

- To explore oral hygiene practices

- To investigate self-reported oral health problems according to different levels of socio-economic status and different educational status.

- To assess types and number of visits to dental care services.

5.0 Research questions

- How do they maintain their oral hygiene?

- How is their food habits and intake of stimulants affecting oral health?(including betel quid, tobacco, areca nut)

- What are their attitudes towards regular tooth brushing, inter-dental cleaning?

- How many Bangladeshi immigrants brush their teeth regularly and how long they brush their teeth?

- How many Bangladeshi immigrants have their own dentist and how many times do they visit the dentist after coming Norway?

6.0 Oral disease: Global trends

I want to briefly describe some important global oral health problems and their current statistics as reported in Beaglehole et al 2009 (5).

- Dental decay (caries) is the most common chronic disease in the World yet it is preventable. Most of the people go to dentist when severe pain arises and when caries destroy maximum part of crown of the tooth.

- Toothache is the number one reason for absenteeism from schools in the Philippines and many other countries. It also detaches from taking food.

- Tooth decay is five times more common than asthma and seven times more common than hay fever in the USA.

- In the year 2000, Children had lost 51 million hours of school due to dental problems in USA.

- Over the last three decades caries rates dropped in high-income countries due to the widespread use of fluoride.

- Between 5% and 20% of populations suffer from severe forms of gum disease, with formation of deep pockets.

- In 2002 there were more than 400,000 cases of oral cancer diagnosed worldwide. Tobacco and alcohol together are risk factors for oral cancer and they cause 15 times more cancer than other risk factors.

7.0 Literature Review

Literature review is conducted by searching various databases. It includes Pub-Med, Google scholar and Bio med Central. There are several studies about immigrant's oral health worldwide.

Most of the Bangladeshi immigrants to western countries live in UK, USA, Canada, Australia and Middle East Countries. The number of studies found were very low and most of the articles reported from studies where the findings were combined with Indian immigrants. Some articles found concerned Bangladeshi children's oral health, especially dental caries.Most of the articles concerned Betel quid and tobacco chewing and its relation to oral cancer. No study was found about 'Knowledge, attitude and practice of oral health among

Bangladeshi immigrants' in Norway and other Scandinavian countries. In Europe, an oral health related study among Bangladeshi immigrants was found from UK.

A study about 'Use of betel quid and cigarettes among Bangladeshi patients in an inner-city practice: Prevalence and knowledge of health effects' was done in UK. The study investigated the knowledge of health hazards associated with betel quid and cigarettes use among Bangladeshi populations living in east London. The prevalence of betel quid chewing was over 80% (with no sex difference). The percentage of tobacco smoking among men was higher than in women. Over 80% of both male and female respondents identified the health risks of smoking and only one third identified oral cancer as a risk (13).

Another study was done in USA about '*Paan* (betel quid) and *Gutka* (tobacco powder) use in the United States: A pilot study in Bangladeshi and Indian-Gujarati immigrants in New York City'. The study was about the *paan* and *gutka* habits and their use in the USA. Regular use of the *paan* was similar for the two groups. Less educated people from Bangladesh were more likely chew *paan* and *gutka* compared to high school graduates. Indian-Gujarati *gutka* users had larger family sizes compared with non-users. Those people who used tobacco with *paan* had more tendencies to consume quid's daily (14).

In Canada, a study was done to investigate the deficiency in oral-health related knowledge and corresponding behaviors in all age groups and both genders among Bangladeshi immigrant school children. Oral health related life style did not differ between boys and girls except for the inter-dental cleaning behavior, neither did it differ according to socio-demographic characteristics. However oral health differed according to consumption of sugar containing drinks among different age groups (15).

Another study from Canada reported on caries related behavior among different ethnic group's children. Different ethnic groups had experienced caries (57%) and in total 32% of children needed treatment. There were no satisfactory significant differences among different demographic groups regarding dental treatment needs or dental health status. It also showed an association between family affluence, family influence and relationship between parents, and children's life style (16).

In Norway a study from 1986 was done among Pakistani immigrants on dental health behavior, knowledge and belief about dental diseases. The study revealed that altogether 60%

Pakistani immigrant had visited the dentist during last 3 years. People coming from cities were more conscious about having a dentist than those coming from rural Pakistan (17).

There are 3705 registered dentists in Bangladesh for a population of 150 million. So the ratio of dentists to population is as 46000:1. For that reason, the majority of patients, especially those in the remotest areas of the country, their only choice is the traditional dentist (unqualified). The most common treatment is extraction of teeth. Modern dentistry facilities are only available in the larger cities in Bangladesh (18).

According to the WHO data published in April 2011 oral Cancer death in Bangladesh reached 11,562 or 1.21% of total deaths. The age adjusted death rate is 12.52 per 100,000 of population ranks Bangladesh #4 in the World (19).

8.0 Methodology

Research can be defined as collection, analysis and interpretation of data by systematic way to find out answer of unanswered questions (20, 21). Research methods depend on the research questions (22). This study will be based on quantitative methodology, since it concerns investigation of self-reported oral health, distribution of oral health, knowledge, attitudes, and practices according to socio-demographic factors.

8.1 Research Site

Most of the Bangladeshi immigrants in Norway are living in Oslo, capital city of Norway. Others are living Bergen. There are a number of Bangladeshi students in Trondheim. Very few Bangladeshi immigrants are living in Kristiansand (7). So I will conduct my research work in those cities.

8.2 Study Design

This is a cross sectional study. In a cross-sectional study on health, data are collected at a given point in time and and the relationship between diseases or other indicators of health and social, economic and environmental factors, thought to be related to health, are examined . Cross-sectional study can be used for assessing the burden of disease or health needs of a population (23).

8.3 Study Population

Study population is Bangladeshi immigrants who have resided in Norway for more than two years, aged 18-58 years.

8.4 Sampling Method

The sampling will rely on the snowball sampling method. "Snowball Sampling may be defined as a technique for gathering research subjects through the identification of an initial subject who is used to provide the names of other actors. These actors may themselves open possibilities for an expecting web of contact and inquiry (24)." "The participants are likely to know others who share the characteristics that make them eligible for inclusion in the study (25)."

I am considering the snow ball sampling method, since this is a study that has to rely on the resources that I, the only investigator, have available. Snowballing would mean that I can start with recruiting subjects I know or can easily come in contact with and take advantage of the first respondents network to eventually include people that are outside my own network. This method may imply that the sample will be biased, but efforts will be made to avoid this and the results will be corrected for bias statistically if possible.

There are three organizations for Bangladeshis in Norway. They are the Bangladesh Association Norway (BDAN) , Norsk Bangla Forum and Amader jalsha (7). Most of the Bangladeshis are member of the association ' Norsk Bangla Forum'. This is most active association and every year it arranges eid and bengali new year celebration program.I want to go through by this association member first. I presented my thesis objectives at bengali new year program of Norsk Bangla Forum.

8.5 Inclusion criteria

Adult Bangladeshi immigrants who want to participate after having been informed about the study and given verbal consent. I want to consider those people who have been living in Norway at least 2 years.

 Immigrant people from Bangladesh (Age: From 18- 58 years)

People who are mentally sound and are willing to participate and have given consent.

8.6 Exclusion criteria

People who will not able to give verbal consent or are not willing to participate.

8.7 Sample size

[Equation, $n = (Z_{1-\alpha})^2 P \times (1-P) / D^2$]

Significance level = 5% = 0.05

Prevalence, P = 50% = 0.5

Confidence interval, CI = 1-α = 95%

Relative Precision = 15%

Sample size, n = 171

I will need a sample size of 171 for the study.

8.8 Data Collection Instruments

The study data will be collected by a questionnaire. A standardized questionnaire is made by the researcher with oral health related questions which will be used for collection of data. I have selected this method because of less expensiveness and for more truthful response. The information gained from the questionnaire will be treated anonymously and will imply no hazards of dishonoring. I will meet the participant personally and take the interview who are living in Oslo and familiar with me. All Bangladeshi Immigrants doesn't live in Oslo. Considering this situation I will make an electronic form (Google drive) in both language English & Bengali for those people who are living out of Oslo like Trondheim, Bergen, Tromsø, Stavanger etc. I will try to discuss with them over telephone, Skype or Facebook if they get any difficulties. I will test the questioners on for example 10 persons and adjust it according to feedback from the test persons. I will translate the questionnaire in Bengali for the person who don't understand English. There is an association named 'NORSK-BANGLA FORUM' for Bangladeshi immigrants living in Norway (7). Most of the Bangladeshi is member of this association. I want to go through by these association members first.

This Questionnaire Includes
- Personal data (age, sex, family, education, socioeconomic situation, years lived in Norway etc)

- Questions about food habits (about sweetened drinks, sugar, green vegetables intake etc)

- Questions about general and dental health (Because some general health diseases have strong relation to oral health disease), I include some questions about heart disease, diabetes, hypertension because of their relations to Oral diseases.

- Questions about oral hygiene maintenance (frequency of tooth brushing, which toothpaste they use, how do they clean inter dental space etc)

- Some others food habit which is very important for South Asian populations (Betel quid, Betel nut and Tobacco use, sometimes people from those region take is very harmful for oral health and causes oral cancer.

8.9 Data analysis

I am mainly interested in the prevalence of self-reported dental diseases among the adult Bangladeshi immigrants (Both male and female). Statistical Analysis Software for quantitative data analysis is used for it. **Chi-square analysis** of variables will be done in Bivariate analysis and **multiple logistic regression** analysis will be performed in this study. **Biv**ariate **analysis** are employed to test gender, socioeconomic status related differences.

8.10 Research Ethics

This research will only be based on questionnaire administration. It has no clinical examination or physiological or laboratory testing. The result of this study can be used in public health personnel development. Data will be collected by informed consent and there will no force for participating. All data will keep confidential. The collected data will be anonymized and names will not appear on the questionnaire.

9.0 Time Plan

Time plans are important for evaluating and completing of the thesis work. So, I need to make a work schedule of what and when I will do it. In this time plan I have presented my thesis work plan.

10.0 List of References

1. World Health Organization- www.who.int/oralhealth/en/

2. World Health Organization- 2003: The World Oral Health Report 2003.Geneva: WHO

3. World Health Organization-2010- www.who.int/mediacentre/factsheets/fs318/en/

4. Oral Health Surveys: Basic methods- 5th edition, World Health Organization..

5. The oral health Atlas – Mapping a neglected global health issue - Roby Beaglehole, Habib Benzian, Jon Crail, Judith Mackay, Published by FDI World Dental Federation 2009

6. SSB-   Statistics Norway - www.ssb.no/en/befolking

7.Immigration to Norway from Bangladesh, Brazil, Egypt, India, Morocco and Ukraine-Scoping Studies for the project ' Theorizing the Evolution of European Migration Systems (THEMIS)'-Cindy Horst, Jorgen Carling and Rojan Ezzati –Peace Research Institute Oslo(PRIO)-

File.prio.no/publication_files/prio/Immigration%20to%20Norway,%20PRIO%20policy%20Brief%202010.pdf-ISBN:978-82-7288-359-0 August 1010

8. Fluoride levels in different drinking water sources in Bangladesh - AKM Fazlul Hoque, M Khaliquzzaman, MD Hossain, AH Khan, Dhaka Bangladesh- 38 Fluoride Vol. 36 No.1 38-44 2003 Research Report- www.fluorideresearch.org/361/files/FJ2003_V36_n1_P38-44.pdf

9. WHO commission on Social Determinants on Health (2008)

12. World Health Organization; Oral health, strategies and approaches in oral disease prevention   and   health   promotion (http://www.who.int/oralhealth/strategies/con't/en/index.html)

10. Role of Research in Oral Health Care-Editorial journal of dentistry- Jan-Mar 2012 Vol 2 issue1-www.ejournalofdentristy.com/articles/e-JOD7BD5F6F930-02FB-4209-8A09-D82537.pdf

11. The KAP survey model (Knowledgw, Attitude & Parctices)

http://www.medecinsdumonde.org/content/download/1772/13753/file/6c27001736f069d23fab6b06b30ee3a1.pdf

12. World Health Organization; Oral health, strategies and approaches in oral disease prevention and health promotion

http://www.who.int/oralhealth/strategies/con't/en/index.html

13. Use of betel quid and cigarettes among Bangladeshi patients in an inner-city practice: Prevalence and Knowledge of health effects" is written by Ahmed S, Rahman A, Hull S (published in British Journal of General Practice , July 1997,47,431-434)

14**.** Paan and Gutka use in the United States – A pilot study in Bangladeshi and Indian-Gujarati Immigrants in New York City.Journal of Immigrant & Refugee Studies. Volume 4, Issue 1, 2006. DOI:10.1300/1500 vo4 n01_07

Jyotsna Changrani MD, MPH; Gustavo Cruz DDS,MPH; Ross Kerr DDS, MPH; Ralph Katz DMD, PhD & Frascesca M, Gany MD,MS Published online 22 sep 2008

15.   THE ORAL HEALTH-RELATED LIFESTYLE OF VANCOUVER INNER CITY ELEMENTARY SCHOOL-AGED CHILDREN- Azadeh Shojael, March 2013- http://circle.ubc.ca/bitstream/handle/2429/44039/ubc_2013_spring_azadeh.pdf?sequence=1

16. DENTAL HEALTH NEEDS AND RELATED FACTORS IN INNER-CITY VANCOUVER ELEMENTARY SCHOOL AGED CHILDREN- Firoozeh Samim-February,2013-

http://circle.ubc.ca/bitstream/handle/2429/43994/ubc2013spring%2520samim_firoozeh.pdf?sequence=1

17. Dental health behavior in a migrant perspective: use of dental services of Pakistani immigrants in Norway. Selikowitz HS. Holst D. Community Dent Oral Epidemiol. 1986 Dec, 14(6):297-301. PMID: 3466751 (PubMed-indexed for MEDLINE)

18. The Dental Situation in Bangladesh- www.dentalghar.com/article/41

19. World Health Organization- WHO Health Data 2011

20. Evan G. DeRenzo, Joel Moss(ed). Writing Clinical Research Protocol: ethical considerations, Elsevier Academic Press 2006.Book

21. Miller LW, Crabtree BF. Clinical research: A multimethod Typology and qualitative Road map. In Crabtree BF, Miller LW editor Doing qualitative research, London: Sage Publications, 1999

22. Varkervisser C, Prathmanathan I, Browlec A. Designing and Conducting Health System Research Project: Proposal Development and Field Work. http://www.idrc.ca/en/en-3301-201-1-DO_TOPIC.html

23. Health Knowledge-EDUCATION, CPD AND REVALIDATION FROM PHAST (www.healthknowledge.org.uk/public-health-textbook/research-methods/1a-epidemiology/cs-as-is/cross-sectional-studies)

24. Snowball Sampling-Row land Atkinson & John Flint :The SAGE Encyclopedia of social science Research Methods- Michael S. Lewis- Beck & Alan Bryman & Tim Futing Liao Pub.date:2004 DOI:http://dx.doi.org/10.4135/9781412950589

25. "The Participants are likely to know others who share the characteristics that make them eligible for inclusion in the study." (David L, Morgan 2008). The SAGE Encyclopedia of Qualitative Research Methods. SAGE Publications, Inc.pp.816-817. ISBN 978 1412941631.

KNOWLEDGE, ATTITUDE AND PRACTICE OF ORAL HEALTH AMONG BANGLADESHI IMMIGRANTS IN NORWAY

Working Schedule

Task	Start Date	End Date	Duration
Thesis design and planning	08.04.2014	31/8/2014	4 weeks
Getting confirmation from supervisor	25.08.2014	09.07.2014	1 week
Communicating with the study population for data collection	09.01.2014	14.09.2014	1 week
Getting confirmation from the study population	09.08.2014	21.09.2014	1 week
Data collection	22.09.2014	23.11.2014	8 weeks
Literature review	17.11.2014	14.12.2014	4 weeks
Data analysis	01.06.2015	02.02.2015	4 weeks
Discussion with Supervisor	02.03.2015	23.02.2015	3 weeks
Developing paper writing	24.02.2015	20.04.2015	8 weeks
Verification with Supervisor	28.04.2015	05.11.2015	2 weeks
Report Submission	05.06.2015	05.11.2015	1 week
Presentation Slide preparation & Correction	05.12.2015	25.05.2015	2 weeks

Gantt chart time axis (weeks by month): August'14 (32 33 34 35), September'14 (36 37 38 39), October'14 (40 41 42 43 44), November'15 (45 46 47 48), December'15 (49 50 51 52), January'15 (1 2 3 4 5), February'15 (6 7 8 9), March'15 (10 11 12 13 14), April'15 (15 16 17 18 19), May'15 (20 21)

Christmas Vacation & New Year Vacation (weeks 51–52, 1)

Easter Vacation (April'15)

Note: It's a tentative thesis working schedule. It's could be change

Appendix B

Informed consent form from participants

Dear Participant

I am a dentist from Bangladesh and my name is Sharveen Ashraf. I am pursuing a Master of philosophy at the University of Oslo. The purpose of my study is to investigate the Oral health related knowledge, food habits and oral hygiene maintaining habits among Bangladeshi immigrants living in Norway. The interview will take about 8-10 minutes and the questionnaire is anonymous, that means that your name will not be asked for and no identification number will be used to identify you. So, participation is entirely voluntary. If you agree to participate in this survey, all of the collected information will be kept in confidential. All of the information will be destroyed when the data are analysed. The findings of this study will be made available to you. If you have any questions before, during, or after the study please feel free to contact me by telephone +4796869702 or email: sharveen.ashraf@studmed.uio.no

I declare that oral and written information has given as well as the declaration of consent to the participant.

Date: _____   Signature: _____

For participant:

I hereby confirm that, after receiving the above information, I agree to participate in this survey. My information will only be used for research purposes by the **Sharveen Ashraf** (researcher).

Date: _____   Signature: _____

Appendix C

THE ORAL HEALTH QUESTIONNAIRE

Please read this carefully:

We should like to know if you had any oral(dental) complaints after coming Norway, how do you maintain your oral hygiene and also about your regular food habits. Please answer ALL the questions on the following pages simply by underling the answer which you think most nearly applies to you.

I will be grateful to you if you try to answer ALL the questions.

Thank You very much for your co-operation.

1.0 GENERAL INFORMATION

❖ Sex: ☐ M; ☐ F

❖ Age: ____ yrs

2.0 WHERE YOU BELONG

1.1 How long have you lived in Norway? ____ Years

1.2 Have you moved here from Bangladesh? ☐ Yes/ ☐ No

1.3 Are you from a village or district or divisional city or capital from Bangladesh?

☐ Village; ☐ District; ☐ Division/Capital

3 .0 EDUCATION AND EMPLOYMENT

2.1 How many years of schooling/education have you completed altogether?

☐ Less than 10 yrs,   ☐ 10yrs   ☐ 12yrs;   ☐ 16yrs;   ☐ 17yrs,   ☐ More than 17 yrs,   ☐ No School

2.2 Are you currently employed?

☐ Full time;   ☐ Part time;   ☐ No

2.3 Describe the activity going on at the place of work (department) where you carried out paid work for the longest period of time during the last few years after coming here (bank, lower secondary school, Firm of accountants, commodity trade, IT firm, telecommunication sector etc…)

Activity _____ / ☐ Retired

2.4 Do you think you are in danger of losing your present work or income in the course of the next 2 years?

☐ Yes;   ☐ No

2.5   Are you receiving any of the following benefits?

- Sick pay (Certified as being ill)? ☐ Yes/ ☐ No
- Old-age pension, early retirement pension or widow (er)'s pension? ☐ Yes /☐ No
- Disability pension (full or part)?   ☐ Yes/☐ No
- Daily allowance during unemployment? ☐ Yes/☐ No

4 .0 FAMILY AND FRIENDS (one cross only)

3.1 Are you living with your family?   ☐ Yes; ☐ No

3.2 Do you have Child? If yes, How many? _____No.

3.3 How many good friends you have? _____ No.

3.4 How many Norwegian friends you have? If yes, _____ Nos.

3.5 Do you meet with Norwegian friends?   ☐Yes;   ☐No

5.0 FOOD AND DRINK

5.1 How many times do you normally eat vegetables and fruits?

Vegetable/Food	Never/ Seldom	1-2 times per day	1-3 times per week	4-6 times per week	3 times or more per day
Fruits?	☐	☐	☐	☐	☐
Cheese?	☐	☐	☐	☐	☐
Potatoes?	☐	☐	☐	☐	☐
Cooked vegetables?	☐	☐	☐	☐	☐
Raw vegetables (Salad)?	☐	☐	☐	☐	☐
Fatty fish (Salmon, trout etc.)?	☐	☐	☐	☐	☐
Sweets (candy, chocolate, dessert etc.	☐	☐	☐	☐	☐

5.2 How much do you normally consume of the following drinks?

Drinks type	Never/ Seldom	1 glass per week	1 glass per day	2-3 glasses per week	4 or more glasses per week
Fruit juice/nectar (with sugar)?	☐	☐	☐	☐	☐
Full cream milk, yoghurt?	☐	☐	☐	☐	☐
Sugar sweetened soft drinks (Coke, etc)?	☐	☐	☐	☐	☐

5.3 How many cups coffee or tea (with sugar) you drink daily? (Please write the no)

_____Number cups coffee; _____Numbers cups tea. & _____ Number of teaspoons sugar/cup

5.4 Do you take the following food supplements i.e. Cod liver oil, cod liver oil capsules, fish oil capsules, OMEGA-3 etc?

☐ Daily; ☐ Weekly; ☐ Sometimes; ☐ No

6.0 SMOKING AND OTHER HABITS

6.1 Do you smoke or have you smoke earlier?

☐ No, Never; ☐ Yes, but I have stopped; ☐ Yes, sometimes; ☐ Yes, daily

6.2 How old were you, when you started smoking? If yes, _____yrs (Please write the no)

6.3 Do you use or have you used smokeless tobacco (Snuff, chewing tobacco or similar)?

☐ No, never; ☐ Yes, but I have stopped; ☐ Yes, sometimes; ☐ Yes, daily

6.4 Do you chewing betel?

☐ No, Never; ☐ Yes, but I have stopped; ☐ Yes, sometimes; ☐ Yes, daily

6.5 How many betel quids? you take in a day? _____ Number of betel

6.6 How many cigarettes you take in a day? _____ Number of stick

6.7 Do you eat *jorda* (wet/dry tobacco)?

☐ Never; ☐ Yes, but I have stopped; ☐ Sometimes; ☐ Daily

7.0 GENERAL HEALTH

7.1 What is your present state of health?

☐ Poor; ☐ Not so good; ☐ Good; ☐ Very good

7.2 Have you following disease diagnosed by doctor? (Please cross the relevant box)

☐ Diabetes; ☐ Heart Disease (Angina, Tubular disease); ☐ Liver Disease (Liver cirrhosis, Carcinoma); ☐ Kidney Disease (Kidney failure, stone in Kidney); ☐ HTN (High Blood Pressure)

8.0 DENTAL HEALTH

8.1 Do you think that you have better/poor teeth than other people of your age?

☐ Better; ☐ Same as most; ☐ Poor; ☐ don't know

8.2 Do you take care of your teeth?

☐ Yes, a lot; ☐ Yes, a little; ☐ No

8.3 Have you had toothache (pain) due to rotten tooth (caries) after moving to Norway?

☐ Yes; ☐ No

8.4 How many teeth have you lost?

☐ If yes, please write no_____; ☐ No loss; ☐ Don't know

8.5 Have you or have you had (after coming Norway)?

- Dental Caries (cavity or decay)? ☐ Yes; ☐ No; ☐ Don't No
- Gum disease (Bleeding and swelling of gum)? ☐ Yes; ☐ No; ☐ Don't No
- Bad breath (Halitosis)? ☐ Yes; ☐ No; ☐ Don't No
- Mouth sores (Fever blisters, cold sores, ulcers, thrush etc.)?
  ☐ Yes; ☐ No; ☐ Don't No
- Tooth Erosion (Loss of tooth structure by acid attacking in enamel)?
  ☐ Yes; ☐ No; ☐ Don't No
- Tooth Sensitivity (Discomfort to eat sweet, sour, hot or cold foods)?
  ☐ Yes; ☐ No; ☐ Don't No
- Oral Cancer? ☐ Yes; ☐ No; ☐ Don't No
- Dental trauma? ☐ Yes; ☐ No; ☐ Don't No

8.6 How many times have you visited a dentist after moved Norway?

☐ Never ☐ 1-2 times; ☐ 3-4times; ☐ More than 4 times

8.7 In Which month did you last visit to dentist?

Date ___/___/_____

8.8 For which purpose you visited to dentist? (Please cross the relevant answer)

- Tooth pain? ☐ Yes; ☐ No; ☐ Don't know
- Gum disease? ☐ Yes; ☐ No; ☐ Don't know
- Tooth sensitivity? ☐ Yes; ☐ No; ☐ Don't know
- Bad Breath? ☐ Yes; ☐ No; ☐ Don't know
- Mouth Sores? ☐ Yes; ☐ No; ☐ Don't know
- Oral Cancer? ☐ Yes; ☐ No; ☐ Don't know
- Dental Trauma? ☐ Yes; ☐ No; ☐ Don't know

8.9 Why do you get Caries? (Reason if you know)

- Because:_____

8.10 Why do you get periodontal disease? (Reason if you know)

- Because:_____

8.11 What type of clinic did you visit?

☐ Public Clinic; ☐ Private Clinic; ☐ Emergency Clinic; ☐ Odontology clinic of University

8.12 Do you wear any artificial denture or tooth cap/crown?

☐ Yes; ☐ No; ☐ Don't Know

8.13 In case of any dental/ oral problem, what did you do?

☐ You consulted with dentist

☐ Try self-medication and recover

☐ Try to live with it

☐ When the condition is serious you would go to Dentist

9.0 ORAL HYGIENE MAINTANING

9.1 How many times brush your teeth every day?

☐ 1 time;   ☐ 2 times;   ☐ More than 2 times;   ☐ Sometimes no tooth brushing

9.2 How long you brush your teeth?

☐ 10-30 sec;   ☐ 30sec- 1min;   ☐ 1-2 min;   ☐ More than 2mins

9.3 What kind of toothpaste do you generally use (with/without fluoride)?

☐ Gel toothpaste;   ☐ White toothpaste;   ☐ Herbal toothpaste

9.4 What do you use for inter-dental cleaning

☐ Tooth pick;   ☐ Dental Floss;   ☐ Nothing

9.5 Do you use any mouth wash for cleaning mouth?

☐ Regularly;   ☐ Weekly;   ☐ Monthly;   ☐ Sometimes;   ☐ Never use it

9.7 Do you wash your mouth after eating/drinking sweetens food/drink?

☐ Yes, always;   ☐ No;   ☐ Yes but sometimes

9.8 How do you clean your tongue?

☐ Daily by tongue cleaner/brush;   ☐ Nothing use;   ☐ Sometimes by others thing

9.9 How long you use one toothbrush?

☐ 3-6 months;   ☐ 7-12 months;   ☐ 1-2 year;   ☐ More than 2 year

THANK YOU VERY MUCH FOR YOUR RESPONSE

REK
REGIONALE KOMITEER FOR MEDISINSK OG HELSEFAGLIG FORSKNINGSETIKK

Region:	Saksbehandler:	Telefon:		Vår dato:	Vår referanse:
REK sør-øst	Anette Solli Karlsen	22845522		27.09.2014	2014/1245/REK sør-øst A
				Deres dato:	**Deres referanse:**
				22.09.2014	

Gerd Holmboe-Ottesen
Institutt for helse og samfunn

2014/1245 Kunnskap, holdninger og praksis om oral helse blant innvandrere fra Bangladesh i Norge

Forskningsansvarlig: Institutt for helse og samfunn
Prosjektleder: Gerd Holmboe-Ottesen

Vi viser til søknad om prosjektendring datert 22.09.2014 for ovennevnte forskningsprosjekt. Søknaden er behandlet av leder for REK sør-øst på fullmakt, med hjemmel i helseforskningsloven § 11.

Vurdering
REK har vurdert følgende endringer i prosjektet:
-Bruk av elektronisk skjema for innhenting av samtykke til deltakelse.
-Bruk av elektronisk spørreskjema for innhenting av opplysninger i prosjektet.

Komiteens leder har vurdert søknaden og har ingen innvendinger til de endringer som er beskrevet.

Vedtak

Komiteen godkjenner med hjemmel i helseforskningsloven § 11 annet ledd at prosjektet videreføres i samsvar med det som fremgår av søknaden om prosjektendring og i samsvar med de bestemmelser som følger av helseforskningsloven med forskrifter.

Dersom det skal gjøres ytterligere endringer i prosjektet i forhold til de opplysninger som er gitt i søknaden, må prosjektleder sende ny endringsmelding til REK.

Av dokumentasjonshensyn skal opplysningene oppbevares i 5 år etter prosjektslutt. Opplysningene skal oppbevares avidentifisert, dvs. atskilt i en nøkkel- og en datafil. Opplysningene skal deretter slettes eller anonymiseres, senest innen et halvt år fra denne dato. Forskningsprosjektets data skal oppbevares forsvarlig, se personopplysningsforskriften kapittel 2, og Helsedirektoratets veileder for «Personvern og informasjonssikkerhet i forskningsprosjekter innenfor helse- og omsorgssektoren».

Prosjektet skal sende sluttmelding til REK, se helseforskningsloven § 12, senest 6 måneder etter at prosjektet er avsluttet.

Komiteens vedtak kan påklages til Den nasjonale forskningsetiske komité for medisin og helsefag, jf. helseforskningsloven § 10 tredje ledd og forvaltningsloven § 28. En eventuell klage sendes til REK sør-øst A. Klagefristen er tre uker fra mottak av dette brevet, jf. forvaltningsloven § 29.

Med vennlig hilsen

Knut Engedal
Professor dr. med.
Leder

Anette Solli Karlsen
Komitesekretær