

**Food, Nutrient Intake, and Physical Activity among Overweight/Obese  
Women of Somali background in Oslo, Norway. A cross-sectional study**

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**“Thesis submitted as a part of the Master of Philosophy Degree in International  
Community Health”**

**May 2023**

## **Acknowledgments**

I would like to express my deepest appreciation to my supervisor, Mr. Ahmed Madar, who was always supportive and helped me to feel I am part of the project and for his invaluable patience and feedback. I am also grateful to Linn Bøhler and others in the nutrition institute for their help and leading me to work with the system and analysis. Thanks to all women with Somali background that participated in the study. Thanks to all the funders, this study was funded by the Research Council of Norway, The Norwegian Women's Public Health Association and Eckbos foundation.

Lastly, I would like to acknowledge my family, especially my parents, who have been supportive for my whole life. Their belief in me has kept my spirits and motivation high during this process. They always encouraged me to follow my interests and always supported all my ideas in different periods of my life. I also would like to show my appreciation for all of my friends, they have always had an important role in my life, here in Norway and in my country Iran. Thanks to them for giving me confidence and encouraging me to continue in my tough days. There were many days that I was about to give up in this process, but their mental support kept me strong and motivated me to continue. It wouldn't be possible without their support.

## **Abstract**

Food, Nutrient Intake, and physical activity among Overweight/Obese Women of Somali background in Oslo, Norway

In Norway, women of Somali background are more overweight and obese than their Norwegian counterparts, with an increased susceptibility for diabetes and other lifestyle-related diseases. There is limited information about their dietary intake and physical activity. Therefore, the aim of this thesis was to describe food and nutrient intake, physical activity, and associated factors among overweight and obese women of Somali background in Oslo.

Data collection took place at the Healthy Life centres in the two boroughs in Oslo municipality. 168 women were included between September 2020 and September 2022. A trained interviewer performed 24-hour dietary recalls on two consecutive days, assessing food and beverage intake and also collected physical activity data using by a questionnaire. The dietary assessment system KBS (version 7.3, University of Oslo, Oslo, Norway, database AE-18) was used to make energy, food, and nutrient estimations. All the collected data was entered and stored in the portal Services for Sensitive data (TSD). Analysis of the data was performed using IBM SPSS statistical software, to compare variables, relevant statistics such as Pearson correlation coefficient and one way ANOVA were performed. P-values < 0.05 were considered to be statistically significant.

The main dietary intake was traditional Somali food such as rice, pasta, meat. The mean energy intake was 4.5 MJ/day. Most of the macronutrient intake were in compliance with the daily recommendations, apart from few. The total median intakes of almost all micronutrients were below recommended daily intake (RI) and Average recommendation (AR) apart from vitamin A, niacin, vitamin B12, zinc and selenium. Over 90% of the participants reported not participating in any very strenuous and moderate physical activity. Most of the participant's leisure time and physical activity is done at home. Based on our results, participants choose not to be physically active, even when they have the option.

Although, most of the macronutrient intake were in compliance with the daily recommendations, apart from few, the intake of micronutrients was below the recommended daily intakes. Thus, the results need to be interpreted with caution. Furthermore, participants are not highly physically active, this could be due to a number of reasons, and including barriers to activity and cultural reasons, which should be explored further in future research and intervention programs.



## **Motivation letter**

I am writing to express my strong interest in pursuing a master's degree in international Community Health at the University of Oslo. I currently have a bachelor's degree in health information technology, from Shahid Beheshti University of Medical Science - one the most competitive medical schools in Iran.

As I already had a background in health studies, I found the Master of International Community Health very interesting. During my studies, I have developed a special interest in research techniques, learned how to be a researcher, and how to manage research study in a large variety of topics. Furthermore, I learned how to discover new topics, manage the process of data collection, data analysis, and how to discuss results from scientific research. Studying for this master's also helped me to develop skills such as decision-making, team working, and analytical skills that I can use in the future in my career.

Studying at The University of Oslo gave me a chance to be in an international environment, communicate with people from all around the world, and learn about new cultures, different lifestyles, and beliefs. It also gave me an opportunity to live as an immigrant and experience the challenges of living in a country as a foreigner.

As an immigrant, I had always been interested to help other immigrants with their challenges and learn more about them. This mean that when I was choosing my master's thesis topic, I was interested in research on immigrants. Finally, my supervisor suggested the current topic to me, which was related to immigrants and their lifestyles. I was very interested to discover about this new topic, learn about the women immigrant population, and also learn about Somali immigrants which are one of the largest immigrant populations in Norway. Therefore, I decided to choose this topic to learn more about an area that I am interested in, and I felt that it could be helpful for other immigrants. Finally, I became part of the research group. I went to some of the interviews in person to see what questions were being asked and become familiar with the data collection procedure. After data collection was finished, I received the 24-hour dietary recall data questionnaires. I was also given access to the KBS system. I had some training sessions with expert users of the system from the nutrition faculty to learn how to work with the system, how to enter data, and finally how to analyse data. All the forms and systems were in the Norwegian language, which was challenging for me, but it was a great opportunity to learn. For physical activity and sociodemographic data, I got access to the TSD system since they were confidential data. I did all the analyses on the TSD system.

This study is an initial analysis of a research-based intervention program which aimed to provide a culturally adapted program to motivate changes in lifestyle habits (physical activity and healthy eating) among overweight and obese Somali immigrant women. The aim of this study was to assess the short and long-term effects of a culturally adapted intervention program on changes in lifestyle habits (physical activity and healthier eating) among overweight and obese Somali immigrant women. In this thesis study, the main focus was to describe the baseline data on physical activity and dietary habits from a larger study.

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## Abbreviations

<b>BMI</b>	<b>Body Mass Index</b>
<b>CVDs</b>	<b>Cardiovascular Diseases</b>
<b>HC</b>	<b>Hip Circumference</b>
<b>HLCs</b>	<b>Healthy Life Centers</b>
<b>GPs</b>	<b>General Practitioners</b>
<b>NCDs</b>	<b>Non-Communicable Diseases</b>
<b>TSD</b>	<b>Services for Sensitive Data</b>
<b>WC</b>	<b>Waist Circumference</b>
<b>WHR</b>	<b>Waist-hip Ratio</b>
<b>WHO</b>	<b>World Health Organization</b>
<b>SES</b>	<b>Socio Economic Status</b>
<b>SEF</b>	<b>Socio Economic Factors</b>
<b>PA</b>	<b>physical Activity</b>
<b>PD</b>	<b>Per Day</b>

# Chapter 1

## 1.1 Introduction

Obesity and overweight are becoming a growing public health challenge across the globe, ranging from low and middle-income to high-income countries. Despite increases worldwide, certain groups are more at risk or vulnerable to obesity and overweight, including immigrant populations. Worldwide, around 2 billion people are affected by obesity and overweight [1] and rates of obesity are rising globally, yet no national programs have successfully controlled this rise.[2] According to the World Health Organization (WHO). Obesity and overweight are the fifth most prevalent causes of death globally. Obesity can lead to many diseases such as obesity-related cancers, type-2 diabetes, and cardiovascular disease. Furthermore, it can also impact mental and physical health, and quality of life , which can lead to many indirect or direct costs for governments worldwide.[3]

In Norway, rates of overweight and obesity are higher in immigrants than in the Norwegian population, with higher rates among immigrant women than men. Somali immigrants are one of the largest populations of asylum-seekers in Scandinavian countries and Norway, and there is a large Somali immigrant community in the capital of Norway, Oslo.[4] The prevalence of obesity and overweight is higher among immigrant women from Africa and South-Asia than among ethnic Norwegians.[5] As seen in immigrant populations in other countries, Somali women in Oslo are also at higher risk of being obese or overweight [4][5].

Migration is a long process of great change. During migration, a person moves permanently, or for an extended period, from one cultural and social area to another. For immigrants moving to Western countries, westernization and urbanization most notably leads to changes in physical activity and nutrition intake. [6] Moreover, studies have shown that immigrants in Norway are more likely to begin to take up negative aspects of Western lifestyles which leads to a higher risk of obesity, T2D, and CVD.[7]

To investigate this, I present a cross-sectional study, which is part of an ongoing interventional study of Somali women in Oslo (aged 20-67 years). Participants were recruited from two boroughs in Oslo with the highest population of Somali immigrants. The aim of the study is to describe the physical activity, dietary habits, and associated factors which influence physical activity and dietary habits. The data used for the study is the baseline data from an intervention study, which is currently being conducted in two boroughs in Oslo. [8]

## **1.2 background**

### **1.2.1 Somalis in Norway**

#### **1.2.1.1 Country profile**

Norway is one of the Scandinavian countries which is consistently ranked at the top of the Human Development Ranking. [9] In 2021, Norway had around 5.4 million inhabitants, of whom around 800,000 were immigrants. [10, 11]

Based on GDP, Norway is the 7th wealthiest country in the world. [11] Norway's GDP is around \$69,000 per capita.[11] The standards of living in Norway are high so it is a suitable destination for migration.

#### **1.2.1.2 Demography**

The civil war in Somalia in the 1990s, led to thousands of Somali people fleeing from Somalia, due to the dangers of civil war and political instability. In modern times, Somalia continues to face severe problems such as war, insecurity, lack of protection, rising internal conflicts and tensions, violence, and limited access to daily necessities. These difficulties lead people to migrate and become asylum seekers in other countries.[12]

The population of Somalia is around 7.4 million and it is estimated that more than one million Somalis are living in other countries. This means that Somalia is a globalized nation, and has a diaspora community, as 14% of Somalia's population now live outside of the country. Most Somali refugees are in Kenya and Yemen. In Europe, the United Kingdom has the largest community of Somalis, and the Netherlands, Norway, Sweden, Denmark, and Italy have large Somali communities. Canada and the US also have large Somali communities. [13]

The Somalian immigrant population in Norway in 2021 is 43 593. [14] They are the largest refugee group; however, they make up a small percentage of the overall immigrant population in Norway. They mainly live in urban areas, namely Oslo. They are the third largest community of immigrants in Oslo. 80 percent of Somali immigrants in Norway are under 40 year old which means most of them are young. [15]

## **1.3 Literature**

First, a comprehensive search of literature about Somalis in Norway was conducted to get an overview of this topic. The literature search was conducted in PubMed, Springer, Google

Scholar, and NIH, using the following keywords: Norway, physical activity, food intake, dietary habit, immigrants, immigrant women, Somali women, Somalia, Somali immigrants, Somali refugees, 24 hours dietary recall, Norway, socio-economic factors, socio-economic demographic, socio economic status and migration, physical activity among immigrants, overweight, obesity. Articles were chosen according to relevance of titles, and abstracts.

### **1.3.1 Socioeconomic Factors**

Socioeconomic status is often regarded as a complicated phenomenon, as it includes many different factors. It is frequently seen as a blend of effects from the financial, occupational, and educational spheres. It is not possible to choose one of the factors as the best indicator since each of them covers a different area of social stratification. SES can affect dietary habits and physical activity, for instance, education can influence lifestyle behaviours, exercise dietary habits, problem-solving capacity and economic skills. Additionally, occupation can affect dietary habits by creating social networks that can influence daily diet choices and habits. Occupation can also affect income, physical activity, and prestige. [16, 17] Families with a lower socioeconomic position, have higher proportions of obesity among adolescents. They also tend to have less healthy diets, for example eating less vegetables and fruits, and consuming higher amounts of sugar-sweetened beverages and snacks.[18]

Length of stay in the new country for immigrants can affect rates or risk of obesity, food intake and physical activity levels. A study in the USA has studied the association between obesity and the duration of US residence. This study used data from 2000 by NHIS. BMI was calculated based on self-reported height and weight measurements, and information on diet and exercise counselling was also collected by self-report. Based on this study, there is an association between the number of years of residence in the United States and higher BMI beginning after 10 years. [23] The study also found that weight gain, obesity, and obesity-related chronic illnesses are preventable through early interventions targeting diet and physical activity.[19]

According to a study conducted in UK, higher occupational social class is significantly associated with greater food expenditure, which means that higher social classes are more likely to purchase healthier foods. [20] Socioeconomic status also affects dietary habits. According to various studies, people with higher socio-economic status report consuming less fatty milk, eggs, and meats and more whole meal, brown bread, more fresh fruits and vegetables, and a lower intake of fat, saturated fat, and refined sugar and a higher intake of

fibres.[21] Another study shows that several factors simultaneously influence dietary behaviours among adolescents.[18] There is also some studies that show, the effect of SEF on physical activity. Lastly, other social factors, such as language proficiency, can affect general health in different ways.[22-24]

Refugees have many challenges in their new country, especially when they are from a non-western country. If they are Muslim and move to a non-Muslim country, there will be extra challenges for them. These can include language barriers, discrimination, and even simple daily tasks such as shopping. All of these can impact their lifestyles and ultimately their health.[25]

According to a study conducted in Norway, Somali culture is very different from Norwegian culture, making it challenging Somali immigrants to adapt to the new culture; this can lead to acculturation problems for Somali immigrants. Additionally, they must adapt to a new climate and learn new language of the host country. Pre-migration difficulties and post-migration challenges cause difficulty in adopting to life in Norway. [26] Also in comparison to other European countries, social inequalities among immigrant populations are higher than expected in Norway.[27]

### **1.3.2 Dietary Habits**

After immigrants move to a new country, they are met with numerous unexpected changes in socio-cultural environment, which can lead to changes in lifestyle such as work, physical activity and eating habits. For instance, eating habits in the first post-migration period, include uncertainty over meal preparation and formats as well as concern about consuming foods that are forbidden by their religion. Immigrants prefer to eat things that are known and familiar to them. It is more challenging to adapt to a new food environment, especially for people that migrate from low-income countries and have low education and low income. [28-30]

Dietary changes that influence health and food security may be caused by factors such as the unavailability or high cost of foods used to make traditional food, lack of information about shopping and cooking alternatives, and changes in lifestyle and working situations. Overall dietary acculturation is a complex, dynamic, and complicated process, not a straightforward linear one. [29]

A study conducted in Oslo, Norway, among Pakistani immigrant women, to investigate how migration can changes their dietary habits, shows living in Norway has led to several changes

in participants' meal patterns, intake of different foods and meal composition. [31] For instance, dinner has become their most important meal and the cultural importance of breakfast and lunch has diminished. Also meals on working days are less traditional than meals on weekends.[31]

According to a study on post-migration, there is an increase in fat and energy intake and a reduction in carbohydrates and fiber for many immigrants. [7] There is also an increase in meat and dairy intake and some groups reduced vegetable intake. All of these factors can increase the risk of obesity T2D and CVD for immigrants after they have migrated to a new country.[7]

Based on this study, after migration there are two main changes in lifestyle and health outcomes. The first is nutrition transition, which is a global trend, and the second is dietary acculturation, which happens during migration. Dietary acculturation is when a person from a minority group adopts the eating habits and food choices of the host country. It makes it difficult for minorities to make their traditional dishes and meals, which often leads to immigrants changing their food habits [7]. However, it is worth noting that immigrants don't move linearly from one "acculturation" to another.

Globalization and industrialization of the food market have led to the nutrition transition. It started in high-income countries and then continued to low-income countries, initially in urban areas, which then expanded to rural areas. Nutrition transition has increased the consumption of ultra-processed foods, which are rich in fat, sugar, and other refined carbohydrates. [7]

There is a little information in the literature about Somali dietary habits in Norway. However, traditionally Somali staple foods consists of pasta, rice, and red meat. Results from a recent qualitative study among Somali women in Norway, shows that women experienced dietary changes since coming to Norway, which they linked to four main factors: taste of food in Norway, children's influence on family eating habits, practical barriers, and cultural and religious factors. [32]

### **1.3.3 Physical Activity**

According to WHO physical activity is any bodily movement that need energy expenditure and is produced by skeletal muscles. Physical activity includes all movements even during leisure time, transporting form a place to place or any movement at work. [33]

Regular physical activity can prevent non-communicable diseases such as strokes, diabetes, hypertension, cardiovascular disease, and different cancers. In general, physical activity helps to improve quality of life and mental health and wellbeing. One of the major independent risk factors for cardiovascular diseases is physical inactivity. Physical activity plays a protective role against certain cancers, osteoporosis, depression, and other diseases. Furthermore, regular physical activity has short term affects which include increased energy, improved sleeping, and stronger heart, muscles, bones, and joints.[34, 35] It has also positive effects on mental health, for instance reducing anxiety depression and stress.[36-38]

According to the WHO “More than a quarter of the world’s adult population (1.4 billion adults) are insufficiently active. Worldwide, around 1 in 3 women and 1 in 4, men do not do enough physical activity to stay healthy. Levels of inactivity are twice as high in high-income countries compared to low-income countries” [33] which means there is an urgent need to promote health and introduce interventions which aim to increase physical activity in populations.

In Norway over the past 15 years, the level of activity among the elderly has increased by around 20 percent. Four out of five people are doing exercise at least once a week. Young people are more active than older people but still the elderly are more active than before.[39] Despite success in increasing physical activity in these groups, immigrants in Norway continue to have less physical activity in comparison to Norwegians. According to a study on physical activity of immigrants in Norway, only one in five Norwegians reported inactivity whilst two in five immigrants described themselves as inactive. Immigrant men were more active, and tended to be less sedentary.[6] It has also been shown by a study on young people with different ethnicities, that girls with minority ethnic backgrounds are less physically active.[27]

According to a study that was conducted in Sweden, Somali women adopt sedentary behaviour due to many reasons and barriers to activity, and that they may need interventions to reduce sedentary behaviours. The authorities need to raise awareness and facilitate physical activity for women and help them to feel secure so they can access physical activities. According to another study conducted in Sweden, physical activity is not a priority for refugees, but that it can positively affect their well-being and health if they participate.[40]

Research has found that Somali women have a high prevalence of sedentary behaviour, as they tend to spend most of their time at home and do not engage in physical activity.[4, 35] Physical inactivity of immigrants can be due to many different reasons including financial reasons, lack of time, or absence of proper physical activity facilities and environment.[38] Somali women may face extra barriers, such as a study, which reports that one of the major issues for Somali women is that the training centres are mixed gender. This study found that exercise facilities which are female-only can help to remove this barrier.[38, 41] It is also reported that Somali immigrants have cultural and religious issues in a new country, due to their religion, such as the preference to have a culturally safe place to exercise without men, or the cultural norms of music whilst exercising.[25] Studies in the US show, immigrants and the refugee population have less healthy dietary behaviour and physical activity levels. Immigrant women have less opportunities to engage with health promotions due to many barriers, including childcare, work demands, lack of suitable places to exercise for women, short days cold winters and reliance on public transport.[43] [42]

#### **1.3.4 Gap in the Literature**

The literature search conducted for this thesis found limited studies to describe and assess the physical inactivity, socio-economic factors, and dietary habits among Somali women in Norway. A comparative study that assessed risk factors for lifestyle-related diseases among Somalis in Norway and Somaliand found that for managing intervention and prevention plans, it is important to understand the underlying causes of the high prevalence of overweight and obesity in this group. Achieving reductions in overweight and obesity rates for low-income and minority women is very important in reducing healthcare and obesity-related social costs, as well as reducing mortality and morbidity. This study has been conducted to improve the knowledge of the health situation of Somali women in Norway and identify the factors that can affect their risk of being overweight, their physical activity, and their dietary habits. This information can help in the planning and implementation of future intervention programs and gives an overview that can be used to improve the health status of Somali women in Norway in the future.

#### **1.4 Aims and Objectives**

##### ***1.4.1 Aims:***



The main purpose of the present study is to describe the physical activity, dietary habits and factors which influence this (age, education level, length of stay in Norway, occupation and Norwegian language proficiency) of Somali women in Oslo, Norway.

#### **1.4.2 Specific Objectives:**

1. To describe the physical activity of Somali women in Oslo, Norway
2. To describe dietary habits of Somali women in Oslo, Norway
3. To study the association between socioeconomic factors and physical activity and dietary habits.

#### **1.4.3 Research Questions:**

1. What is the physical activity level of immigrant women in Norway?
2. What are the dietary habits of immigrant women in Norway?
3. Is there an association between socioeconomic factors and physical activity?
4. Is there an association between socioeconomic factors and dietary habits?

## **CHAPTER 2**

### **Methodology**

#### **2.1 Recruitment and Participants**

Participants were recruited from two boroughs in Oslo municipality (Sagene and Gamle Oslo) between September 2020 and September 2022. These were selected because they have the highest proportion of immigrants with Somali background, an already established research collaboration with the University of Oslo and access to Somali women networks in these areas. The eligibility criteria for participants were having Somali background, BMI  $\geq 27$  kg/m<sup>2</sup>, non-pregnant, and without serious health problems. Different recruitment strategies were used including women networks, Somali radio, general practitioners and through female user representatives from Somali organisations who were included in the study team helping with information and recruitment. All participants gave written consent prior to participating in the study. We included 168 overweight and obese Somali women with a BMI  $\geq 27$  kg/m<sup>2</sup> aged between 22 and 82 years.

#### **2.2 Data collection and Instruments**

Data collection took place at the Healthy Life centres in the two boroughs. All measurements were conducted by a trained study team who followed and used standardised protocols and tools. The participants completed a sociodemographic questionnaire about their age, civil status, education level, Norwegian proficiency, and length of stay in Norway.

##### **2.2.1 Anthropometric Measures**

Weight and height were measured with participants standing without shoes and wearing light clothing. Height was measured to the nearest 0.1 cm using Seca stadiometer 213 and 217 (Hamburg, Germany), body weight was measured to the nearest 0.1 kg by an electronic Omron medical scale (BF214, Hoofddorp, The Netherlands), and BMI was calculated as weight in kilograms divided by the square of the height in metres (kg/m<sup>2</sup>).

##### **2.2.2 24-hour dietary recall**

Dietary intake was collected using 24-hour dietary recall on two consecutive days. A 24-hour dietary recall is a structured interview intended to capture detailed information about all food types, beverages, snacks, and dietary supplements consumed in the past 24 hours. [43]

(Appendix VI) This method was chosen, as it is one of the most used methods to assess dietary intake and was the most feasible in the context. The method was first pilot tested on 10 women of different ages.

In this dietary recall method, the women were interviewed by a bilingual and culturally competent researcher about the exact food and beverage intake during the preceding 48-hours. The interview was face-to-face and conducted in Somali. The recall was performed as a four-step process. In the first step, the participants were asked to talk freely of everything they have eaten the last two-days, beginning with the first meal or first consumption of any food or beverage. Allergies and intolerances were also asked in this phase. In the second step, the participants were asked for more details of the food and drink consumed (step one) such as brands and preparation method (cooked, canned, fresh, and pre-cooked), and type of meal (breakfast, lunch, dinner, evening meal, snacks, and fruit). In addition, follow-up questions were asked to provide additional detailed information about each item of food and drink consumed. It was important to map what was actually eaten, not what was served, for example, if the women consumed milk, it was necessary to ask about the type of milk. In the third step, portion sizes and amounts were estimated and various types of aids, such as food models including photographic booklets previously used in Norwegian national dietary surveys, measuring cups, spoons or measuring scales, were used. We also used the Norkost booklet containing a series of adult portion sizes, to estimate portion sizes of different kinds of bread (16). In the fourth step, information was collected on which supplements such as vitamin and mineral supplements the participants had taken. Lastly, the researcher went through the information they had collected, to allow the participant to confirm that all the data was correct. Finally, the women were asked if they could think of anything else they had eaten in the last 48-hours. On average interviews lasted around 30 minutes.

### **2.2.3 Food Intake and Nutrient Calculations**

The master's student coded all information from the repeated 24-hour recall and food and beverage items consumed were converted into grams of edible portions. The daily nutrient intakes (averaged over the two days) were assessed using the dietary assessment system KBS (version 7.3, University of Oslo, Oslo, Norway, database AE-18) to calculate energy, food and nutrient estimations. The database is linked directly to a food composition database based on the Norwegian Food Composition Table.

### **2.2.4 Physical Activity and Socioeconomic Factors**

Physical activity collected by a structured interview. (Appendix V) The collected physical activity and socioeconomic data were entered and stored in the portal Services for Sensitive data (TSD) (<https://www.uio.no/tjenester/it/forskning/sensitiv/>). This is a data storage portal developed by Oslo University (UiO) for secure storage and storage of sensitive data and other personal information. SPSS was used to analyse the data.

### **2.3 Ethics**

This study was approved by Norwegian Social Science Data (NSD) (Ref number: 724880). (appendix III) All participants received relevant and necessary information both orally and in physical written form in Somali and Norwegian. Written informed consent was obtained from each participant before inclusion in the study.

### **2.4 Statistical Analysis**

Analysis of the data was performed using IBM SPSS statistical software (V.22 SPSS Inc., Chicago, IL, USA). Descriptive statistics are presented as mean with standard deviation (SD) and as medians, with 25th and 75th percentiles for variables that were not normally distributed. To compare variables, relevant statistics such as Pearson correlation coefficient and one way ANOVA were performed. P-values < 0.05 were considered to be statistically significant.

## Chapter 3

### RESULTS

#### 3.1 Participants Profile

A total of 168 respondents were included in the analysis. In Table 1, sociodemographic characteristics of the study population are shown. Although over 93% of the women can read and write, the majority, (69%) have only primary or less education level. The mean BMI was 33.9 kg/m<sup>2</sup>, as shown in table 1 and over 73 % of the women were classified as obese.

Table 1. Background characteristics of the women, 2020-2022 (n = 168)

	mean (SD) or % (n)
<b>Age years, mean (SD)</b>	46.8 (10.4)
<b>Education years, mean (SD)</b>	7.4 (4.6)
<b>Education % (n)*</b>	
Primary school or less	68.9 (111)
Secondary school	23.0 (37)
High school or university	8.1 (13)
<b>Civil Status % (n)</b>	
Married	40.9 (67)
Non-married	11.6 (19)
Divorced/separated	12.2 (20)
Missing data	35.4 (58)
<b>Number of children in household, mean (SD)</b>	2.4 (2.2)
<b>Years of Norwegian residence, mean (SD)</b>	16.5 (6.5)
<b>Read and write % (n)</b>	
Yes	93.1 (149)
<b>Norwegian proficiency % (n)</b>	
Poor	30.1 (49)
Average	56.4 (92)
Very Good	13.5 (22)
<b>Height and weight</b>	
Height (cm), mean (SD)	161.4 (4.8)
Weight (cm), mean (SD)	88.4 (13.4)
BMI (kg/m <sup>2</sup> ), mean (SD)	33.9 (5.1)
Obese ( $\geq 30$ kg/m <sup>2</sup> ), % (n)	73.2 (123)

## 3.2 Physical Activity

### 3.2.1 Leisure Time Activity

Participants were asked about their leisure time activity and physical activity during weekdays and weekends in the past seven days.

During weekends 5.7% reported between 60 to 180 minutes sitting with their friends, 3.7% reported 10 to 120 minutes sitting in transport such as car, bus, and train and 3% had spent between 1 to 9 hours sitting by desk to use computer to work.

During weekdays, the majority of their time sitting is at home watching TV or movies, using their PC and mobile phone, and other leisure activities at home. 46.5 % reported sitting between 30 to 180 minutes, and 52.3 % reported 240 to 600 minutes sitting at home.

95% reported that they do not spend any time sitting with their friends during weekdays; also 72.8% reported that they do not spend any sitting time during transport. 20.8% had reported 10 to 60 minutes of sitting time in public transport and 6.4% reported that they had 90 to 360 minutes of sitting time during transport on weekdays. 69.9 % reported that they don't spend any sitting time during working, for instance sitting by a desk to use a computer to work. 13.3 % reported 30 to 240 minutes sitting to work and 16.8% reported 300 to 600 minutes.

Table2. Proportion of sitting time during weekdays and weekends based on minutes among overweight and obese women with Somali background aged 22–82 years. 2020-.2022.

(N=168)

	<b>Weekends (min/day)</b> Mean (SD)	<b>Weekdays (min/day)</b> Mean (SD)
Home	287.6 (178.7)	236 (144.1)
Transport	1.44 (10.6)	20.9 (60.15)
Work	10.5 (70.4)	82 (141.5)
Others*	6.2 (28)	7.3 (43.7)

\*being with friends, family members and so on

### 3.2.2 Strenuous Physical Activity

99.4% of the population does not do any very strenuous physical activity and 90.8% does not do any moderate physical activity.

Physical activity when it is very strenuous makes the person hot and sweaty, and they cannot speak full sentences during the exercise. 99.4% of participants reported no very strenuous physical activity during the past seven days of the interview and only one person (0.6%) reported 3 days in a week, which was only 2 minutes per day.

We have also asked about their moderately strenuous physical activity in the past seven days of the interview, which is the same as very strenuous, but they can still talk during the exercise. 90.8% reported that they do not have any moderately strenuous physical activity, 8.1% had between 2 and 4 days and only 2 participants (1.2%) had 5 and 7 days of moderately physical activity.

### 3.2.3 Low Physical Activity

12% reported that they have not had walked for at least ten minutes in the past 7 seven days before the interview. 42% reported that they had walked once or twice, 38.8% had walked 3 to 5 times, and 6.8% reported that they had walked 6 or 7times. 38.4% reported that they spend 1 hour on a weekday on household chores such as cleaning and cooking. 33.7% reported 2 hours and 3% reported between 4 to 8 hours in a day. Also 12.8% reported that they spend less than one hour a day on household chores.

The table below shows how often participants choose to be physically active. We can also see that often they chose to not be physically active, for instance, more than 70% reported they have never chosen to stand instead of sitting, parked their cars further to walk more, used breaks for physical activity, or have been physical activity with family, for instance, participate with children playing or hiking.

Table 3. Proportions of sedentary time and physical activity in past seven days among overweight and obese women with Somali background aged 22–82 years. 2020-.2022.

(N=168)

	Never	Once in a while	Sometimes	Often	Always
Taken stairs instead of elevator,%	37.4	4.5	5.6	10.6	39.7
Walked instead of car or public transport,%	73.7	6.1	8.9	5	5

Parked car further to walk more,%	93.3	1.7	0.6	0.6	0
Used breaks at work or home for physical activity,%	86	3.9	5	1.7	1.1
Chosen to stand instead of sitting,%	81.6	2.8	7.8	0.6	0.6
Have been physically active with family and friends,%	73.7	3.4	12.8	6.7	1.1

### 3.2.4 Factors Associated with Physical Activity

Bivariate correlation test was performed to investigate the relationship between days of being physically active, (very strenuous, moderately strenuous, and low physical activity which means walking at least ten minutes in a week), BMI, age, length of stay in Norway, education level (years of study at school), and number of children. There was no statistically significant relationship found between being physically active and these factors.

An ANOVA test was performed to study the relationship between days of having physical activity and writing and speaking Norwegian skills, however this found that there was no statistically significant relationship between them.



## **Chapter 4**

### **Discussion**

#### **4.1 Discussion of the Results**

##### **4.1.1 Dietary habits**

The study findings indicate that the women's macronutrient intake is largely in line with the Norwegian nutrition recommendations. [44] However, the majority of micronutrients especially essential micronutrients such as calcium, iron, vitamin D and iodine are below recommended values. The intake of vegetables, fruit, berries, and fish were lower than recommended intakes, while mean salt intake was only 2.4 gram per day. Which is lower than the suggested value.

The results show that the main common food intake among Somali women was cereal products such as rice and pasta. They have also reported lower intake of vegetables, fruit, berries, and roots. Most of the types of meat products are ground meat, which was used with rice and spaghetti dishes. The use of fish/fish products and milk/milk products were also low. The results are in line with the typical traditional food habits among Somalis which mainly consists of pasta, rice, and red meat.

Additionally, tea with large quantity of white sugar is widely use. This is in line with findings from a similar study among Somali immigrant women in Sweden [45]. Possible reasons for low intake of vegetables and fruits in Norway can be the difference in taste and freshness of the fruit and vegetables in Norway and in Somalia. [45, 46]. Another explanation can be due to economic factors, as fruit and vegetables are expensive in Norway.

##### **4.1.2 Energy and Macronutrient Intake**

Energy intake requirements depend on body size, gender, energy expenditure, hormonal status and psychological states. [47] The median and mean energy intakes of 4.5 and 4.3 MJ/d respectively in our participants are lower than the approximate reference energy requirements for women with an inactive lifestyle. [48] [44] The majority of our participants reported sedentary and low physical activity level (data not published). Furthermore, the mean energy intake in our population is almost half of what was observed in Norkost 3 which used the same methodology (two 24-h dietary recalls) and same age group. [49] This might indicate that the participants most likely underreported their dietary intake and is line with

what has previously been reported from other population-based surveys using 24-h dietary recalls. [50] [51]

The median E% of protein, total fat and carbohydrates were all within the recommended intake ranges. [47] However, the estimated saturated fat intake was above the recommended 10 E%, and the major sources of saturated fats in the diet was meat/meat products, fats, and oil. Fiber intake was low, and the intake of added sugar was higher than the recommended upper level of 10 E%. These results are in line with those reported in the Norwegian National Dietary Surveys. [44] [48] Intake of sugar is reported to increase the risk of caries. [52] Overweight, and obesity, while high intake of fiber might reduce the risk of some types of cancers, type-2 diabetes and cardiovascular diseases. [53] Our study participants being overweight/obese is not favourable and should be addressed. Comparatively, the intake of PUFA (Polyunsaturated fatty acid) was within the recommended intake amount range which is a positive finding and is in line to what reported in other studies in Nordic countries. [21] The overall intake of salt in this study was 2.4 g, this is considerably three times lower than the previously reported of dietary salt intake of 7.4 g/d among Somali adults in Norway. The intake is lower than estimates of average salt intake in the Norwegian population of approximately 10 g/day. [54]

#### **4.1.3 Micronutrient Intake**

Almost all micronutrient intake was lower than the recommended micronutrient intakes, with the exception of vitamin A, vitamin B12, niacin, zinc and selenium, which can be due the intake of animal products. For example, the vitamin B12 intake in our study participants was almost similar to the intake of Norwegian women, which was high (5.5 vs 6 µg/d) (Norkost 3). [44] The reasons for this are the high intake of meat and liver, which contributed to almost half of B12 intake, while fish contributed to 1/3 of B12 intake. However, the intake of essential micronutrients was lower than the recommended guidelines. In this study, the median intake of iodine was 49 µg/day, which is three times lower than the recommended intake of 150 µg/day. Compared to the findings in our previous study among Somali immigrants in Norway and Norkost 3 [44], our population had a very low median intake of iodine. This could be attributed to the low intake of milk and milk products, fortified food and lean fish products. Compared to the findings in our previous studies among Somali and other immigrant populations, our study participants had very low mean intake of vitamin D. In Norway and other Nordic countries, vitamin D deficiency is far more prevalent among immigrants than among ethnic Norwegians, and more than one-third of immigrants from the

Middle East, Sub-Saharan Africa and South Asia have vitamin D deficiency. [55] [56] In addition, compared to the findings in Norkost 3 [44] with mean vitamin D intake of 4.9 µg/day for non-supplement users, our participants had a slightly lower mean intake of vitamin D (4.0 µg/day). In Norway, some food items are fortified with vitamin D such as margarine and butter (10 µg/100 g), semi-skimmed milk (0.4 µg/100 g) and one type of bread (3 µg/100 g). Other sources of vitamin in Norway are fatty fish and supplements. Knowing that very few of our participants reported intake of supplements, the fortified products and fatty fish intake could have contributed to vitamin D intake.

The overall intake of salt in this study was 2.4 g; this is considerably three times lower than the previously reported of dietary salt intake of 7.4 g/d among Somali adults in Norway. [57] The intake is lower the estimations of average salt intake in the Norwegian population of approximately 10 g/day. [54]

#### **4.1.4 Relation between Energy Intake and Associated Factors**

No associations were found between socioeconomic factors and energy intake. This is very interesting due to expectation that those with higher education, longer duration in Norway and proficiency in the language was expected to influence the speed or extent of diet acculturation. However, this is in line with previous findings that Somali women in Norway often choose to stick to traditional Somali foods.[46]

#### **4.1.5 Physical Activity**

Based on our results, about 90% of the participants do not participate in any strenuous physical activity. Their highest levels of physical activity are whilst they are at home and doing household chores, such as cleaning and cooking, and the longest duration of their sitting time is also when they are at home, when using mobile phones, watching movies, or using the computer.

On both weekends and weekdays, most of the participants' sitting time is for the time that they are at home, and this is used for work, for instance sitting by desk to use the computer. On weekends the third most time that they spend sitting is on public transport and on weekends it is the time that they spend with their friends. Other studies have also shown that Somali immigrant women are spending most of their time at home and are less physically active. [4, 35]

Our results show that being physically inactive is their choice, and they do not try to be more physically active even when they have the option. Over 70% of the participants reported that they do not make choices to be physically active. Another study among Somali immigrants in Norway also shows that over 70% of the participants reported being physically inactive. [58] Other studies also show that being physically active is not refugees' priority that they are usually not aware about the benefits of the physical activity, and they need awareness and education about it. They also need support and facilitation to become more physically active. [59] [38, 40]

Islamic refugee women, when they move to a new country, which in westernized and non-Islamic, face many challenges to adapt to the new country. It is especially important for women to be in the best health situation possible, because they are additionally responsible for their children. Physical activity helps to maintain good health situation mentally physically and socially. [60] There are many barriers for Somali women in Norway for participating in physical activity such as cost, going to the gym alone, gyms are mixed gender, cold weather and lack of childcare. [46] A study in Sweden shows that Somali women are aware about advantages of physical activity. Based on this study there are some universal barriers such as time, climate and motivation but Somali women have other barriers as well, such as tradition and religion.[38] According to a study that was conducted among Africans in Norway, public health policymakers should lead Somali immigrants, especially women, to a healthy lifestyle, including more physical activity and healthier diets. [4]

#### **4.1.6 Physical Activity and Socioeconomic Factors**

No statistically significant relationship was found in this study between physical activity and socio-economic status factors such as, age, length of stay in Norway, proficiency in Norwegian language (oral and writing), education level and number of the children that they have at home. This was unexpected, as previous studies show that SES can affect physical activity. Based on SES disparity and ethnic, people have unequal availability of PA facilities, which can lead to being overweight. Minority status and lower SES populations have less access to PA facilities. Neighbourhood as a SES factor can affect physical activity, when the neighbourhood is not safe or people don't have enough facilities, they tend to be less physically active. Educational level also can effect it, as more highly educated people may be more aware of the importance of physical activity, which can affect families' choices, for instance choosing active transportation. [61, 62] Based on another study, language

proficiency in Norway plays an important role in health status. Immigrants with poor Norwegian language proficiency have poorer levels of health.[63]

A study shows physical activity levels (leisure, walking, occupational, and household) among lower socioeconomic status women are lower than higher socioeconomic status women.[64] Also, those at the top of the socio-economic scale, tend to participate in more leisure-time activities than those at the bottom. [34] Other studies show there is not any significant relationship between socio-economic status and overweight or obesity. [1, 23] According to another study, household income and parental education can influence obesity in children and adolescents, both among immigrants and those with Norwegian backgrounds.[24]

In sum SES is a complex phenomenon, [16] and has complex relationships with risk of overweight, and physical activity levels. Because SES can be blend of different factors that can influence each other and it is not easy to just choose one factor as the main one. Result of our study don't agree with some of the previous studies, which can have many reasons for instance sample was not big enough or because of some biases during the data collection, such as recall bias. Overall if we could not find relationship between socioeconomic factors does not mean that there is not any relationship between socioeconomic factors and level of physical activities and other studies with different samples and methods can find different results.

## **4.2 Limitations and Strengths**

To our knowledge, this is the first study, which aimed to describe the food and nutrient intake using 24-hour recall and describing physical activity of overweight and obese women with Somali background in Norway. The study has several limitations: The major limitation using a 24-recall is that data is self-reported, which could lead to misreporting, either consciously or unconsciously. Median intake of 4.3 MJ/d might indicate that most nutrient intakes were likely higher than presented here. We have not included systematically weekends in the two consecutive days which can influence the intake.

The study's strengths include that interviewer of this study was a bilingual and culturally competent researcher. All the interviews for collecting both physical activity and 24-hour recall data was conducted in Somali, and by one researcher, which ensures consistency. For collecting 24-hour recall data, the women were interviewed about the exact food and beverage intake during the preceding 48- hours. In the first interview, participants did not know which kind of questions they were going to be asked, so they couldn't prepare. For

getting accurate and exact information from participants, the interviews were conducted in a four-step process.

One of the most challenging parts of this study was recall bias. It was difficult for the participants to remember precisely how much and what they have eaten in the past 24 hours. This recall bias was also present when collecting the physical activity data. It can be difficult for participants to remember exactly what they eat during the day, especially for items such as snacks which are often eaten without much thought or planning. Therefore, it is not easy to remember exactly what we had eaten before.

There was the same problem about physical activity and sedentary lifestyle data. During the interviews, some of the questions were difficult for the participants to answer, due to poor memory recall. For instance, their sitting time during weekend or weekday at home, while using PC or mobile or at work or in public transports. In daily life people do not pay attention how many minutes they sit during using their phone or to watch TV and don't try to memorise or calculate it if they don't have any reason for it. Therefore, it is normal that they didn't remember the exact amount of time and had to estimate the answers.

Furthermore, bias may have been introduced as all the participants are overweight and their food intake may more than average, so perhaps they were embarrassed about the portion or type of the food that they are eating in their daily life.

Another limitation with the study methodology was that there is a water loss and weight change during food preparation due to water evaporation. In 24-hour recall, the women provided estimates of ingredients in the dishes, and for some dishes, we just entered the ingredients because KBS did not have complex Somalia dishes. This means there may have been errors in the calculations for evaporation and food weight change, when there was limited information on temperature and duration of cooking. However, most of the dishes, like cooked rice and pasta, are already in the KBS system with the calculated amount of evaporation during preparation.

The other limitation was the conversion of the amount of eating into grams. We have used the Norkost picture booklet, (appendix VII) containing a series of adult portion sizes. But still, there is uncertainty about the amount, for example, with a plate of rice it is uncertain how deep the plate was or how full the plate was. So, there is a probability of overestimation or underestimation of the portions. Interviews and the work were done as accurately as possible,

but it is expected that these limitations may have impacted the accuracy of the results and study.

Lastly, we collected 24-hour recall data on paper-based form during the interviews and then entered into the KBS system manually. Therefore, there may have been typing errors during entering data into the system, although efforts were taken to keep data entry as accurate as possible.

## **Chapter 5**

### **Conclusion**

We found out that the most common food intake among overweight and obese woman with Somali background is rice, pasta and meat, which means they are continuing to follow their traditional food cultures. Although, most of the macronutrient intake were in compliance with the daily recommendations, the intake of most micronutrients were below the recommended daily intakes. Thus, that weekends were not systematically included in the repeated 24-hours recall the results need to be interpreted with caution.

The study also found that the group had low physical activity levels and sedentary life style. The majority reported not having either strenuous or moderate strenuous physical activity. Participants need intervention programs to raise awareness and help them to become more physically active and have healthier dietary habits.



## **6. Dissemination of results**

### **6.1 Feedback to participants**

All participants were given an information about their physical activity levels and diet after the completion of the data assessment. All other relevant information about their BMI, blood sugar levels and lipid profile were also given (not part of thesis). In both locations, participants were advised to see their general practitioner if they presented positive for any CVD risk factors.

### **6.2 Feedback to relevant stakeholders**

Relevant feedback of major findings will be shared with stakeholders including Somali women networks, participating boroughs in Oslo municipality and Health Directorate. We are planning to have a workshop for participants from all boroughs in Oslo municipality to presents the finding from the major intervention study including our findings.

### **6.3 Article**

This article will be submitted to Public Health Nutrition journal for publication, to contribute to the knowledge on nutrition status and physical activity among women with Somali background in Oslo. An abstract from our finding will be presented at “Folkehelsekonferansen 2023, Tromsø 21. – 22. September”.

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## Appendix I

### **Food and Nutrient Intake among Overweight/Obese Women of Somali background in Oslo, Norway.**

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#### **Abstract**

**Objective:** In Norway, women of Somali background are more overweight and obese than their Norwegian counterparts, with an increased susceptibility for diabetes and other lifestyle-related diseases. There is limited information about their dietary intake. The aim of this study was to describe food and nutrient intake among overweight and obese women of Somali background in Oslo.

**Design:** Baseline study for an intervention study.

**Setting:** Oslo municipality

**Participants:** Overweight and obese women (n 168) aged 22-82, were included in an intervention study between September 2020 and September 2022. A trained interviewer performed 24-hour dietary recalls on two consecutive days, assessing food and beverage intake. The dietary assessment system KBS (version 7.3, University of Oslo, Oslo, Norway, database AE-18) was used for energy, food, and nutrient estimations.

**Results:** The mean (SD) age was 46.8 (10.4) years, and the mean BMI (SD) was 33.9 kg/m<sup>2</sup> (5.1). The main dietary intake was traditional Somali food such as rice, pasta, and meat. The mean energy intake was 4.3 MJ/day. The median energy percentages from carbohydrates, fat, protein and added sugar are in accordance with the Norwegian nutrition recommendations. The total median intakes of almost all micronutrients were below recommended daily intake apart from vitamin A, niacin, vitamin B12, zinc and selenium.

**Conclusion:** We found that overweight and obese women in Oslo with Somali background, most commonly eat cereals such as rice, pasta, and meat. Most of the macronutrient intakes were in compliance with the daily recommendations. However, the intake of micronutrients

## Vurdering av søknad sendt til Norges forskningsråd

### Søknad

Prosjektnummer	296558
Prosjektittel	Økt fysisk Aktivitet og Sunnere Livsstil hos Innvandrerkvinner
Prosjektleder	Madar, Ahmed
Prosjektansvarlig	OSLO KOMMUNE BYDEL 3 SAGENE
Søknadstype	Innovasjonsprosjekt i offentlig sektor
Program/Aktivitet	Gode og effektive helse-, omsorgs- og velferdstjenester
Saksbehandler	Anila Nauni

### Bekreftelse

Ved å levere dette skjema i utfylt stand, bekrefter jeg / vi følgende forhold (dette gjelder for den enkelte ekspert eller panelet):

- Jeg/vi er habil til å vurdere denne søknaden. Se Forskningsrådets bestemmelser om habilitet og tillit.	Ja
- Jeg/vi har lest og gjort meg/oss kjent med de kriteriene jeg/vi er bedt om å vurdere søknaden etter og retningslinjene for bruk av karakterskalaen. Karakterskalaen skal brukes for å reflektere absolutte verdier, og karakterer skal ikke settes relativt til andre søknader som panelet/fageksperten vurderer.	Ja
- Jeg/vi er kjent med og har akseptert bestemmelsene for vurdering av søknader for Norges Forskningsråd. Se Bestemmelser for eksperter / panel som skal vurdere søknader for Norges forskningsråd.	Ja
- Jeg/vi er kompetent(e) til å foreta denne vurderingen.	Ja



**NSD's assessment**

**Project title**

Økt fysisk Aktivitet og Sunnere Livsstil hos Innvandrere Kvinner (ASLI)

**Reference number**

724880

**Registered**

16.12.2019 av Ahmed Al Madar - ahmedma@uio.no

**Data controller (institution responsible for the project)**

Universitetet i Oslo / Det medisinske fakultet / Institutt for helse og samfunn

**Project leader (academic employee/supervisor or PhD candidate)**

Ahmed Madar, a.a.madar@medisin.uio.no, tlf: 99486552

**Type of project**

Research Project

**Project period**

01.06.2019 - 31.05.2023

**Status**

27.01.2020 - Assessed

**Assessment (1)**

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**27.01.2020 - Assessed**

Det er vår vurdering at behandlingen av personopplysninger i prosjektet vil være i samsvar med personvernlovgivningen så fremt den gjennomføres i tråd med det som er dokumentert i meldeskjemaet den 27.01.2020 med vedlegg, samt i meldingsdialogen mellom innmelder og NSD. Behandlingen kan starte. **MELD VESENTLIGE ENDRINGER** Dersom det skjer vesentlige endringer i behandlingen av personopplysninger, kan det være nødvendig å melde dette til NSD ved å oppdatere meldeskjemaet. Tør du melder inn en endring, oppfordrer vi deg til å lese om hvilke type endringer det er nødvendig å melde: [https://nsd.no/personvernombud/meld\\_prosjekt/meld\\_endringer.html](https://nsd.no/personvernombud/meld_prosjekt/meld_endringer.html) Du må vente på svar fra NSD for endringen gjennomføres. **TYPE OPPLYSNINGER OG VARIGHET**



## UNIVERSITETET I OSLO, DET MEDISINSKE FAKULTET, September 2019

### FORESPØRSEL OM DELTAKELSE I INTERVENJONSPROSJEKT

#### ØKT FYSISK AKTIVITET OG SUNNERE LIVSSTIL HOS INNVANDRER KVINNER

I Norge øker andelen med overvekt og fedme i befolkningen, med en betydelig sosial gradient. Somaliske kvinner har en forekomst av overvekt og fedme på over 80%. For kvinner i fertil alder ses ofte en vektøkning etter fødsel. Overvekt og fedme er blant risiko faktorer som diabetes, hjerte- og karsykdommer og noen typer kreft. På grunn av dette planlegger Oslo kommune i samarbeid med Universitetet i Oslo til å utvikle en langsiktig, innovativ, kulturelt skreddersydd og motiverende intervensjon blant somaliske kvinner i Norge. Målet for denne intervensjonen er at deltakere skal bli mer fysisk aktive, mindre stillesittende, spise sunnere, og opprettholder disse endringene på sikt. Intervensjonsprosjektet omfatter overvektige kvinner (20-67 år) som bor i først omgang i bydelene Sagene og Gamle Oslo.

#### HVA INNEBÆRER PROSJEKTET?

De som samtykker vil delta i en intervensjonsprosjekt i to-faser;

12 ukentlige tilrettelagt interaktive gruppeundervisning på 90 minutter, deretter 9 månedlige samlinger (fase-1) etterfulgt av en 12-måneders vekt vedlikeholdsfasen (fase-2). De i intervensjonen veiledes gjennom opplæring i grupper hvor det er fokus på skreddersydd sunn mat, fysisk aktivitet, stillesittende adferd og strategier for vekttap.

Bakgrunnsinformasjon, selvrappert sykdommer, smerte, bruk av medisiner, og psykososial helse (stress) vil bli samlet inn vha spørreskjema. Din kostholdsvaner vil bli samlet vha 2 x 24-timers kostintervju. Høyde, vekt, hofteomkrets, midjeomkrets og blodtrykk blir målt. Datainnsamling skjer på frisklivssenteralene, ved intervensjonsstart og ved 6 og 12 måneder (fase-I) og 18 og 24 måneder (fase-II vedlikeholdsfasen). Kommunikasjonen vil foregå på somali og norsk. Kvinnelige prosjektmedarbeidere vil utføre målingene blant deltakere.

For å måle din fysisk aktivitetsnivå og stillesittende tid vil vi bruke en liten akselerometer som du vil ha på deg i 7 dager. Akselerometer vil bli gitt til deg ved begynnelsen og en uke før datainnsamlingen ved 6, 12, 18 og 24 måneder.

Du vil få en rekvisisjon til å ta blodprøve hos Først Medisinsk Laboratorium i Oslo sentrum. Blodprøvene skal brukes til å bestemme konsentrasjonen av glukose og glykosert hemoglobin (HbA1c), som viser gjennomsnittlig blodsukker de siste 8-12 ukene før prøven er tatt, lipider (total kolesterol, HDL, LDL og triglyserider) i blodet og andre relevante markører. Prøvene kan du ta ved intervensjonstart og intervensjonsslutt. Intervensjonsgruppen vil bli påminnet intervensjon med en SMS engang i uken for først 12 uker og deretter en gang i måneden i intervensjonsperioden.

#### MULIGE FORDELER OG ULEMPER

Belastningen for deg er at du må ta blodprøve. Blodprøven blir tatt på vanlig måte i armen av en erfaren biokjemiker hos Først Medisinsk Laboratorium. Du vil få vite din høyde og vekt og ditt blodtrykk rett etter måling og blodprøveresultat etter at de har blitt analysert. Å motta SMS mottakelse ofte kan være forstyrrende men du kan gjerne reservere deg for å motta det.

## SPØRRESKJEMA BASELINE

Løpenummer: \_\_\_\_\_

Dato for utfylling ut av skjemaet: \_\_\_\_\_

Hvor har hørt om intervensjonen? Kvinnegrupper  flyer  lokal radio  annen  
sted: \_\_\_\_\_

### 1. Spørsmål om deg

1.1 Fødsels år \_\_\_\_\_

1.2 Kjønn  Kvinne

1.3 Siviltstand nå  Gift  Separert/ skilt  Enslig

1.4 Har du barn Ja  Ja  Nei

1.5 Antall hjemmeboende barn \_\_\_\_\_

1.6 Hvor lenge har du bodd i Norge? Antall år: \_\_\_\_\_

Født i Norge? Ja  Nei

1.7 Hvilken bydel bor du i? Sagene  Gamle Oslo  annen bydel: \_\_\_\_\_

### 2. Utdanning og arbeid

2.1. Hvor mange års skolegang har du fullført? Antall år \_\_\_\_\_

2.2. Kan du lese og skrive? Ja  Nei  på hvilket språk \_\_\_\_\_

2.3. Hvor gode vil du si at dine norskkunnskaper er?

Muntlig:	Skrifflig:
<input type="checkbox"/> Svært Gode	<input type="checkbox"/> Svært Gode
<input type="checkbox"/> Middels	<input type="checkbox"/> Middels
<input type="checkbox"/> Litt dårlig	<input type="checkbox"/> Litt dårlig
<input type="checkbox"/> Dårlig	<input type="checkbox"/> Dårlig

2.4. Jobber du nå? (mulig med flere alternativer)

Ja, heltid

Ja, deltid

Nei, jeg er arbeidsløs

Jeg studerer

Nei, jeg går kurs

Nei, jeg er sykemeldt

Nei, jeg er i permisjon

2.5. Hvis du jobber nå, hva slags jobb har du: \_\_\_\_\_

APPENDIX VI

**24- timers recall**

<b>Tidspunkt</b>	<b>Type mat</b>	<b>Mengde</b>
Eksempel: Kl. 8.00	Grovt brød Margarin (vita hjertegod) Ost synøve 26 % fett Lettmelk, 0,7 % fett Eple, grønt	1 skive (eller 40 gram) Se bildet (A, B; C, C) 2 skiver 2 dl 1 stk

