SEASONAL AFFECTIVE DISORDER AND ASSOCIATED FACTORS AMONG SRI LANKAN IMMIGRANTS LIVING IN OSLO

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Abstract

Human migration is as old as the human evolution. Factors influencing migration are numerous and the number of migrants is increasing worldwide. Immigrants constitute 13.1% of the Norwegian population and 23% of the population of the capital of Norway, Oslo. Migration can be associated with increased risk of mental illness.

Seasonal affective disorder (SAD) is more prevalent in populations who live in higher latitudes. SAD is described to occur more in the winter season (W-SAD) than in the summer. In addition a milder form of SAD, Sub-syndromal SAD (S-SAD) is also described in the literature. Despite the fact that SAD among immigrants found to be higher than the native population in some studies, there is a significant paucity of research on SAD among immigrants.

This is the first study on SAD among the immigrants in Norway. The quantitative part of the study used the data collected among adult (31 to 60 years) immigrants living in Oslo in 2002 (The Oslo immigrant health study). The qualitative part of this study conducted in 2011, which includes eight in-depth interviews among adult Sri Lankan immigrants living in Oslo, is novel as there are very few qualitative studies to look in to seasonal affective disorder.

There were significant differences in SAD prevalence rates among the five immigrant groups (Turkey; 16.9, Sri Lanka; 6.9, Iran; 21.5, Pakistan; 17.7 and Vietnam; 14.9) included in the study. W-SAD was significantly associated with country of birth, younger age, smoking, presence of mental distress, frequent visits to the psychiatrist or the General Practitioner (GP), self reported poor health and presence of chronic illnesses. Gender, Number of years living in Norway, education and employment status were not significantly associated with W-SAD. S-SAD was significantly associated with Country of birth, smoking and alcohol consumption.

Sri Lankan immigrants expressed the view that seasonal changes do not affect their mood and they feel happy and contented about their physical and mental health. They also described that family, social and cultural integrity and better economic prospects as reasons behind their perceptions of happiness.

In conclusion, Iranians had the highest and the Sri Lankans had the lowest prevalence of W-SAD, and prevalence of SAD is not as high as compared to other studies among immigrants. These findings were confirmed by the qualitative study, where Sri Lankan immigrants attributed lower levels of SAD to close family and social networks and better economic prospects. Further research on perception of SAD and mental health among immigrants, especially the other four groups, should be encouraged.

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List of Abbreviations

BMI	Body mass index
FGD	Focus group discussion
GOSL	Government of Sri Lanka
GP	General Practitioner
GSS	Global seasonality score
HSCL	Hopkins symptom check list
HUBRO	Oslo Health Study
Innvandrer HUBRO	Oslo immigrant health study
LDL cholesterol	Low density lipoprotein cholesterol
MDGs	Millennium development goals
PO	Participatory observation
REK	Regional Committee for Medicine and Health Research Ethics, Oslo
S- SAD	Sub syndromal Seasonal affective disorder
SAD	Seasonal affective disorder
SPAQ	Seasonal pattern assessment questionnaire
SSI	Seasonality score index
Summer-SAD	Summer- Seasonal affective disorder
UiO	University of Oslo
UN	United Nations
WHO	World health organization
W-SAD	Winter-Seasonal affective disorder

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1. INTRODUCTION

1.1 Migration

The phenomenon of migration, simply defined as seasonal movement of animals from one place to another is observed in smaller creatures like frogs to the world's largest living thing, the blue whales (1, 2). In contrast to animals whose migration is seasonal, migration of the modern man varies from escape from torture to education or finding better employment (3). History of human migration is as interesting and fascinating as the human evolution. The journey of human migration started approximately 100 000 years ago at the birth place of human kind, the African continent causing humans to spread far and wide all over the globe, and this remarkable phenomenon still exists among human beings though in an entirely different manner (4,5). In contrast to the primitive man who principally migrated to find more food or to avoid harsh weathers, migration of the modern man is far more complicated and diverse. Modern migration, which can be defined as the permanent or long term change of residence by an individual or a group has different reasons (6). These can be economical reasons such as employment, educational needs or political reasons, ranging from escape from torture and persecution to avoiding discrimination such as different religious beliefs (3, 6, 7). Type of migration varies from one context to another and migration could occur within the borders of the same country or people could migrate to other countries crossing international borders (3, 4, 6).

International migration has grown rapidly during the last few decades. In 1965 there were 75 million migrants in the world which increased to 84 million during the next decade and by the year 2007 the number increased to 175 million people (4). According to the UN (United Nations) the total number of international migrants in 2009 was 214 million (about 3% of the world population) and 15 million of them were refugees. This trend is expected to be continued and may be even escalated due to the recent upheavals of civil wars in many parts of the world. It is estimated that by the middle of the 21st century the total number of international migrants will be around 230 million (6, 8, 9).

1.2 Migration to Norway

The very first group of Norwegians migrated to the North America in the year of 1825. Since then Norway used to be the sending country of migrants rather than the opposite during the nineteenth century and the early twentieth century (10). Nearly 800 000 Norwegians or almost

half of the population of the country (population of Norway in 1865 was 1.7 million) emigrated during this period (10, 11). But with the boom in the oil industry and subsequent economic development Norway attracted, first, more labor migrants and later refugees and asylum seekers with the escalation of conflicts in Asia, Latin America and Africa (10). Now, according to the Statistics Norway, more than half a million people with an immigrant background live in Norway (655000; 13.1 % of the total population) and they have migrated from 215 different countries and independent regions of the world. Between 1990 and 2010, 471 000 non-Nordic citizens were granted residence in Norway and 22% of them were refugees and another 28% were labor migrants (11% migrated on education purposes and 38% on family reunification) (11, 12).

Sri Lanka is a small island in the Indian Ocean with a population of 20 million. Three major ethnic groups live in the Island; Sinhalese, Tamils and Muslims (13, 14). The Island was ravaged by a civil war that began in the early 1980s between the Government of Sri Lanka (GOSL) and the Tamil rebel fighters which lasted nearly 30 years displacing tens and thousands of civilians of all the three ethnicities. Majority of the displaced civilians were Tamils and they migrated all around the world mainly as asylum seekers or refugees.

A small group of Sri Lankan Tamils have migrated to Norway in the 1960s as labor migrants for the fishing industry and had gained the reputation of hard working people (15). But the majority of Sri Lankans migrated after the escalation of the war in the 1980s. At the beginning, most of the initial Tamil refugees settled down initially in the Finmark County because there were more job opportunities in the fishing industry in the Northern Norway. They were recognized as hard working and had better wages than people living in the south and their living conditions were similar to those of the native Norwegians. Soon they built their own little community with separate movie theatre, radio station, shops and cafes (10). According to the Statistics Norway, by the 1st of January 2012, 14293 Sri Lankan immigrants were living in Norway (first generation immigrants and Norwegian born to Sri Lankan immigrant parents). They rank 16th on the immigrants' list and more than half of this population (7365) is living in Oslo (16). Among the immigrant population of Norway, compared to many of the other immigrant groups, Sri Lankan immigrants are reported to be employed more in the labor market and also enjoy relatively higher income levels, lower crime rates, and higher education levels (11, 15).

1.3 Migration and mental health

The ancient Latin proverb of the Greek philosopher Thales "mens sana in corpore sano" (a sound mind in a sound body) is well reflected in the WHO definition of "health", in which mental health is regarded as one of the essential components of overall health of an individual. Mental health of an individual is in turn related to and affects socio-cultural, economical and physical well being. On the other hand mental health of an individual is determined by socio- economical, cultural, environmental, biological and genetic factors. A person with a good mental health should be able to work productively according to his or her own abilities, cope with normal stressful events in life and contribute meaningfully to the community in which he or she lives (6, 17, 18).

According to the WHO statistics more than 450 million people worldwide suffer from mental disorders and it is estimated that many more suffer from undiagnosed mental illnesses. In the year 2008, reported number of deaths due to neuropsychiatric conditions were more than 1.3 million and it was 2.3% of the total number of deaths worldwide (19). Poor mental health is associated with multiple factors such as major life style changes (retirement from work), socio cultural factors (war and conflicts), personal factors (bereavement of a close relation or a friend), political reasons (persecution or migration) and environmental factors (natural disasters) (6). Mental illnesses, while directly contributing to the global burden of disease, indirectly affect the health of the population in multiple ways. The importance of mental health on global burden of disease becomes obvious when we analyze the Millennium Development Goals (MDGs). Mental health, though not included in the MDGs has been shown to be very important for the successful implementation of the MDGs (20, 21). In addition mental health is also associated with suicides, accidents and injuries and increased risk of chronic diseases such as diabetes, hypertension and myocardial infarction (22, 23). It is also associated with reduced immunity and increased risk of infections (6). The importance of mental health was recognized by the WHO by declaring the year 2001 as "the global mental health year".

Migration has many benefits as well as many disadvantages for the migrant, the host country and the home country (6). Safety, improved socio-economic conditions and better educational opportunities are some of the benefits a migrant can experience in the host country. On the other hand, loss of own cultural and religious support, loss of autonomy and increased risk of illnesses can put the migrants in a disadvantageous situation in the host country (3, 6).

Migration is described as a three stage process; pre-migration, migration and post-migration (3, 6, 24). Different factors affect an individual's health during these three different stages of the migratory process. Different pull factors (such as better socio-economic conditions in the host country) and push factors (such as violence and persecution in the home country) influence the decision of migration (3, 24). Migration also can be categorized as voluntary or involuntary depending on the context of migration. Labor migration, most of the time is undertaken by the migrant voluntarily in contrast to forced migration faced by asylum seekers and refugees and the health impact of migration on the migrant vary enormously in these two different groups (3, 6, 7).

Health impact especially the mental health impact of migration on the individual and community has been studied for decades. Migration is associated with a higher risk of mental and physical illnesses among immigrants compared to the host population irrespective of reason for migration (3, 6, 18). In contrast to earlier beliefs, even the individuals who have migrated voluntarily to a new place such as labor migrants are increasingly recognized as having higher risk of illnesses than the host population despite the fact that they enjoy relatively much higher standards of living compared to the individuals who migrated as refugees and asylum seekers from the same community (6, 25).

Migration can cause an enormous psychological stress on the migrant and the families (3, 26). During the pre-migratory stage violence and persecution in the home country and traumatic experiences can increase the risk of mental illness in an individual. Hazardous border crossings, anxious waiting and even imprisonment of a migrant are some of the factors that can impact seriously on an individual's mental health during the second stage of the migratory process. Once a migrant has arrived to the host country number of different factors can adversely affect the mental health of a migrant. Initially migrants may have a sense of relief especially those who escaped conflicts, violence and torture. But gradually other issues would emerge causing much anxiety and distress to the individual. Immigrants are living between two cultures or sometimes even more than two cultures (6). Their family and social structure may be destroyed and they live in a foreign land with a different culture, society and language. All these factors create psychological stress on the immigrants and their families which would lead to mental ill health (3, 6, 24). However an individual's reaction to the stress of migration depends on several factors such as personality, psychological stability and cultural identity of the individual. On the other hand immigrants are a vastly heterogeneous

group and vary enormously in handling the stressors of migration and not all immigrants have the same experiences and they are not affected to the same degree of mental ill-health (26).

Social support and acceptance by the host society and the own ethnic group and better employment and economic status in the host country also play a major role in shaping an immigrant's mental health (3, 6, 26).

The "healthy migrant effect" described in earlier literature as immigrants having better health status than the native population has now being increasingly questioned (27). Some first generation immigrants in fact had been found to be healthier than the host population when they first arrived to the new country. But the health status of the immigrants deteriorates with time due to several factors such as poor living conditions, unemployment, adoption of an unhealthy life style and poor health care provision and utilization (27). On the other hand it is described that immigrants are reluctant to use some of the health care facilities available in the host country especially mental health care facilities (28). One reason could be that the amount of stigma associated with mental health in the immigrants' native culture (15). In the Sri Lankan society the attitude towards mental health patients found to be negative even among health personal (29).

1.4 Seasonal Affective Disorder (SAD)

Changes in mood and behavior in different seasons is called seasonality (30, 31). Seasonality of disease occurrence has been described since ancient times (32). Seasonality is found to be a universal phenomenon affecting all individuals to a certain degree and the Seasonal Affective Disorder (SAD) which was first described as a separate clinical entity in 1984 is at the extreme end of seasonality (33). SAD could occur in the summer (Summer-SAD) and winter (W-SAD) though the latter has been studied most often. W-SAD is characterized by typical depressive mood and atypical symptoms such as increased sleep, increased appetite, increased weight and carbohydrate craving (33, 34). SAD has been considered as a specifier of bipolar or recurrent major depressive disorder in the DSM 4 criteria (35). Major risk factors for SAD are living in higher latitudes, amount of sunlight per day, female gender and younger age. Socio-cultural factors, climate, ethnicity and genetic factors have also been associated with SAD and living with a partner, older age and male gender are described as protective factors. Higher education level and higher income level of an individual has also been found as positively associated with higher levels of SAD (36-38).

Melatonin secretion in the brain which is associated with diurnal rhythm and neurotransmitters such as serotonin, norepinephrin and dopamine are suggested as biological mechanisms for the onset of SAD (30, 39). Prevalence of SAD varies from one geographical region to another even in the same country (34). Prevalence of W-SAD has been found to be higher in temperate countries in North America and Europe and the opposite is true for Summer-SAD which is comparatively higher in warmer climates (40-42). On the other hand prevalence rates of Sub-syndromal SAD (S-SAD) which is a milder form of SAD has been found to be generally higher than W-SAD prevalence (34). Exposure to bright light is the best and the most effective treatment of W-SAD (33, 34). Nonetheless, W-SAD is often under-diagnosed or miss-diagnosed and treated with expensive drugs despite the availability of this low cost and non-pharmacological method of treatment (43, 44).

Studies among immigrants on SAD are lacking and the available data shows that the prevalence of this disorder is higher among immigrants than the native population (45, 46). It is also higher among individuals who move to higher latitudes in the same country or region despite their ethnicity (34). Most of these studies had been conducted, however among small sub groups of immigrants such as students who have not lived in the new locations for a considerable time period (45, 46). So the results obtained in many of these studies could not be generalized.

Norway with its harsh seasonal changes and high immigrant population could be a typical place to experience SAD. Prevalence of W-SAD among the Norwegian native population varies between 6.5% to 19% in different studies (34, 47, 48). S-SAD prevalence among native Norwegian population found to be 10.1% among males and 10.8% among females (34). I could not find any published studies on SAD among any immigrant groups living in Norway. I also could not find any published qualitative study on SAD among immigrants among the available literature neither in Norway nor in other countries.

1.5 Need for more research among immigrant groups

Immigrants' health conditions and health needs are increasingly recognized as being different than the host population (6, 24, 49). Immigrants come from different social and cultural backgrounds with different health beliefs, attitudes and needs. In addition most of the studies that had been carried out among immigrants have considered immigrants as a single homogenous group. This has led to making blanket health policies covering all immigrants in one group which has not very much benefited the immigrants (24). It has also been found that

the disease prevalence rates vary considerably among different immigrant groups (6, 7, 50). On the other hand most of the studies have used instruments which are not culturally validated for the immigrant group under investigation which has led to the doubt of validity of the outcome of most of these studies. So the need for more research among different immigrant groups is an essential and urgent need for health policy planning and public health preventive strategies (24, 28).

Research material on migrants' mental health is scarce (28). In Norway public health research on immigrants' mental health has only a short history. But the available literature shows that the immigrants, especially the non western immigrants have more mental health problems than the host population (50, 51). It is also shown that economic conditions and social support are important factors in mental health of immigrants (51). The underutilization of available health facilities, especially the mental health facilities by immigrants has also brought in to light in some of the literature (15, 28).

Though the statistics show that the Sri Lankan immigrants living in Norway have better social, economical and educational status, the health indices do not show the same amount of positivity (11, 50, 52). The Oslo Health Study (HUBRO) and The Oslo Immigrant Health Study (Innvandrer HUBRO) show that Sri Lankans have higher levels of risk factors for cardiovascular diseases such as increased LDL cholesterol levels and obesity (50). It has also shown that compared to the host population Sri Lankan immigrants have poor dietary habits and lesser amount of physical exercise (50). But on the other hand mental health of Sri Lankan immigrants found to be better than some of the other immigrant groups living in Norway (15, 50). Nevertheless in a study among Sri Lankan immigrants living in Northern Norway, Grønseth (2010) describes that Sri Lankan immigrants have many health related problems especially psychological problems for which they do not get proper attention from their doctors (53). In her opinion the gap between the immigrants' attitude towards their illnesses and the Norwegian physicians who treat them has created a conflict which has resulted in further aggravating the situation of the immigrants, especially their psycho-social wellbeing. But on the other hand her focus on the study was the immigrants' use of medical services rather than mental health per se (53).

In the light of these research evidence one could postulate that answers for some key questions remained unanswered.

- What is the explanation for the important finding that Sri Lankan immigrants have lower levels of mental distress compared to some of the other immigrant groups living in Norway?

- Is there any cultural, social or other factor which has a protective effect against mental illnesses among the Sri Lankan immigrants living in Norway?

- How do Sri Lankan immigrants perceive the seasonal variations especially the cold winter months in Norway and how do they cope up with it?

To find answers for some of these questions I proposed to carry out a qualitative study and to analyze a group of already collected quantitative data. The quantitative part of the study used already available data from the Oslo Immigrant Health Study (2002). The second part was a qualitative study among Sri Lankan immigrants living in Oslo.

2 Main Research Objectives

The research had two main objectives because it had two components; a quantitative and a qualitative part.

1. Assess the prevalence of Seasonal Affective Disorder (SAD) among immigrants living in Oslo, Norway.
2. To gain an understanding of the factors affecting the well being and mental health of Sri Lankan immigrants living in Oslo, Norway.

2.1 Specific Objectives

1.1 Assess and compare the prevalence rates of Seasonal Affective Disorder among five ethnic immigrant groups in Oslo (Sri Lanka, Pakistan, Turkey, Iran and Vietnam).

1.2 Determine the associated factors affecting the prevalence of SAD in these groups.

2.1 Understand the migrant Sri Lankans' perceptions about their well being and mental health.

2.2 Understand the reasons behind these perceptions.

2.3 Understand the informants' perception on any seasonal changes to their wellbeing and mental health.

2.4 Understand the reasons behind the informants' perception of the seasonal changes to their wellbeing and mental health.

3 Methodology

Generally the main reason a research is carried out is to discover, understand and communicate the truth of the object being researched and this object under study could be a person, a disease, a phenomenon or a situation (54). The phenomenon called "truth" depends on the point of view of the researcher, the researched as well as the audience who view the results of the research. The word "research" also means differently to different individuals depending on his or her attitude towards research. The main two paradigms of research "positivist" and "interpretivist" which use quantitative and qualitative research methods respectively had not been the same in the history of search for the "truth". Before medieval times among the Greek and Roman philosophers the qualitative view dominated in the analysis and description of situations. During the middle ages a new way of reasoning began and only the "intellectually superior scholars" were thought to be able to fully comprehend and discuss the precise, meticulous and logical reasoning of a given subject. The common man and the non-intellectuals were regarded as not fully able to comprehend these and were not allowed to venture in to these fields. Frustrated with the situation where only the philosophers could express their reasoning, the scientist in the 17th century came up with the idea of truth being self evident and observable. They believed that there cannot be any doubt about truth which could be quantitatively measured (54). So the debate about understanding and evaluation of truth raged on for centuries and finally the quantitative research methodology took shape in to a more course and effect relationship with a scientific background and qualitative research methodology was applied more in social sciences. So the gap between them widened and the interpretivist paradigm was not regarded as a true scientific method to apply on scientific research, but during the last few decades of the 20th century qualitative research has again come to the attention proving its validity and usefulness in other branches of science such as public health (54-57).

The qualitative and quantitative debate during the last century can be roughly divided in to three stages (53). During the latter part of 19th century up to the 1970s there was a stage of conflict and polarization between the two approaches. Quantitative and qualitative methods were regarded as having different theoretical positions and therefore used separate and specific methodologies of their own. They were considered to be so different that any attempt of bringing them together was looked in contempt. Especially in such fields like science and

medicine where precise, controlled and objective measurements were needed to obtain mathematically sound models to describe and illustrate the truth behind a given situation (54).

The next stage reached with a compromise between the two and both regarded as parallel research tools. The critical approach with good and bad viewpoint was relaxed and the differences were accepted as variations of the same concept. During the 1980s a more pragmatic stage was reached with cooperation of the two methods. Qualitative research was applied with more rigorous methodology so as to be regarded as a legitimate tool in scientific research. During the last two decades however the debate has died down a little and now both methods are regarded as complementary to each other and used in triangulation in research strengthening the possibility of reaching more accurate conclusions (54-56, 58, 59).

3.1 Quantitative research methodology

Quantitative research is used more in natural and applied sciences than the social sciences. It is more critical about the way a research is carried out and dictates stringent terms on how to apply scientific and logical approaches in research and how to analyze the data with mathematical and statistical tools. Quantitative research is more concerned with course and effect relationships of the situation under study and the goal of quantitative methodology is to measure the phenomena under study more objectively (54, 59). Much of the data we use in medicine such as demographics, prevalence rates and disease patterns are obtained from studies and surveys conducted under quantitative methods (56, 60). Almost all the information that is used in both communicable and non communicable diseases such as symptoms and signs, pathophysiology, diagnosis and treatment have been discovered based on quantitative methods. In quantitative research the researcher tries to minimize his or her influence on the research by using various scientifically accepted norms such as random sampling, blinding and controlling the confounders as much as possible (54, 60).

The positivist paradigm dictates that rationality belongs only to scientific knowledge and the methodology must be based purely on observations and any interference with interests, values or purposes are not tolerated (56, 57). Due to these strict criteria quantitative approach is criticized as mechanical and not having the human touch (55-57). The researcher and the researched or the interviewer and the interviewee are handled as objectively as possible to reduce their subjective influence on the outcome of the research. The research questions are made by the researcher before the research was carried out and there are stringent regulations to distance the researcher from the researched. The feelings and subjective individual opinions

of both parties are suppressed so as to minimize any bias creeping in to the research study (57).

Two broad study design types are used in quantitative research of medical science; experimental studies and observational studies (61). Experimental studies can generate the most convincing evidence in a research because the confounding factors which could affect the outcome of the research could be controlled to a much larger extent with this type of a study design. Observational studies, on the other hand delivers less reliable results because the confounding variables are not effectively controlled as opposed to experimental studies (61). Public health research uses mostly observational studies. Several types of observational study designs are used in epidemiological surveys; cohort studies, case control studies and cross sectional studies (62). The cohort studies are longitudinal in nature and the defined sample population is studied over a longer time period either prospectively (forward in the time span) or retrospectively (backwards in the time span). In cohort studies disease patterns and cause and effect of a disease can be discovered. But these studies require more resources and time. Case control studies are designed as retrospective studies. Cross sectional studies are described as snap shots of a single point in time (61, 62).

Cross sectional studies in contrast to longitudinal studies are easier to design, quicker to perform, and need fewer resources. Because these surveys are carried out in one point of time they can measure only disease prevalence rather than incidence of a disease which needed to be measured during a given period of time. Disease trends over time are also not measured due to the same reason. Cross sectional surveys can predict on risk associations of a disease but not any causations (61, 62). One way to overcome these limitations is to perform repeated cross sectional studies over a time period on the same study population. However it is not practical to get the same individuals as sample population and so the validity will be lost. On the other hand longitudinal studies need more time and resources and also could be hampered by recall bias of the subjects (61).

Innvandrer HUBRO study (The Oslo immigrant health study 2002)

I used the data collected in the Oslo Immigrant Health Study which was a large cross sectional survey. This survey included a target population of more than 7000 people and had multiple research objectives. For this type of a large study a cross sectional design would be more appropriate for several reasons. The large target population in the survey would have limited the options of the researchers due to the limitations in resources and time available

and if it was designed as a longitudinal study, follow up of the number of subjects participated would have been a daunting task both financially and logistically. On the other hand this study was part of a series of several studies and that also could have limited the options available for the research team. However this approach limits some of the epidemiological calculations and interpretations from the study outcome as discussed above.

The Oslo Immigrants Health Study (Innvandrer HUBRO) is a large cross sectional epidemiological survey and was conducted in 2002 by the National Health Screening Service (now Norwegian Institute of Public Health – NIPH) and the University of Oslo (UiO). The target study population included all adult immigrant residents of Oslo, who were born in Turkey, Sri Lanka, Iran, Pakistan and Vietnam between 1942 and 1971 except the birth cohorts who were invited to another study previously (1954/55, 1960 and 1969/70). A total population of 7890 met the eligibility criteria. Out of this population 7607 were reached by mail to participate in the study. 3019 gave written consent and participated in the study. The response rate for the total population was 39.7% and the response rates for individual countries of birth were; Turkey 32.7 %, Sri Lanka 50.9%, Iran 38.8 %, Pakistan 31.7% and Vietnam 39.5%. Non responders were sent one written reminder between 3 to 8 months after the first invitation letter. Ethnicity, age and gender were determined by using the Norwegian population register and only the first generation immigrants were included in the survey.
The research group adopted several strategies to increase the participatory rate. The main questionnaire, consent form and the information sheet were translated in to the five respective languages of the participants, field workers at the screening centers spoke the five different languages, a mobile screening unit was used for the late responders, the project coordinator worked closely with immigrant groups, lectures and meetings were organized and radio and TV advertisements were broadcasted.

Objective of the main survey was to assess the main health problems of the adults of five of the largest immigrant groups living in Oslo and to compare their health status to the native Norwegian population.

Mass media was used to disseminate the information about the study and invitation letters were mailed to the eligible participants two weeks prior to the data collection. One main questionnaire and an additional supplementary questionnaire were completed by the participants and participants who had at least returned one questionnaire was included in the study. In addition to the two questionnaires, anthropometric measurements and blood tests

were performed on the subjects at several screening sites (but those data were not used in my analysis except the calculated body mass index (BMI)).

The main questionnaire included questions on physical and mental health, social activities, education, employment, alcohol consumption and smoking habits. The questionnaire was in Norwegian and also included a translated version of the native language of the participant. The supplementary questionnaire (which was only in Norwegian and English) contained the Seasonal Pattern Assessment Questionnaire (SPAQ) which is used to calculate the prevalence of SAD.

3.1.1 Instruments

Seasonal pattern assessment questionnaire (SPAQ) which was included in the supplementary questionnaire is the commonest instrument used in epidemiological surveys of SAD (34, 63, 64). It has several scales and three of them were used in my analysis. Seasonality score index (SSI) is one of the mostly used scales. SSI investigates seasonal variation of six items (sleep, social activity, mood, weight, appetite and energy). These items are measured in a scale of 0 to 4 ranging from 'no change' to 'major change'. The total score of these six items which ranges from 0 to 24 is called the global seasonality score (GSS). The second scale used asked the participants to rate the degree to which they experience the seasonal changes as a problem (ranging from 'no problem' to 'completely disabling problem'). The subjects were also asked to rate which month of the year they felt the seasonal changes to be worst (31, 34, 38).

Total GSS equal to or more than eleven with the degree of problem as equal to or more than moderate degree is regarded as a SAD positive case. With SAD positive and if the subject felt worse in the winter months (November to February) then the subject is categorized as W-SAD. The same procedure is carried out for the Summer-SAD and a subject is categorized as Summer-SAD if the subject felt the seasonal changes worst in the summer months (May to August) (31, 34, 38).

Calculation of S-SAD uses two criteria. If the total GSS is more than 11 with the seasonal changes being a problem less than moderate degree then the subject is classified as S-SAD. If the total GSS is 9 to 10 and the subject feels the seasonal variation to be an equal to or more than a moderate problem then also the subject is classified as S-SAD positive (34). A subject who falls under any one of these two criteria is classified as S-SAD.

The Hopkins symptom check list- 10 item version (HSCL-10) is a widely used scale to assess the mental distress in epidemiological surveys (65, 66). This scale was included in the main questionnaire form. It uses a scale with responses ranging from 'not troubled (1)' to 'much troubled (4)' and assesses the experience of the subject on ten different items experienced during the past one week. The average of the total sum of the all ten items is used to classify mental distress. Sample mean of any missing item replaces the missing values. Nevertheless responses with more than 3 missing items were excluded from my analysis. Those scoring an average of 1.85 or more in the HSCL-10 are classified as mentally distressed (65, 66).

3.1.2 Ethical considerations

The approval and ethical clearance for the quantitative (Innvandrer HUBRO) study was obtained from the Norwegian Data Inspectorate and the Regional Committee for Medical Research Ethics (REK). The study has been conducted according to the ethical principles declared by the World Medical Association Declaration of Helsinki. All the participants gave written, signed consent for the study prior to the data collection. All the data were encrypted to ensure confidentiality of the participants.

3.2 Qualitative research methodology

Malterud (2001) defines qualitative research method as "systematic collection, organization and interpretation of textual material collected by talk or observation" (55). The basic aim in qualitative research is to obtain a comprehensive understanding of the situation under study (54). To gain this understanding a researcher can use different approaches in qualitative research. Four broad theoretical approaches are described in qualitative research; critical theory, feminist theory, postmodernist theory and interpretive constructionist theory (67).

In critical theory the researcher emphasizes action research, tries to highlight and uncover problems in the society such as problems of the oppressed poor people, migration and stigmatized diseases like HIV/AIDS. The researcher often takes the view point of the oppressed and argues that the knowledge is subjective and depends on the perceiver's viewpoint (54, 67).

Empowering the disempowered groups like women are important for a feminist researcher. They argue that the positivist paradigm with surveys as research methods disempower subjects and disregard the feelings and cultural influence of the subject under study. The

research methodology used by the feminist researchers is believed to open up interviewees to talk more freely and express themselves more coherently (54, 67).

For a postmodernist researcher truth is impossible to define and neutrality is also impossible to achieve because everyone involved in the research influences the whole process of research from writing the proposal to the publication of findings. Because different people see the same problem differently they accept different viewpoints from different researchers about the same situation under study. Many argue that only the viewpoint and the voice of the interviewee should be the outcome of a study (54, 67).

Interpretive constructionist theory states that interviewee's views on experiences and observations about his or her life, work and society is more important. The researcher is more concerned with different views of different interviewees and tries to draw specific and relevant meanings of the interviews and interpret them comprehensively (54).

Qualitative research methods were criticized as subjective, biased, non relevant and unscientific as a research tool in the past, especially in natural sciences and did not have a place in medicine. To overcome these criticisms more vigorous methods were applied in all aspects of qualitative research. But now qualitative research is recognized as an important research method and increasingly used in Medicine, especially in Public Health (55, 56, 60).

Kenneth Howe (1988) argues that in any research only a few things are based on scientific grounds and the bulk of the study is based on common sense and previous experiences of logic inherent in the problem definition. According to him even the scientific method or positivist approach is also heavily dependent on subjective influences of the researcher and affects the topic under study and its outcome (57). Malterud (2001) adds to this stating "medical discipline is founded on scientific knowledge, but clinical decisions and methods of patient care are based on much more than results of the controlled experiments" (56). In medicine the diagnosis or the understanding of the disease is more dependent on quantitative methods but on the other hand understanding the patient is an entirely different matter. Patients have feelings and opinions and they differ in attitude, behavior and character. Qualitative studies are essential to understand these phenomena among the patients, doctors and other health care workers (56).

The steps in a qualitative research design are interdependent and overlapping especially because the research design would change and reshape as the information is gathered (60).

Several factors influence the design of a research project; theoretical and conceptual frame work, purpose or the objectives of the study, which method of data collection is used?, who are the participants?, ethical standards, and finally the method of analysis and dissemination of the information collected (60).

According to Rubin (2005) in the interpretivist paradigm research questions were not decided at the beginning but they emerge during the process of the interview and should be pursued further (67). So the position is that the researcher must have a high level of tolerance towards any uncertainties that could occur especially at the beginning of the research and then with time the researcher would be able to reshape his or her previous ideas and come up with different research questions later on with the progress of the research project (67).

Three main data collection techniques are used in qualitative studies especially in interpretive constructionist paradigm; participant observation, focus group discussions and in-depth interviews (60). In 'participant observation' method the researcher would observe the behavior of the participants and the researcher has the choice to sit separate from the participants or to become part of the group and mingle with the study participants. The main focus is to observe the behavior and interactions of the participants in their natural setting such as a work place or home.

A 'focus group' is a group of participants preferably six to eight people chosen by the researcher who would sit with the researcher and discuss a common theme of interest (58, 60). The researcher would not be actively participating in the discussion, rather the researcher would be the moderator and direct and encourage the free flow of ideas from all the participants. In contrast to these two methods in an in-depth interview the researcher would interview individual participants with a face to face interview. Depending on the research theme, the availability of time and resources, the interview could take few minutes to several hours and sometimes the researcher would meet the participant over and over again during the course of the research project, until the researcher is contented about all the possible information that could be obtained from the participant (60, 67).

The main objective of interviewing is to gain the interviewees' interpretation of the experiences and perceptions of the research topic under investigation. The personal characteristics of the interviewer as well as the interviewee influence the outcome of an

interview and interviewer also contributes actively to the interpretation of the interview. Because the interviewer could influence the interviewee in an interview it is important that the interviewer poses his or her questions in a manner that the interviewee could answer without limitations on his or her feelings and opinions (67).

There is a great debate on bias in qualitative methods and bias in research is a concern for any researcher. Especially in qualitative research the outcome of the research is influenced by the bias of the researcher depending on the researcher's cultural, ethnic, political and religious views. To reduce the bias of the project researchers suggest to increase the rigour in qualitative methods. The use of a tighter research design is called rigour. Several ways of increasing the rigour are suggested; using triangulation methods, using a valid theoretical basis, being reflexive about the biases and perspectives of the researcher and acknowledgment of contradictory interpretations (54). In addition when designing a research reflection on several key issues are also important to reduce bias. Objectivity (influence of the researcher and the participant on the outcome of the research), validity (authenticity of the data collected), reliability (acceptance of the outcome of the study), subjectivity (perspective of the researcher) and sampling are very important (54, 67).

Reliability and validity of the information gathered play an important part in acceptability of the findings of a research. Several ways are suggested to increase the reliability of the data gathered for a qualitative study. Training the researcher on interview techniques prior to the start of the project, using standardized questions and applying transcription rules when transcribing the data are some of the methods suggested. Proper documentation is also important in increasing the reliability of the data gathered (58).

The validity of the information gathered is also important when disseminating the findings. The researcher must make sure that the interpretation of the data shows the true ideas and opinions of the participants. According to some of the literature, if the participant's presentation is a narrative then it is regarded as valid (58). But on the other hand it is argued that this is applicable for only a very limited number of situations. Some authors suggest involving the participants to validate the findings. The researcher would meet the participant for a second time to get the response of the participant on the analyzed data. Another way is to compare the findings with the available literature and find some common grounds in theory

and findings. Finally triangulation can also be used for validation of the information gathered (58).

Generalization of the findings is another hotly debated topic in social sciences as well as natural sciences. Due to the subjective nature of the methodology qualitative research analysis is a challenging task. This is further intensified by the fact that the researcher and the interviewee both could influence the outcome of the research with their biased subjective views. On the other hand that is what the researcher is interested in when conducting a qualitative study. But without generalization the applicability of the findings of a study would become ineffective. Therefore the selection of a representative sample from the population under study would be essential for generalization of the findings (58). On the other hand in qualitative research the depth and insight of a topic is more important than the breadth, so generalization becomes more of a conceptual concept than a numerical one (60).

Selection of a representative sample from the population would not necessarily be an objective in a qualitative study and given the nature and the size of the sample it would not be practical either. The researcher decides which person to be included in the study or not. Therefore the very nature of qualitative research design is not about generalization of the findings to the wider population but more of a deeper and richer understanding of the topic under study (58, 60).

Selection of subjects for a research project or 'sampling' is a challenge in any research. Unlike in quantitative methods where strict selection criteria can be used, in qualitative research the selection criteria are comparatively more flexible. In qualitative methods selection of participants can change with the progress of the research project. Usually the selection of participants would be carried out until the researcher is convinced that all aspects of the research topic were covered. The researcher has the flexibility to select participants who would provide the richest information for the research. Several main sampling methods are used in qualitative methods. For example, in 'extreme sampling' outstanding cases will be selected as participants, in 'homogenous sampling' method a subgroup of participants who has the same type of experiences will be selected such as a group of nurses or doctors, in 'convenient sampling' the most available and easiest to reach subjects are selected as study participants (60).

Qualitative study among Sri Lankan immigrants living in Oslo

In my qualitative study also I used several strategies to increase the reliability and validity of the data. Being a novice for the qualitative research and trained as a quantitative person it was a very challenging task for me to look at things with a qualitative perspective, at least at the beginning. I had several classes on qualitative methods. I used a semi structured interview guide for my research and I did two pilot interviews with two Sri Lankan immigrants before I started the project. I documented all the data meticulously as possible. I also used theoretical background for my project. But I did not meet the interviewees for a second time.

Out of the several theoretical approaches described above in my study I inclined more towards the interpretive constructionist theory and focused the research on the experiences of the participants' interaction with their family, friends and social environment.

My qualitative study included Sri Lankan born first generation immigrants who are currently living in Oslo. The selection criteria for our study had several components.

- Sri Lankan born immigrants living in Oslo
- Age preferably between 31 to 60 years
- Participant is living in Norway at least more than three years.

These criteria were selected because we wanted to make the qualitative study as a complementary study for the larger quantitative survey and I wanted to select a sample of participants as similar as possible to the quantitative study. All the subjects who participated in the quantitative survey were living in Oslo and the age limits were between 31 and 60 years. I used data from participants who had lived at least 3 years in Norway, this is because we were calculating SAD prevalence and it is an objective that the participants had lived minimum of three years in a given location to calculate SAD prevalence.

I used purposive and snow ball sampling method to recruit my participants. In purposive sampling method in contrast to convenient sampling method the researcher selects subjects who can provide the richest information for the research topic (54, 60). Snow ball sampling is a commonly used method to reach and find subjects who are not known to the researcher. Usually word of mouth and social networks are used to recruit participants in this manner and it has been proven effective in reaching the participants (54, 60). Being a Sri Lankan myself I

personally know many Sri Lankan immigrants living in Oslo and I have a fairly large network of friends among Sri Lankan immigrants. At the beginning of the research I talked to many of my friends and let them know what I was doing. I prepared an information leaflet in Tamil and English, inviting participants to take part in the project which was approved ethically by the REK (see annex 2, 3). Copies of this leaflet were distributed among many of my friends and acquaintances at the start of the project. Many potential subjects were introduced to me by my friends and finally my study included four males and four females.

The first participant in the study introduced me to several other participants and I interviewed one of these participants as well. The fifth participant was introduced to me by the fourth participant. So four of the participants were recruited by snow ball sampling method and the rest of the participants were introduced to me by some of my friends and acquaintances. I continued with my interviews with recruitment of participants one by one and I stopped recruiting any more participants when I felt that I was not getting any more new information from recruiting anymore participants (data saturation).

The study included semi structured in-depth interviews with all the eight participants. The interviews lasted on average about 60 to 90 minutes. Interviews were done at places that were convenient for each individual participant. Some interviews were carried out at their homes and some were done in cafes or work places. Except for two interviews all the other six interviews were carried out in the evening after work because the participants had no other free time. The interviews were carried out during the winter months of 2011 from October to December.

3.2.1 Ethical considerations

The qualitative study was approved by the Regional Committee for Medicine and Health Research Ethics, Oslo (REK).

Ethical consideration is one of the most important factors in a research study. The Sri Lankan immigrants represent a minority ethnic group in Norway and my qualitative study focused on mental health issues, which can be considered as very sensitive topics in a research. The ultimate choice of study design depends on ethical considerations, in addition to, aims and availability of resources (61). The safety of the subjects' life, privacy and integrity are some of the most essential issues in relation to ethical considerations.

In any research that involves human subjects it is especially important to ensure that the participant has the right to withdraw from the research at any time without incurring any repercussions to him or her. Usually in quantitative surveys a written informed signed voluntary consent is obtained prior to the beginning of the research.

In qualitative studies obtaining a written consent signed by the participant poses several challenges to the researcher. Unlike quantitative studies qualitative research involves only few participants. So securing the anonymity and confidentiality of the subjects is even more challenging in a qualitative study. The researcher assures the participants full anonymity and confidentiality before the research begins. Most of the time name, sex and other personal information of the participants are not collected and even the location or the interview set up is changed when the results are published so as not to identify the participants. So obtaining the signature on a legal looking form could jeopardize the confidentiality that the researcher builds up with his or her participants (67).

The researcher must all the time safeguard the promise of confidentiality and anonymity of the participant of the study. Once the results are published the information should not be traced back to the subjects. The confidential information of the subjects should not be divulged to anyone outside the project group. At the same time the researcher should be able to publish the results in a way that the data are valid. This is especially important if the topic under investigation is sensitive in nature (54, 67, 68).

There are many thousands of Sri Lankan immigrants living in Oslo. But the community is so much interconnected it will be easy to identify a person even with a little description. So I had to be extra careful when publishing my data and results to safe guard the anonymity of the participants in my study.

I gave the participants a full and complete description regarding the study and they could opt to withdraw from their participation at any time from the study (See annex 2 and 3). I assured them that the confidentiality and anonymity of them will be safeguarded and none of their personal details will be published or stored with the information gathered. I also will destroy all the data files once the results are published. I did not collect their personal information such as name and address which can be referred back to them. I have also not mentioned the exact location of the interviews and certainly will be discrete when I publish their individual characteristics such as gender when I quote them in my published articles.

The participants were not paid any compensation for their contribution to the study. Reimbursement for the time participants spent for a study often arises in Focus Group Discussions (FGD) (60) and it is better to follow the local customs in such an instant. On the other hand, paying for participation in a study would result in recruiting participants with a bias view (60). The customs and traditional values of Sri Lankans is that they usually do not expect money or gifts for a help that they rendered for someone and it would be even considered as an insult. Thus I did not pay any money or gave any gifts to the participants.

4 Reflexivity

Reflexivity is the critical self awareness of the researcher during a research study (54, 59, 60). The researcher sees the research project thorough his perspective and this influences the research from the start to the end of the project. The researcher is the one who decides on the research topic, which methods to use, how to recruit subjects and gather data, analyze, interpret and finally disseminate the information gathered. So the outcome of a research is influenced by the researcher from the inception of the project (54, 60).

In qualitative studies the researcher himself is a valuable asset with the knowledge, skills and the experience he or she brings to the field. But at the same time he or she should have an awareness of the influence he could exert on the study (68). The researchers position in the research in regard to his or her education, experiences, culture and background, personal attitudes and characteristics and pre-understanding influences the way he conducts the interviews and direct the participants towards a given topic of discussion (54).

In the past when the researcher's influence was regarded as an unwanted bias, the researcher did everything possible to minimize this effect when doing research, but now the trend is to acknowledge this fact and in qualitative studies the researcher is considered as an active participant in the process of information gathering and the researcher's skills and experience as a communication partner is regarded as an asset for the project. However, when sensitive topics are brought in to the discussion it is acknowledged that if both the researcher and the participant are of the same gender it would be more advantageous (60, 67).

I acknowledge the fact that my pre-understanding and prejudices as a medical doctor and a public health researcher on the one hand and as a Sri Lankan on the other hand would affect the way I design, conduct and analyze the research project and final interpretation of the results. For example I have my own opinions and feelings of how mental health is affected by certain factors. So avoiding, disputing the participants of their feelings and experiences when talking about mental health was a real challenge for me. Also as a fellow Sri Lankan my political, social and cultural opinions were not the same as some of the participants and when social and cultural topics were discussed or analyzed the influence I have as a researcher could not be denied. On the other hand pre-understanding and prejudices are issues that have shaped who a person is and denying the presence of these could jeopardize the outcome of a research.

However as a Sri Lankan who speaks the same language as the participants and with similar cultural back ground I was welcomed by the participants and I felt that they were not hesitant to discuss their feelings and opinions on the research topic. In Sri Lankan culture medical doctors are regarded with respect and honor and becoming a doctor itself is regarded as one of the biggest achievements for a person. I also felt that my participants were amused at the prospect of a doctor coming to their place and interviewing them. So I believe that my participants were feeling comfortable talking to me about their health. The research objectives, though about mental health, did not discuss any sensitive areas such as war or trauma. Rather the research was more focused on mental well being of the participants, especially seasonal changes of health and wellbeing of the participants. Nevertheless it cannot be ruled out that participants might have had doubts about the motives of the project. To minimize this I adopted several strategies.

I used my social network among the Sri Lankan immigrants and also common meeting places such as Sri Lankan shops to recruit participants, the information leaflet was translated in to Tamil and contained a comprehensive account of the research project and it also contained the information of me and my supervisors and our contact telephone numbers. The interviews were conducted in Tamil, one of my native languages and took place at places where the participants felt convenient for them. I had another unique advantage as well. As a person from a different religious and ethnic background than the Tamils and Sinhalese who were at war in Sri Lanka, I did not receive any animosity from the Sri Lankan immigrant society.

Participants also have their own pre-understanding and prejudices about certain issues and sometimes a participant might not be frank enough to reveal certain aspects of an issue. But on the other hand if the researcher could develop better confidence in the participant this could be minimized. Another way of verifying this is to observe the subject to see whether they actually do what they said. But in my study the objective was not to observe their behavior or interactions with the others so this was not carried out. On the other hand during my interviews when I felt resistance from a participant on an issue, I avoided going deeper and changed the conversation. For example I felt that most of the participants were not willing to discuss the social support networks among the Sri Lankan immigrant community and I did not question on it any further.

5 Mixed methods or Triangulation

Combination of both quantitative and qualitative methods is increasingly being used in health research (58, 59). Combination of two or more methods in contrast to using a single method to explore the same phenomena under study can reveal many aspects of a complex problem and it can generate more comprehensive answers to the research questions and improve the validity and the quality of the study (60). Both methods have their own strengths and weaknesses but when used together they can complement each other to provide better outcomes than used alone (58, 60). Mixed methods also can broaden the perspective of the research and the final outcome can be used more effectively to persuade policy makers (60). In contrast, according to some of the literature the quantitative and qualitative methods cannot be and should not be combined in one single research because they have different paradigms, different technical approaches and they study different phenomena (68, 69). Sale (2002) argues that they can be combined for complementary purposes only and should not be used for triangulation or cross validation of findings (69). On the other hand the challenge of combining quantitative and qualitative methods is that the study could break down into two or more parallel studies (70). To overcome this it is suggested that the research should be designed with mixed methods from proposal to publication and the questions in both methods should be complementary to each other and overlapping (70).

Despite challenges and arguments mixed methods approach is becoming a separate entity in health research (57-59). According to Uwe Flick (2009), mixed methods approach in a single study design can be accomplished in three ways; both studies can run parallel to each other, sequencing of methods (one method after the other) or they can be carried out separately and later used in triangulation (58). Sequencing of quantitative and qualitative methods in the same study can be done in four ways; a smaller qualitative study followed by a more comprehensive quantitative study and vise versa or a comprehensive quantitative study followed by a smaller qualitative study and vise versa (59, 60, 71).

Two outcomes can be expected in a mixed method study. Both methods can give similar results and would increase the credibility of the findings (called corroboration) and broaden the knowledge about the issue under study (called elaboration). If dissimilar results are obtained for different methods this could raise new questions and can lead to alternative interpretations or more research (called initiation) (58, 60).

The word triangulation is used in many disciplines. It means ascertaining the exact location of a place or an object by taking readings from multiple viewpoints. In navigation triangulation increases the accuracy of finding the exact location. In qualitative studies triangulation is used in several aspects of the research such as triangulation of data, investigator, theory and methodology (60, 72). In data triangulation multiple sets of data are obtained using the same or different methods in different times and locations. Same situation is investigated by different researchers in investigator triangulation and in theory triangulation multiple theoretical approaches are used. Methodological triangulation involves the use of multiple methods. Methodological triangulation can be used 'within method' and 'between methods'. 'Within method' triangulation means using multiple approaches of the same method and in 'between method' triangulation different methods such as quantitative and qualitative methods are used (72).

In my study the quantitative data I used were already collected in 2002. So, in practical sense I only conducted the qualitative study and the analysis of the quantitative data. But I recruited a sample of participants as similar as to the quantitative survey subjects. In addition the qualitative interviews focused on the themes that were investigated in the quantitative survey. The questions I asked were complementary to the items in the quantitative survey questionnaire (see annex 4). For example I particularly focused my interviews on participants' experiences on the seasonal variations.

I used the findings of the qualitative study as complementary to the findings of the quantitative survey. Using triangulation as a mixed methods research design in contrast to using a single method design increases the confidence of the researcher about the outcome of the study in relation to external validity and reliability (58, 72). Triangulation in mixed methods research design is being used increasingly in public health research despite the arguments against it in some of the literature because in addition to providing external validity and reliability triangulation can broaden the view of the issue under study providing a more clearer picture (60, 68).

6 Findings and analysis

6.1 Findings and Analysis of the quantitative Study

6.1.1 Socio Demographic Characteristics

Out of the total sample of 1047 43% were females. 26.3% of the participants were Sri Lankans who also had the highest response rate of (50.9%) in the survey. The percentage of Pakistani immigrants in the sample was only 14.6% which was the lowest. The total sample had a mean age of 42. 5 (± 7.2) years for males and 42.4 (±7.7) years for females. The age range was 31 to 60 years for the total sample as well as for the five different immigrant groups. The Sri Lankan group had the lowest mean age for men (40.3±6.3 years) and women (40.1±6.3 years). The oldest mean age for men 45.5 ±8.3 years was found among the Pakistani group and Pakistani and Vietnamese women had the highest mean age for women (45.2 years).

Average number of years living in Norway for the total sample was 13.9 (±7.2) years for males and 12.2 (±6.5) for the females. The oldest group living in Norway was Pakistani males with a 20.6 (±9.4) mean number of years and Pakistani females 17.0 (7.2±) mean number of years. The youngest male group was Iranian men (9.8±4.0 years) and the youngest female group was Sri Lankan women (9.0±4.7 years).

6.1.2 Mean GSS, Mean HSCL score and Prevalence rates of W-SAD, S-SAD and Summer-SAD

Mean GSS for the total sample was 6.0 (±4.6) for males and 6.2 (±4.7) for females and the difference was not statistically significant for different genders. The Iranian men (7.6±4.6) and women (7.7±4.6) had the highest mean GSS for individual groups. The lowest GSS was recorded among the Sri Lankan men and women (4.7±3.8 and 4.7±3.9 respectively).

Mean HSCL-10 score for the total sample was 1.48±0.64 for men and 1.61±0.69 for women and there was a statistically significant difference between the two genders. The highest mean HSCL-10 score was recorded by the Turkey group with 1.66±0.73 and 1.82±0.75 for men and women respectively. The lowest level of HSCL-10 was recorded by Sri Lankan men and women with mean HSCL-10 scores 1.30±0.49 and 1.34±0.52 respectively. These findings are compatible with the findings in the main survey (The Oslo Immigrant Health Study) from where the original data was obtained.

Prevalence of W-SAD for the total sample was 14.3% for males and 16.4% for females and there was no statistically significant difference between the two genders; x^2 (1, n=900) =.621, p=.431. The highest prevalence of W-SAD for both males and females were discovered among the Iranians with 20.3% and 23.0% respectively (x^2 (1, n=223) =.067, p=.796). The lowest was among the Sri Lankan men and women which were 5.8% and 8.0% respectively (x^2 (1, n=225) =.148, p=.701).

Prevalence of S-SAD was 13.7% for males and 12.0% for women for the total population (x^2 (1, n=900) =.435, p=.510). The highest prevalence of S-SAD among men was 25% which was found among the Turkey men and the highest among women was 19.5% which was found among the Iranian women. In contrast to W-SAD the lowest prevalence of S-SAD among men was found in Pakistani men which was 7.6% and Sri Lankan women however had the lowest levels of S-SAD prevalence which was 4.6%.

Summer-SAD prevalence was 2.9% for both sexes and the prevalence rates for the individual groups were not calculated because the number of positive cases were quite low.

6.1.3 Risk and protective factors for W-SAD and S-SAD

According to the Spearman rank order correlation (rho) the total score of GSS was negatively correlated to age (r = -.086, n = 1047, p = .005). However this was a small effect though, it was statistically significant. Nevertheless this confirms the findings of the available literature on SAD which has clearly shown a lower prevalence of SAD among older age groups (30, 33, 34). On the other hand number of years living in Norway had no significant correlation with the total GSS score. Sri Lankan group however, had a statistically significant positive correlation with number of years living in Norway and GSS score (r = .120, n = 275, p = .047).

According to the chi squared test for independence W-SAD was significantly associated with country of birth, smoking, presence of mental distress, self declared poor health, frequent visits to the GP or the psychiatrist and presence of chronic diseases. S-SAD was significantly associated with country of birth, smoking and alcohol consumption according to the chi squared test for independence.

Logistic regression analysis was carried out for both W-SAD and S-SAD with their respective statistically significant independent variables. Age, presence of mental distress, frequent visits to the psychiatrist, self reported health and presence of chronic diseases showed a statistically

significant relationship with W-SAD. On the other hand S-SAD had a significant association with country of birth and alcohol consumption.

Presence of mental distress had an odds ratio of 2.7 with W-SAD while odds ratio for frequent visits to the psychiatrist was 2.6.

Moderate levels of alcohol consumption had an odds ratio of 2 with S-SAD.

The prevalence of Summer-SAD for males and females in the total sample was 2.9%.

6.1.4 Tables

Country	Male			Female		
	Number	%	% within country	Number	%	% within country
Turkey	103	17.2	56.3	80	17.9	43.7
Sri Lanka	168	28.0	61.1	107	23.9	38.9
Iran	148	24.7	60.9	95	21.2	39.1
Pakistan	90	15.0	58.8	63	14.1	41.2
Vietnam	90	15.0	46.6	103	23.0	53.4
Total	599	57.2		448	42.8	

Table 1: Total population for country

Variable		Male		Female	
		Number	%	Number	%
Living with Partner	Yes	508	87.6	391	90.7
	No	72	12.4	40	9.3
Education	Up to 10 years	160	26.9	183	42.1
	11 to 12 years	145	24.4	88	20.2
	More than 13 years	289	48.7	164	37.7
Employment	Yes	459	78.1	257	57.9
	No	129	21.9	187	42.1
Smoking	Currently smoking	194	33.5	48	11.3
	Not smoking	385	66.5	375	88.7
Alcohol consumption	Low	342	58.5	377	88.9
	Moderate	219	37.4	46	10.8
	High	24	4.1	1	0.2
Mental distress	Yes	114	20.7	123	29.6
	No	438	79.3	292	70.4
Self reported Health	Poor	35	6.0	43	9.8
	Not very good	196	33.7	183	41.8
	Good	298	51.2	189	43.2
	Very good	53	9.1	23	5.3
Self reported Diabetes	Diabetic	38	6.6	34	7.9
	Non diabetic	535	93.4	398	92.1
Obesity (according to BMI)	Obese	77	12.9	101	22.5
	Not obese	521	87.1	347	77.5
Physical activity	Active	291	51.3	199	48.8
	Inactive	276	48.7	209	51.2
Frequent visits to the GP	Yes	190	33.0	186	42.5
	No	386	67.0	252	57.5
Frequent visits to the Psychiatrist	Yes	21	3.9	29	7.2
	No	519	96.1	373	92.8
Chronic diseases	No diseases	323	53.9	221	49.3
	1 Disease	164	27.4	142	31.7
	2 Diseases	69	11.5	61	13.6
	3 or more Diseases	43	7.2	24	5.4

Table 2: Number and percentages of different variables for the total sample

Variable	Male		Female	
	Mean	SD	Mean	SD
Age	42.5	7.2	42.4	7.7
Duration of living in Norway	13.9	7.2	12.2	6.5
Average HSCL score	1.48	0.64	1.61	0.69
Total score GSS	6.0	4.6	6.2	4.7

Table 3: Mean value and Standard Deviation (SD) of age, duration of living in Norway, Average HSCL score, and Total score GSS for the total sample

Country	GSS				Average HSCL			
	Male		Female		Male		Female	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Turkey	6.3	4.9	7.1	4.8	6.3	4.9	7.1	4.8
Sri Lanka	4.7	3.8	4.7	3.9	4.7	3.8	4.7	3.9
Iran	7.6	4.6	7.7	4.6	7.6	4.6	7.7	4.6
Pakistan	6.2	4.8	5.5	4.9	6.2	4.8	5.5	4.9
Vietnam	5.2	4.5	5.9	4.7	5.2	4.5	5.9	4.7
Total	6.0	4.6	6.2	4.7	6.0	4.6	6.2	4.7

Table 4: Mean value and Standard Deviation (SD) of age, duration of living in Norway, Average HSCL score, and Total score GSS for different groups

Country	Male				Female			
	W-SAD		S-SAD		W-SAD		S-SAD	
	Number	%	Number	%	Number	%	Number	%
Turkey	12	13.6%	22	25.0%	15	20.8%	9	12.5%
Sri Lanka	8	5.8%	14	10.1%	7	8.0%	4	4.6%
Iran	28	20.6%	23	16.9%	20	23.0%	17	19.5%
Pakistan	16	20.3%	6	7.6%	6	13.3%	5	11.1%
Vietnam	10	13.2%	6	7.9%	15	16.3%	11	12.0%
Total	74	14.3%	71	13.7%	63	16.4%	46	12.0%

Table 5: Prevalence rates of W-SAD and S-SAD for different groups

Variable	X^2	df	p	phi or Cramer's V	p
Gender	.435	1	.510	-.025	.447
Country	18.631	4	.001	.144	.001
Living with a partner	2.246	1	.134	-.056	.096
Education	.104	2	.950	.011	.950
Employment	3.036	1	.081	-.062	.064
Smoking	4.654	1	.031	.077	.023
Alcohol consumption	11.148	2	.004	.113	.004
Mental distress	3.506	1	.061	.069	.047
Self reported health	2.244	3	.523	.051	.523
Self reported diabetes mellitus	.265	1	.607	-.024	.475
Obesity	.492	1	.483	.028	.405
Physical activity	.065	1	.798	.012	.721
Frequent visits to the GP	.021	1	.885	.008	.803
Frequent visits to the Psychiatrist	.017	1	.896	.005	.896
Chronic diseases	.970	3	.809	.033	.809

Table 6: Results of the Chi squared test with independent variables and S-SAD

Variable	X^2	df	p	phi or Cramer's V	p
Gender	.621	1	.431	.029	.378
Country	20.590	4	.000	.151	.000
Living with a partner	2.773	1	.096	.062	.069
Education	.380	2	.827	.021	.827
Employment	2.157	1	.142	.053	.116
Smoking	9.707	1	.002	.110	.001
Alcohol consumption	3.424	2	.180	.063	.180
Mental distress	82.833	1	.000	.319	.000
Self reported health	83.025	3	.000	.308	.000
Self reported diabetes mellitus	2.591	1	.107	.061	.073
Obesity	.213	1	.644	-.019	.559
Physical activity	1.477	1	.224	-.045	.190
Frequent visits to the GP	39.222	1	.000	.215	.000
Frequent visits to the Psychiatrist	47.335	1	.000	.248	.000
Chronic diseases	61.722	3	.000	.262	.000

Table 7: Results of the chi squared test with independent variables and W-SAD

Variable	B	SE	Wald	df	p	Odds ratio	95% C.I for odds ratio	
							Lower	Upper
Country			9.252	4	.055			
Country (1)	-.425	.456	.868	1	.352	.654	.267	1.599
Country (2)	.449	.342	1.723	1	.189	1.566	.802	3.060
Country (3)	.752	.419	3.227	1	.072	2.121	.934	4.819
Country (4)	.640	.406	2.481	1	.115	1.896	.855	4.202
Self reported health			8.945	3	.030			
Self reported health (1)	-.297	.358	.691	1	.406	.743	.369	1.496
Self reported health (2)	-1.121	.434	6.657	1	.010	.326	.139	.764
Self reported health (3)	-19.609	4957.259	.000	1	.997	.000	.000	.
Smoking	.475	.266	3.177	1	.075	1.068	.954	2.710
Frequent visit to Psychiatrist	.943	.390	5.862	1	.015	2.568	1.197	5.510
Frequent visit to GP	.262	.268	.955	1	.329	1.299	.768	2.197
Chronic diseases			9.042	3	.029			
Chronic disease category (1)	-.111	.309	.130	1	.719	.895	.488	1.640
Chronic disease category (2)	.859	.346	6.168	1	.013	2.362	1.199	4.653
Chronic disease category (3)	.443	.450	.971	1	.324	1.558	.645	3.761
Age	-.042	.018	5.299	1	.021	.959	.925	.994
Mental distress	1.002	.267	14.098	1	.000	2.724	1.614	4.596
Constant	-.511	.920	.309	1	.578	.600		

Table 8: Results of the Logistic Regression analysis for W-SAD

Variable	B	SE	Wald	df	p	Odds ratio	95% C.I for odds ratio	
							Lower	Upper
Country			14.195	4	.007			
Country (1)	-1.007	.344	8.568	1	.003	.365	.186	.717
Country (2)	-.123	.277	.198	1	.656	.884	.513	1.522
Country (3)	-.854	.410	4.330	1	.037	.426	.190	.952
Country (4)	-.718	.339	4.478	1	.034	.488	.251	.948
Smoking	.171	.235	.530	1	.467	1.187	.749	1.880
Alcohol consumption			9.142	2	.010			
Alcohol consumption (1)	.678	.225	9.032	1	.003	1.969	1.266	3.064
Alcohol consumption (2)	.478	.580	.678	1	.410	1.612	.517	5.024
Age	-.005	.015	.097	1	.755	.995	.967	1.025
Constant	-1.509	.684	4.859	1	.027	.221		

Table 9: Results of the Logistic Regression analysis for S-SAD

	Total sample	Analyzed Sample	Removed sample
Age	42.1	42.4	42.0
Number of years in Oslo	12.8	13.1	12.6
Total GSS	6.1	6.1	6.2
Average HSCL	1.54	1.53	1.54
Percentage of Females	44.0%	42.8%	44.8%

Table 10: Mean values of age, Number of years lived in Norway, Total GSS, Average HSCL score and Percentage of females in the Total sample (n=3019), Analyzed sample (n=1047) and the removed sample (n=1972)

6.2 Findings and Analysis of the qualitative study

Several different techniques are described for analyzing qualitative data (54) such as Enumerative mode, Investigative mode, Iterative mode and Subjective mode. In my study I mainly used the iterative mode of data analysis. Iteration is an interpretive and interactive approach of qualitative data analysis.

In the iterative mode of qualitative data analysis the researcher gathers information by interviews or observations and the analysis of the information gathered starts with the first interview itself and the researcher would be all the time listening and analyzing what the participant is saying and then direct the next question according to what the participant said previously (54). Then in view of what the researcher discovered during the previous interview the researcher decides what to follow up and what questions to be included or discarded. Depending on these, during the next interview the researcher would explore deeper in to more important aspects of the research topic that are not covered in the previous interview. This dynamism in the process would continue until the researcher is satisfied that all the possible avenues are explored and the information is saturated (54, 60). In qualitative interviews the researcher and the subject both are active participants in the information gathering process. The researcher while guiding the participant during the interview, actively listens to the participant and when needed can challenge the subject to give more information on the topic. So the analysis of a qualitative research is a process that starts with the beginning of the first interview itself. But at the end of the information gathering the researcher would spend a considerable time reading, reflecting and digesting the material gathered (54, 55, 60).

I used to take notes while participants spoke and soon after an interview was over I would sit down somewhere and read what I have written down often in shorten form and quickly fill the gaps before I forget anything that was said. This was made easier because I used a semi structured interview guide for my interviews. This was a less effective method in contrast to using a tape recorder to gather information, but I did not wish to sacrifice that all important confidence of the participant for my convenience. However in this type of data gathering there is a chance of missing or misinterpreting some of the information gathered. This can be rectified by meeting the participant again and verifying the information either during the data gathering or before publishing the data. But this was not done in my study. One reason was it was not one of the objectives to do a second interview and the second reason was the time

factor. However apart from the original eight participants I interviewed for the study, I conducted two pilot interviews with two Sri Lankan immigrants who happened to be my acquaintances. I interviewed them before beginning the proper interviews and these two interviews were not included in the study. With this I gained some hands on experience on how to interview a participant and how to take down notes without using a tape recorder. After each and every interview I read the information gathered and transcribed them in to English, then before the next interview I would prepare myself to explore deeper on some of the important information gathered and also to look into some of the lacking data.

Finally, at the end of the data collection the information gathered from all the eight participants were read and re-read by me, several times before the data were pooled according to common themes. This was made possible by the fact that I used an interview guide for my interviews. Common themes were then compared with the quantitative survey findings. There were some contrasting views described by the participants on some of the issues taken up in the interviews and these were also identified and used in the interpretation of the findings.
I did not use any computer software for the analysis of the qualitative study.

I interviewed four males and four females. All the participants in the study were married and had children. One participant was divorced and was living with the participant's child. Only one person was living alone which is very unusual and also not an accepted norm among Sri Lankans, and the other seven were living with their families. The youngest in the group was 32 years old and the oldest participant was 61 years old. Among the participants the minimum number of years lived in Norway was 6 years and the maximum was 26 years. Two participants were educated up to 10 years, one had graduate level university degree, one had a master's degree and the other four had 12 years of school education. Four of the participants were not employed at the time of the interview. They have been on sick leave for sometime because of occupation related injuries. One participant was doing a part time job, one was retired and the other two had full time jobs. Five of the participants were Hindus and the other three were a Muslim, a Christian and a Roman Catholic.

The interview guide (see annex 4) had fifteen questions and the following five main themes emerged during the analysis of the information gathered.

1. Experiences in Norway

Four participants had migrated as asylum seekers, two as students and the other two have migrated to join their spouses after marriage.

Most of the participants have felt almost the same experience when they first arrived in Norway.

"I came to Norway after I got married. It was an arranged marriage. When I first arrived I did not like the country at all, I wanted to run away" – subject 2

"I did not like it. It was cold and looked like a forest" – subject 7

They all described the first experience as the place was cold and strange. The language, culture and the weather had been the most difficult aspects to adjust for most of them. But still they also described that they were received well by the Norwegians especially the authorities. One participant who migrated after an arranged marriage (subject 2) had a special difficulty with the spouse because they could not understand each other. The spouse who was born in Norway could not communicate well in Tamil and the other could not communicate in Norwegian, so they had to communicate mostly in English.

But those who migrated here as refugees described that they also felt an enormous sense of relief because the fear for their life was lifted and they could enjoy freedom. With time they learnt the language and gradually have assimilated with the host society. Most of them said that now they feel happy and contended about their family life and economic situation. And all of them stated that the Norwegian culture has not influenced them much.

"The Norwegian culture has not influenced me much. Their culture is theirs ours is ours" – subject 4.

The same types of thought were expressed by the others. This was attributed by them to several factors. They keep their identity as a separate community, especially the dress was mentioned as important. They wear the traditional dress especially at functions. They

celebrate their religious and cultural festivals together. They eat the same type of food that they used to eat in Sri Lanka.

Now the main worry for them is the future of their children. They said that they are worried that the children are losing the Sri Lankan cultural values because they are influenced by the Norwegian society and culture. So they are trying to bring them up with their own cultural values. They have special Tamil language classes for children, most of the marriages are arranged by the parents, they try to take the children to Sri Lanka during the holidays to visit grandparents and relatives.

2. Working in Norway

Sri Lankan immigrants living in Norway are described as having better economic and employment levels. The same types of ideas were expressed by the participants. Most of them described that they have a job that suits their qualifications and the money they earn is satisfactory to them.

"Working here is easy. I am happy about my job. The work is flexible and we can get leave without much of a problem" – subject 6.

The most important thing to get a better job was described as the language.

"If you know the language you can go up to the prime-minister level in this country" – subject 6

But on the other hand some of them expressed their concern about the current job situation. They felt that finding a job has become difficult now due to high competition.

3. Importance of the family

"The family is important for us. That is our life" – subject 7 (lives with three children and spouse)

This theme emerged again and again in all the interviews. For them family was everything. They expressed the view that they do everything for the family especially the children. Most of them have no leisure time activities and they have happily given up their time for the welfare of the children. They take pride in their children's achievements in education and do everything possible to give a good education for their children.
The notion of family for them does not confine to the parents and the children. It has a wider perspective. The cousins, aunts, uncles, grandparents and grand children are all considered as the family.

4. Physical and mental health

Three of the participants were not working due to occupation related injuries at the time of the interviews. But all participants felt they are healthy. They described that they are happy about their health. All of them said that to live a healthy life one must eat healthy food, do exercise and be happy. Most of them said they eat healthy food. They eat less fat and more vegetables. But still they gave the impression that they eat more Sri Lankan type of food which contrasts with this idea. Sri Lankan food contains less vegetables and more fat.

All of the participants expressed the view that exercise is important for a healthy life but only three of them did exercises regularly. Most of them described that they work a longer time every day, have to take care of the family especially the children and they simply did not have the time. When we consider these findings with the findings of the Oslo Immigrant Health Profile (50) importance of this issue becomes apparent (this issue is further discussed under the heading of Discussion).

All except one participant described their mental health as good and they feel happy about their life. Most of them expressed that the happiness comes from their family. But some of them also worry about their family because they have a lot of work to do because of the children. They also said that they have control of their life in their hands, have good jobs with a good pay, stable family life and a good social life with family and friends, factors described as important for good mental health (3, 6).

"I am happy because of my family" – subject 2

"*My mental health is good. I think all those things that keep you happy are important for a good mental health"* – subject 6

Most of the participants were happy about the Norwegian health care system even though they complained about the longer waiting hours. They did not feel any particular cultural or a language problem when working with health service personal. Two of them had bad personal experiences with the health care system with misdiagnosis of illnesses. But even then they appreciated the health care system because it is free and fair for everyone.

5. Experience with the seasonal changes

All the participants felt the seasonal changes. Especially the winter was described as cold, dark and long. At the beginning when they first arrived in Norway the winters had been difficult for them, but with time they have got used to it. All said that they wear warm clothes and carry on with their day to day activities as usual. They also described that they are not much affected by the seasonal changes. Especially their mental health was not affected in the winter period. They described that now they have to accept and live with it because now they are living in Norway. Subject 3 expressed her experience of winter;

"It is difficult in the winter. I use heaters and warm clothes. Now I am used to the winter".

Some of them said they go to bed earlier than usual in the winter time. They explained that this is because the day times are shorter. Some of them also feel a little depressed during the darker period but said they become happier with the snow fall because then there will be more light.

"In the winter because of the cold I feel like 'God when is this going to end'. But with snow the happiness will come"- subject 6

One of the participants has different activities during the winter. The participant's family and relatives would get together and have parties at different places especially in the weekends. The same type of family reunion and sharing of experiences during the long winter evenings in the high North of Norway (in Tromsø) is described in a qualitative research article published by Stuhlmiller (1998) (73).

In summary, all the participants in my qualitative study described the same type of experience when they first arrived in Norway and now they feel they are more adjusted to the foreign culture. At the same time they all said that the Norwegian culture has not influenced them much. On the other hand they all worried about their children's future because of the influence of the Norwegian culture on them. They all described that they are physically and mentally well despite some illnesses. They all said they feel happy and the seasonal variations do not change their mood much. They attributed their happiness to family, better economic conditions and social networks.

7 Discussion

Prevalence rates of W-SAD and S-SAD found to be different in different groups and Sri Lankan immigrants have the lowest prevalence rates of W-SAD and S-SAD which were also complemented by the qualitative interview findings. W-SAD was significantly associated with country of birth, younger age, smoking, presence of mental distress, frequent visits to the psychiatrist or the General Practitioner (GP), self reported poor health and presence of chronic illnesses. S-SAD was significantly associated with Country of birth, smoking and alcohol consumption. Sri Lankan immigrants experience the seasonal changes in Norway but their mood is not affected by this and they described their happiness and feeling of mental and physical well being owing to their family, cultural integrity and better social and economic prospects.

7.1 Discussion of the methodology

I used two different methodologies in this study. The quantitative component I used in my study was carried out in 2002, and at that time a qualitative part was not a component of the design of the Oslo immigrant health study. The qualitative part was designed and carried out by me in 2011. Therefore this study could not be characterized as a mixed methods research according to the practices and norms of mixed methods research (59). On the other hand I designed the qualitative study to obtain a deeper understanding of the perceptions of the Sri Lankan immigrants of their mental health, especially in relation to the seasonal changes. The qualitative study provides further insight and concurs with the findings of the Oslo immigrant health study. So in my opinion this study is more of a triangulation of different methodological approaches than a mixed methods study.

7.1.1 Quantitative study

The quantitative study was a cross sectional study. As already discussed in the Methodology section in cross sectional studies the findings can be applied to show disease associations only. Cause and effect of a disease relationship cannot be explained by a cross sectional study. On the other hand this was the best option given the objectives, size of the study population and resources available for the study.

Selection bias is also another important issue in any research (61). Norwegian population register of 2001 and Norwegian personal number which has a unique 11 digit number to identify individual citizens were used to select participants for this study. It was shown that it

had only a minimal error when selecting the five different ethnic groups for the study (49, 74). On the other hand five birth cohorts were not invited for the study (1954/55, 1960 and 1969/70) because they had participated in an earlier study. This was a limitation in the study design and could have caused some selection bias.

The response rate for the total sample was 39.7% in the survey which was comparatively low. However the research team had taken several steps to increase the participation and it was also found that the non-responders had little impact on the estimates of prevalence rates in the Oslo immigrant health study (74). On the other hand these 3019 participants were actually 39.7% of the total population of immigrants of age group 31 to 60 years living in the Oslo area from the five different immigrant groups participated in the survey.

Missing values of the SPAQ questionnaire resulted in exclusion of a considerable number of subjects from the analysis. In addition subjects who have lived in Norway less than 3 years were also excluded from the analysis making the final number of subjects in the analysis to 1047 (13.8% of the eligible population). The influence of removal of a large number of subjects from the analysis, on generalization of the findings of the study cannot be denied. A comparison of the most important characteristics between the total sample (n=3019), analyzed sample (n=1047) and the removed sample (n=1972) are shown in table 10. The differences in mean age mean number of years lived in Norway, mean value of total GSS, average score of HSCL and Percentage of males and females are not significantly different in the three samples. Thus the removal of those subjects from the original sample has not affected the main socio-demographic characteristics of the sample which I used in the analysis.

Response bias has been described in relation to different prevalence rates of SAD in different studies. Some of the higher values of SAD were attributed to several factors such as; participants had prior knowledge of SAD and non random selection methods (30, 34, 64). Some studies were advertised on mass media or gave descriptions of the symptoms of SAD when inviting participants for the study (75). This has eventually resulted in higher response rates from individuals who were more susceptible to seasonal variations of mood, thus finding higher rates of SAD. Some studies have used non-random sampling methods such as paper advertisements (75). However some of the different values were due to using different criteria and cut off values to calculate SAD prevalence rates than actual response bias (30, 34, 64).

In contrast to some of the studies where participants had prior knowledge about specific questions on SAD, the questionnaire of the SPAQ was only a part of the Oslo immigrant health study and participants were not specifically informed about the questions on SAD. So we could assume that the participants might not have had a preconceived idea about SAD which could have biased their responses on the SPAQ.

Compared to many of the other research studies on SAD our sample contained only 43% females. This pattern however is not uncommon in epidemiological surveys of mental health among immigrants (76, 77). Nevertheless higher prevalence rates of SAD are associated with female gender (33, 78, 79), a finding we did not find in our analysis. A reason for this could have been lower participation rate of women in the study.

It is also widely accepted that SAD is more common in younger age (80, 81). In our study the younger age group less than 31 years was not included. However W-SAD was found to be negatively associated with older age in our analysis.

The SPAQ was only in Norwegian and English. This could also have contributed to the lower response rate. In addition the instrument was not culturally validated among any of the five immigrant groups. This could have caused a miss interpretation of the prevalence values. Nevertheless the prevalence rates obtained for the total sample were not very high compared to the available literature and the Sri Lankan group had the lowest rates which could have been expected given the fact they have also had the lowest levels of mental distress in the same survey and the findings of the qualitative study also concurred with this (49, 50). But the importance of culturally validated instruments in epidemiological surveys cannot be over emphasized.

The SPAQ is one of the most commonly used instruments in the epidemiological surveys of SAD (34, 63, 64). However it has been criticized for several shortcomings inherent in the instrument. The questionnaire focuses on retrospective recall of the subjective feelings of the participant during the past several years. Especially it questions on the affective state of the mind in the past which could give a very subjective estimate (34). Some studies have found the SPAQ to overestimate SAD prevalence (80, 82, 83) while the others found the opposite (45). The sensitivity of the instrument is quite high (.98) but the specificity is low (.13) (80, 84). On the other hand the SPAQ has been described as having good test-retest validity (.65-.87) (34, 47, 85) and a good internal consistency with a Cronbach's alpha of .82 (34). It is also considered as a simple to use instrument with well constructed and reliable components (38,

85). One of the other most important characteristics of the SPAQ is, it has been used in many surveys making it possible to compare results from different studies (34, 44, 82).

7.1.2 Qualitative study

For the qualitative part of this study I used in-depth interviews as my method of data collection. In in-depth interviews the researcher will focus on one or two issues and try to gain a comprehensive and deeper understanding of the participant's experience on the topic of investigation, thus in-depth interview was chosen as the data gathering tool in my study. In addition in an in-depth interview the researcher could meet the participants individually, face to face and could build better confidence in them and gain richer information.

On the other hand I did not select participant observation or focus group discussions for my study. Participant observation (PO) was not selected as a technique because observation of the behavior or social interactions of the participants was not an objective of the study. On the other hand focus group discussions (FGDs) could have been used in the study in addition to in-depth interviews. In FGDs a group of participants would sit and discuss and exchange ideas about a common theme of interest with the researcher acting as a moderator. FGDs are highly effective in bringing out rich information on issues like social values, expectations of the community, their beliefs and norms (60). One of the standards of FGDs is to have a homogenous group of participants as to provide equal opportunity for each and every participant to come out with their own ideas and feelings without a hindrance (60).

Majority of the Sri Lankan immigrants living in Norway have migrated here as refugees and asylum seekers following the onset of the civil war in Sri Lanka and most of them are Tamil people. There were many armed and civil groups involved in the civil war in Sri Lanka and immigrants living here also might have different political views and attitudes towards the civil war in Sri Lanka. In addition Tamils in Sri Lanka have a very strict cast system which could not be usually observed by an outsider (53). So bringing together a group of Sri Lankan immigrants for an FGD would have been futile in this study. Grønseth (2010) describes the same type of experience when she was doing her research in the Northern Norway where some people did not open up in front of others and sometimes even avoided social gatherings (53). On the other hand mental health is a sensitive subject for Sri Lankan people because mental illnesses are still stigmatized and viewed as shameful in the Sri Lankan context (29). This would also have not helped to obtain proper information if it was taken up in an FGD. In

addition the resources and time factor also must be considered when using an FGD. Most of the participants recruited in the study did not have a free time except in the evenings to meet me for an interview, and it would have been very difficult to organize an FGD among these subjects.

The interviews were not tape recorded. I took notes while interviewing the participants. It is shown that when a tape recorder is used the confidence of the interviewee towards the researcher can be lost and sometimes the interviewee would not divulge the true feelings and opinions especially when a sensitive issue was discussed. In addition the participants can feel shy or even get distracted with the presence of a tape recorder (67). The topic that I was discussing was sensitive but I also had other reasons for not to use a tape recorder. The civil war in Sri Lanka ended just two years ago and anybody coming from Sri Lanka would be regarded with distrust. Especially when that person is a total stranger and doing a research on mental health. So, I wanted to gain the confidence of the participants especially as I have not planned to meet them for a second time and I wanted to get reliable and valid information as much as possible during the interviews. I used to take down hand written notes while the participants were speaking. It was made easier because my interviews were semi structured and I had an interview guide (see annex 4) with me and I asked almost the same type of questions from the participants.

7.2 Discussion of the findings

I used findings from both quantitative and the qualitative studies to compare and contrast similarities and differences of the findings.

Prevalence rates of W-SAD and S-SAD among the Sri Lankan group were the lowest compared to the other four ethnic groups (see table 4 and 5). This is not a surprising finding because it has been shown in the same survey that Sri Lankans had the lowest levels of mental distress among the five ethnic groups studied in the Oslo immigrant health study (50). On the other hand all the participants of the qualitative study described similar views regarding their general mental health and mood variations in the winter. They all felt the seasonal variations in Norway and especially the winter was described as cold, dark and difficult but they still carried on with their day to day work and did not change much of their activities except going to bed a little early some times in the evenings, a finding compatible with available literature

which describes increased sleep as one of the important aspects of SAD (31, 34). As subject 1 described the experience of the winter;

"Winter makes me a little sad because of the dark and shorter day time, but I do not think seasonal variations change my mood".

These experiences can explain the lower levels of SAD among the Sri Lankan group. Yet we do not know the experiences of the other four groups to come to a final conclusion. Compared to many other immigrants from low and middle income countries, Sri Lankan immigrants living in Norway have higher levels of education, employment and income (15). On the other hand higher levels of SAD are associated with higher levels of education and higher income (36, 64, 85, 86). But in this survey we found that prevalence of SAD is not significantly related to education or employment. Lower prevalence of SAD is also associated with increased duration of stay in a particular area (81). According to the quantitative analysis the duration of stay was positively correlated with higher scores of GSS only among the Sri Lankan group which again contradicts the two findings. Pakistani immigrants were the oldest group and Sri Lankans are the youngest immigrant group in this study. Therefore the findings in the analysis are again contrary to the available literature.

Sri Lankan immigrants living in Norway are described as a model immigrant community. They are seen as more organized, help each other in the community especially with finding employment and education of children (10, 15). These are some of the characteristics described as associated with lower levels of mental distress among immigrant communities (6). Subject 6 in the qualitative study echoed similar sentiments;

"We stay together, we organize our own sports festivals, religious festivals and we get together and keep our identity. Education is important and our children are doing very well, they go for extra classes".

On the other hand some of the subjects had contrary experiences about social support among the Sri Lankan immigrants;

"I do not know about any social groups that we have, I did not get any help from anybody, we have a Tamil school for children on Saturday run by….."- Subject 1.

Younger age is another risk factor associated with higher levels of SAD (81, 82). In our survey also we found that older age is a protective factor in SAD. Pakistani group was the

oldest in the survey with a mean age of 45.4 years and Sri Lankan group was the youngest with a mean age of 40.2 years. However, in contrary to expectations Pakistani group had the second highest levels of W-SAD (17.7%) prevalence rates.

Presence of chronic diseases is also associated with higher levels of SAD in our survey. Sri Lankan immigrants have more non communicable diseases and risk factors such as diabetes and obesity in contrast to the better level of mental health among them. This finding also contradicts each other.

Self reported poor health and frequent visits to the psychiatrist are also associated with higher levels of W-SAD according to the analysis of our survey. Rates of these two variables are also lower among Sri Lankan group in the survey. Findings in the qualitative study also support this. All the participants said that they are healthy physically and mentally and live a happy life.

According to the available literature prevalence rates of SAD among immigrant populations are found to be higher than the native populations (45, 46, 83). In this survey prevalence rates of W-SAD and S-SAD for the total sample were not significantly higher than that of the native Norwegian population. So the total prevalence rates of W-SAD and S-SAD found in this survey is not as high as one would expect to find among immigrants. On the other hand if we look at the different W-SAD and S-SAD prevalence rates among the five different groups, some of the groups have prevalence rates more than 20% while the lowest W-SAD prevalence was 5.8% which was found among the Sri Lankan males which is even lower than the prevalence rate of W-SAD found among the native Norwegian males (6.5%). These different values between different immigrant groups illustrate the heterogeneity of different immigrant groups living in Norway. On the other hand available literature on SAD among immigrants is very few and most of the studies had been done among subgroups of immigrants such as students and employees (45, 46, 83), thus comparison of those findings with the findings of this study would not be an appropriate comparison.

In the qualitative study six out of the total eight participants expressed the feeling that they are healthy and they are happy with their health. When further explored most of them came up with the idea that food and exercise are important for health. As subject 5 describes it;

"I think I am a healthy person, it is important to do trening (exercise) and take care of your food if you want to stay healthy, like eating less meat and more fish and vegetables. But I am not doing (exercise)" - *subject* 5.

The two subjects who expressed concern about their current health situation are not sad about it, but they said they are active doing other things and are happy.

Even though the participants acknowledge the fact that exercise and good food are important for health, the participants do not exercise regularly. Most of the participants said that they do not have time for exercise because they have work and they devote the rest of the time to look after their family and kids. Subject 7 puts it this way;

"The family is very important to us. That is our life" - subject 7.

But in contrast to this some of the participants said that they do exercise regularly.

"*I am healthy, I do exercise everyday with a cycle and also every morning I go for a walk*" subject 2

This finding is also supported by the Oslo immigrant health survey which emphasizes the fact that immigrants in all the five groups involve themselves less in active exercise (50). It also emphasizes the fact that Sri Lankan immigrants in particular have more LDL cholesterol levels and obesity, conditions that are considered as dangerous for long term health in an individual.

The participants in my qualitative study expressed that they feel healthy and happy. Did they say this because that they thought I expected to hear that? There is also a possibility that because I am a medical doctor they might have thought it is important to show me that they are aware of the importance of healthy food and exercise. In addition Grønseth (2010) also describes various types of health problems the Tamil refugees face in the Northern Norway and the hard ships they experience (53). But compared to her study subjects, my study was conducted among Oslo residents who have a better economic and social situation than those she describes. However, my qualitative study shows the Sri Lankan immigrants' description of their lifestyles and habits and it reflects the reality and therefore the need to address this issue (especially the lack of physical exercise in view of higher LDL cholesterol levels and obesity).

Compared to physical health when questioned about their mental well being the participants expressed the view that they feel happy about themselves. They all had similar views about their mental well being and happiness. They were happy because they were economically and socially secure. Also all participants attributed their happiness to their family life. As subject 2 describes it;

"I am happy because of my family" - subject 2.

Subject 7 said;

"I am ok (mental health), but sometimes I get stressed. Because I do not have a regular job now (on sick leave) and also there is too much work with the kids. So I am busy all the time and it stresses me out".

But at the same time participant 7 also said that family is the most important thing for the participant and the participant did not express any unhappiness despite the stress;

"*I live here with my family. It is very important for us. That is our life.*"

These quotations show the different perceptions of the participants' experience with the family and the occupation. Subject 2 has a good income and also feels happy about the family. In contrast subject 7 does not have a job now and is more stressed with the kids but also feels happy with the family. This again reiterates the fact that economic and social factors play an important role in mental health.

Immigrants are described as living in two cultures (and sometimes even more than two cultures) in the literature (6). The immigrants try to keep their original cultural values and identity even though they get influenced by the culture of the host society (6). In my qualitative study also all the participants expressed the view that their culture is important to them. However the cultural conflict between the first generation immigrants and their children who are born in the host country is also a well recognized issue (6).

All of the participants in the qualitative study expressed their concern and worry about the future of their children. They said that the children are influenced by the foreign culture and the society, and they try to keep their traditional values alive by various ways such as sending the children to Tamil schools on weekends, having cultural events and arranging marriages for the children by the parents. As subject 8 described this issue;

"*We had to adapt to the culture here. They (children) change a lot, demand equal rights. We have rigid values in Sri Lanka. The man in the house controls everything. The Norwegian culture affects the children who are born here. They do not learn the Sri Lankan values. There is a contradiction between the expectations of the parents and the children which leads to conflicts.*

In contrast to this, subject 1 said that subject 1 has control over their kids and not much worried about the influence of Norwegian culture on them;

"Everything is in our hands. The way we bring up kids. Our kids listen to us and when we say no, they will not do that".

With regard to mental health, from my qualitative study, most participants did not express many worries or causes for unhappiness or change of mood other than the concern about the future of their children. This finding is also observed by Hamad Raza Syed among Pakistani immigrants living in Oslo (Personal communication, Master's thesis 2002). The quantitative study findings also complement this finding on better mental health of Sri Lankan immigrants.

8 Conclusions and recommendations

This is the first epidemiological study in Norway on Seasonal Affective Disorder among the immigrant population. In addition, to the best of my knowledge this is also the first qualitative study in the world on Seasonal Affective Disorder (SAD) among immigrants. This study also analyzes many different factors associated with SAD.

Prevalence rates of W-SAD and S-SAD were different among the different immigrant groups and prevalence rates of W-SAD and S-SAD for the total sample were not as high as expected in an immigrant group. In addition the prevalence of Sub syndromal SAD is lower than the prevalence of W-SAD. W-SAD prevalence is higher than the Summer-SAD prevalence.

W-SAD is significantly associated with younger age, country of birth, smoking, presence of mental distress, self reported poor health, frequent visits to the psychiatrist or the GP and presence of chronic diseases. In contrast to available literature, W-SAD was not significantly associated with gender or higher education level. Employment level and number of years living in Norway were also not significantly associated with W-SAD prevalence.

S-SAD is significantly associated with the country of birth, smoking, and alcohol consumption.

Sri Lankan immigrants had the lowest level of W-SAD. This finding was concurred with the findings in the qualitative study among the Sri Lankan immigrants. Mental health of Sri Lankan immigrants who participated in the qualitative study was not reported to be affected by the cold, dark and long winter in Norway. Mental well being of Sri Lankan immigrants was attributed to, a close family structure, social networks and better economic conditions.

The ethnic differences in the prevalence rates of SAD indicate that immigrants are a very heterogeneous group with different health behaviors and health needs. This fact should be taken in to consideration when health policies are made, especially those which target the immigrant population.

Future research on SAD among immigrants should focus on recruiting subjects from all ages and determining the protective factors against SAD such as socio-cultural issues. Perception of immigrants on seasonality and their mental health should also be prioritized in future mental health research, especially for the other four immigrant groups who participated in the Oslo immigrant health study.

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Annex

(1) Ethnic differences in Seasonal Affective Disorder and associated factors among five immigrant groups in Norway

Abstract

Purpose of the study

Research studies on seasonal affective disorder (SAD) among immigrant populations are scarce. In this study prevalence rates of winter SAD (W-SAD), sub syndromal SAD (S-SAD) and summer SAD (Summer-SAD) and associated risk and protective factors were explored among five immigrant groups living in Oslo, Norway.

Methods

The Oslo Immigrants Health study (innvandrer HUBRO), conducted in 2002 is a large cross sectional epidemiological survey conducted among five of the largest immigrant groups living in Oslo. 1047 (34.9%) subjects were included in the analysis out of 3019 who participated in the survey (response rate 39.7%). Mailed questionnaire which included the seasonal pattern assessment questionnaire (SPAQ), hopkins symptom check list (HSCL) and other variables were used in the analysis.

Results

The prevalence rates for the total sample were; W-SAD (15.2%), S-SAD (13%) and Summer-SAD (2.9%). Sri Lankan immigrants had the lowest levels of both W-SAD and S-SAD. W-SAD was significantly associated with country of birth, younger age, smoking, presence of mental distress, frequent visits to the general practitioner or the psychiatrist, self reported poor health and presence of one or more chronic disorders. S-SAD was significantly associated with country of birth, smoking and higher levels of alcohol consumption.

Conclusions

Prevalence rates of W-SAD, S-SAD and Summer-SAD were not as high as expected in an immigrant population living in a latitude of 60^0 North. Different immigrant groups had different prevalence rates of SAD and the need for culturally validated instruments is reiterated.

Introduction

Seasonal variation in behavior and mood is called seasonality (1). Descriptions of seasonality of disease occurrence can be found since the writings of Hippocrates, but seasonal affective disorder (SAD) as a clinical entity was first introduced by Rosenthal et al in 1984 (2,3). In the DSM 4 criteria SAD is considered as a specifier of either bipolar or recurrent major depressive disorder, with a seasonal pattern of major depressive episodes (4). Seasonality is described as a feature that is present all year around and seasonal affective disorder has been described in the winter and summer seasons (5-8). Majority of the research has been focused on winter SAD (W-SAD) and the prevalence rates of W-SAD are found to be much higher than Summer- SAD (9). According to the available literature it is an interesting feature to see that W-SAD is more prevalent in temperate climates with higher latitudes and Summer-SAD is more prevalent in tropical weathers in countries nearer to the equator (5,6,10,11). In addition, a milder form of SAD, sub syndromal SAD (S-SAD) has also been described (6,9,12).

In addition to depressive mood W-SAD is characterized by several atypical symptoms; increased sleep (hypersomnia), increased appetite (hyperphagia), weight gain and craving for carbohydrate or starchy food (3,9,12,13). An essential feature of interest is that the improvement of the depressive mood and the atypical symptoms with the exposure to bright light (3,14,15). Several biological mechanisms are suggested as responsible for the onset of seasonal affective disorder. Melatonin secretion associated with photoperiod variations and phase shift mechanisms, neurotransmitters such as serotonin, norepinephrin and dopamine and genetic factors have been postulated (1,16). However conclusive evidence on how these mechanisms play a role in SAD are still lacking.

Higher latitude, reduced amount of sunlight per day (photoperiod), female gender, young age and ethnicity are described as associated with the prevalence of SAD (1,3,9,17). Latitude and the photoperiod were among the first risk factors described (3). But many newly published research articles claim that the latitude effect is rather small and other factors such as environmental factors, climate and socio- cultural effects are more important (9,18,19,20). However, it is interesting to note that migration to higher latitudes from lower latitudes has been associated with higher prevalence rates of SAD, especially among non indigenous people (9,21,22) But in contrast, length of stay in a geographical area with a higher latitude has a negative correlation with prevalence rates of SAD (23,24). Lack of day light is also

postulated as one of the predictors of SAD (3,9,22). Some of the available literature contradicts this idea (17,19,25). However, the higher prevalence of SAD in geographical areas with higher latitudes suggests that photoperiod is an important risk factor. There is substantial evidence to show that female gender and young and middle age are increasingly recognized as important risk factors (1,26,27). Only few research articles contradict this finding (23). SAD first occurs in early twenties and the prevalence rates peak in early forties and then decrease with the older age.

Some research findings suggest that ethnicity and genetic predisposition also play a major role in the prevalence of SAD (24,26). Prevalence of SAD in the northern parts of Norway and Iceland is found to be lower than the prevalence rates in some areas in the USA with much lower latitudes than these two countries (26,28) In an interesting study among Icelandic descendents living in the higher latitudes of North America, Magnusson et al found that SAD prevalence was lower among the Icelandic descendents than the others who live in the same area (29). This finding suggests that SAD may have a genetic predisposition (26).

Higher annual income has found to be associated with lower prevalence of SAD in contrast to higher education level which has been associated with higher prevalence of SAD (30,31). Nevertheless some of the research findings challenge this evidence and has not found any significant association (23). Living with a partner in contrast to living alone has also been shown to have a protective effect against SAD (30,31).

Prevalence of SAD varies from country to country and among different communities in the same country (9). Prevalence of SAD among the Norwegian population as estimated in different studies varies between 6.5% to 19% (9,20,32). Different prevalence rates in different studies have been attributed to the differences in weather and climatic conditions but some of the different values are due to the different methodological approaches that have been used (9).

The Seasonal pattern assessment questionnaire (SPAQ) is one of the most commonly used instruments to assess the prevalence of SAD (9,18). Since the formulation of it, the SPAQ has been criticized for its validity as an instrument for measuring the prevalence of SAD (9,18). The questionnaire relies on the subject's retrospective recall of mood and behavior over the past years, hence making it a very subjective measurement (9). Some of the studies found that the SPAQ over estimates the prevalence of SAD (12,18,27,33) while one study found it to under estimate the prevalence of SAD (21). It has also been criticized as differentiating poorly

between SAD and S-SAD (34). The sensitivity of the SPAQ found to be very high (.98) while the specificity is quite low (.13) which would question the validity of the SPAQ as a screening instrument of SAD (13,27).

Even with some of the above mentioned limitations, SPAQ has been used in many studies across the world; in Europe, North America and Asia (6, 7, 9, 14). According to many research studies SPAQ is a good screening instrument which focuses directly on seasonal variations of mood and classifies SAD well (9,12,20,27). It also has a good internal consistency (Cronbach's alfa .82) and good test retest validity (.65-.87) (9,20,35). It is well constructed, reliable and simple to use (31,35). More importantly it is commonly used in research studies of SAD making comparisons of different studies and prevalence rates of SAD (9,12,15,20). Apart from the methodological issues the differences in prevalence rates of SAD in different studies are partly true and partly due to the different criteria or the cut off points used to calculate SAD (9,18).

Poor response rate (RR) is cited as one of the limitations of many research surveys of SAD (9,14). Response rates have varied from the lowest around 13% up to the highest RR of more than 95% in different surveys (9,23,36). However RRs vary depending on the methodology used to recruit participants. Different surveys have used different methods of recruitment of participants such as; advertisements in the mass media (37), random selection from population registers (9,18) or telephone directories (25,38) and some surveys were done among patient populations or subgroups such as students (6, 23, 28, 39). The high prevalence of SAD in some studies were attributed to poor RRs (9). Non responders were less likely to feel the seasonal changes of behavior and mood, and this would cause an over representation of participants who are more vulnerable to feel seasonal changes, hence giving an increased prevalence rate of SAD (9,18). Also in some studies participants were aware of the objectives of the researchers and they knew or had read about SAD which could have made them to respond more positively towards the researchers' objectives (1,18).

Nonetheless, irrespective of the different prevalence rates in different studies, evidence show that seasonal affective disorder is under - diagnosed at the primary care level and the patients receive suboptimal and expensive treatment (14). If diagnosed properly, SAD can be treated with bright light therapy which is cheap and non-pharmacological (3,15).

There is a paucity of research on seasonal affective disorder among immigrant populations and the few research articles published so far were mostly conducted among sub groups of

immigrants such as students (21, 22, 33). According to the United Nations the estimated total number of immigrants worldwide in the year 2010 was 214 million, and 49% of them were women (40). The number of international migrants has increased by 43% during the last decade. About 13% of the Norwegian population is comprised of immigrants from various parts of the world (41). Norway has a latitude range between 57^0 N and 81^0 N. As a result the country experiences extreme weather conditions in different seasons of the year. Many immigrants in Norway have immigrated from countries in the Asian and African region (46% of total immigrants) with tropical warm weathers and minimal seasonal variation in weather and amount of daily sunlight (42). So we would expect to find a higher prevalence of SAD among immigrants in Norway. To our knowledge there is no previous research done on SAD among the immigrant groups living in Norway.

Methodology

Participants

The Oslo Immigrants Health Study (Innvandrer HUBRO) a large cross sectional epidemiological survey, was conducted in 2002 by the National Health Screening Service (now Norwegian Institute of Public Health – NIPH) and the University of Oslo (UiO). The study is described in detail elsewhere (43-45). The target study population included residents of Oslo, who were born in Turkey, Sri Lanka, Iran, Pakistan and Vietnam between 1942 and 1971. A total population of 7890 met eligibility criteria and 7607 were reached by mail to participate in the study. 3019 gave written consent and participated in the study. The response rate for the total population was 39.7% and the response rates for individual countries of birth were; Turkey 32.7 %, Sri Lanka 50.9%, Iran 38.8 %, Pakistan 31.7% and Vietnam 39.5%. Non responders were sent one written reminder between 3 to 8 months after the first invitation letter. Ethnicity, age and gender were determined by using the Norwegian population register and only the first generation immigrants were included in the survey.

The approval and ethical clearance for the study was obtained from the Norwegian Data Inspectorate and the Regional Committee for Medical Research Ethics. All the participants gave written consent for the study prior to the data collection. Mass media were used to disseminate the information about the study and invitation letters were mailed to the eligible participants two weeks prior to the data collection. One main questionnaire and an additional

supplementary questionnaire were completed by the participants and participants who have at least returned one questionnaire was included in the study.

The main questionnaire included questions on physical and mental health, social activities, education, employment, alcohol consumption and dietary and smoking habits. The questionnaire was in Norwegian and also included a translated version of the native language of the participant. The supplementary questionnaire (which was only in Norwegian and English) contained the seasonal pattern assessment questionnaire (SPAQ).

Instruments

The SPAQ includes several different scales to investigate seasonal changes in mood and behavior (9, 12,18,35). Three scales of the SPAQ were included in this survey. One of the scales used was the seasonality score index (SSI). SSI investigates seasonal variation of six items; sleep, social activity, mood, weight, appetite and energy. Participants are asked to rate the degree of change they experience on the above items on a scale which ranges from 0 to 4 (no change to major change). The sum of the six items will give a total score range of 0 to 24 which is called the global seasonality score (GSS). In addition to this, participants were also asked to rate the degree to which they feel the seasonal changes as a problem (no problem to completely disabling problem). The third scale asked the subjects to rate which month of the year they felt seasonal changes worst. These three scales were used to calculate the prevalence rates of W-SAD, S-SAD and Summer-SAD. (9,31,38)

The Hopkins symptom check list – 10 item version (HSCL- 10) which was included in the main questionnaire is an instrument widely used in population surveys to investigate the prevalence of mental distress (46,47). It has ten questions with four possible answers ranging from not troubled (1) to much troubled (4), experienced by the participant during the previous week. The average value of the total sum of the ten items is used to define mental distress with those scoring 1.85 or more classified as mentally distressed (48,49). Missing values were replaced with the sample mean of the respective items. However responses with more than 3 missing items were excluded from the analysis. The HSCL-10 has shown high reliability (Cronbach's alpha = .88) and good correlation with the longer version HSCL-25 (.97) (48,49), and it has been used in many population surveys in Norway (46-48).

Variables

Out of the total 3019 original participants (38.3% of the eligible participants) only 1047 have completed all the items in the SPAQ and also have lived in Norway for the past three or more years and were included in the analysis. Statistical package SPSS for windows version 19 was used for the analysis. Prevalence rates for W-SAD, S-SAD and Summer-SAD were calculated for the total sample and also for the five individual immigrant groups. Chi squared test for independence, correlation tests and logistic regression analysis were used to explore the relationship of different variables to W-SAD and S-SAD. Presence and absence of W-SAD and S-SAD as dichotomous variables and the total score of GSS as a continuous variable were used as dependent variables. Gender, country of birth, level of education, employment status, smoking, level of alcohol consumption, presence or absence of mental distress, self reported health status, self reported diabetes, obesity (calculated according to the body mass index; BMI), physical activity, frequent visits to the general practitioner or the psychiatrist and the presence of chronic diseases were used as independent categorical variables. Age and number of years living in Norway were used as continuous independent variables.

The variable 'self declared health' had four responses ranging between poor to very good. Self declared diabetes had two variables and participants stated whether they have been already diagnosed with diabetes or not. Presence of chronic diseases was calculated from a list of 10 common chronic diseases in the questionnaire. Participants were asked whether they have or they have had the following chronic illnesses ; asthma, hay fever, chronic bronchitis, diabetes, osteoporosis, fibromyalgia, mental disorders, myocardial infarction, angina pectoris and stroke. The calculated variable "presence of chronic diseases" included four categories ; "no chronic illnesses", "one chronic illness"," two chronic illnesses" and "three or more chronic illnesses". Frequent visits to the psychiatrist or the General Practitioner (GP) was calculated from the question "number of times during the previous year the participant has visited the psychiatrist or the GP (never to more than 4 times in the year). If the participant has visited the psychiatrist or the GP more than four times during the previous year then the participant was considered as a frequent visitor. Level of education had three categories; educated up to 10 years, between 10 to 12 years and 13 years or more. Smoking had two categories if the participant smokes now or not. Alcohol consumption is calculated from the frequency of alcohol intake. The responses included (1 to 8) never taken to 4 to 7 times a week. Low intake was calculated as less than once a month, moderate consumption was two

to three times a month to once a week and high intake was calculated as two to three times a week or more. Employment had two categories as employed now or not. Obesity was calculated from the body mass index (BMI); BMI more than 30 was taken as obese. Physical activity was calculated from the question how many hours a week the participant has engaged in light or hard physical activities (you sweat and feel out of breath) during the previous year. Physically active was calculated as; had more than three hours a week of light physical activity and/or two hours or more of hard physical activity a week.

Results

Socio demographic characteristics

The total number of subjects included in the analysis was 1047 and 43% were females. Highest percentage of participants (26.3%) was Sri Lankans and the lowest percentage (14.6%) represented participants who were born in Pakistan. Percentages of participants from the other three countries varied between 18.4% to 23.2%. (Table 1) Mean age and SD (standard deviation) for the total population was 42.5 (7.2) years for males and 42.4 (7.7) years for females (range 31 to 60 years).

Main socio demographic characteristics of the study population are shown in the tables 1 and 2.

Classification of W-SAD, S-SAD, and Sub-SAD

The classification of W-SAD, Summer-SAD and S-SAD according to the SPAQ was done using the following criteria. A total score of GSS 11 or more, with respondents feeling the seasonal changes to a moderate degree or more and feeling the changes worst in the winter months (November to February) were defined as W-SAD (9,15,26,31). With the above first two criteria and if the respondent feels worst in the summer months (May to August) are defined as Summer-SAD (50). Two separate sets of criteria were used to define S-SAD; 1. With a score of GSS 11 or more and if the respondent feels the seasonal changes to a mild degree or less and 2. With a score of GSS 9 or 10 and if the respondent feels the seasonal changes to a moderate degree or more (15,23,26,31).

The mean GSS and SD for the total sample was 6.0 (4.6) for males and 6.2 (4.7) for females and there was no statistically significant difference between the two genders. The mean value of the average HSCL-10 score and SD for the total sample was 1.48 (.64) for males and 1.61

(.69) for females and there was a significant difference between the two genders. (Tables 3 and 4)

Prevalence rates of W-SAD, S-SAD and Sub SAD for the total sample were 15.2%, 2.9% and 13.0% respectively (Table 5).

The relationship between total GSS score and age and number of years living in Oslo was investigated using Spearman rank order correlation (rho). The total sample showed a statistically significant small negative correlation between age and GSS score (r= -.086, n=1047, p=.005). However when the same procedure was carried out for males and females only the male group showed the same result and the female group had no significant correlation with both age and number of years living in Oslo. A more interesting pattern emerged when the procedure was carried out for the five different countries. Sri Lankan group showed a significant negative correlation with age and a significant positive correlation with the number of years lived in Oslo. Turkey group had a significant negative correlation with age only. All the other groups had no significant correlations with neither age nor the number of years living in Oslo.

According to the Chi squared test for independence; Gender, living with a partner or not, education level, employment status, alcohol consumption, self reported diabetes, obesity, and physical activity were not significantly related to W-SAD. Country of birth, presence of mental distress, self reported health, smoking, frequent visits to the GP, frequent visits to the psychiatrist and presence of chronic diseases were significantly associated with the prevalence of W-SAD, hence these variables were used in the logistic regression analysis. Chi squared test for independence for S-SAD with the same variables showed a statistically significant relationship only with country of birth, smoking and alcohol consumption and these three independent variables and age were used in the logistic regression model with S-SAD (Tables 6 and 7).

Logistic regression analysis was performed to assess the impact of several independent variables (Country of origin, Age, Presence of mental distress, frequent visits to the Psychiatrist, Frequent visits to the GP, smoking and Presence of chronic diseases) on the likelihood of presence of W-SAD. Several variables had more than two categories and reference categories were taken as follows; for country of birth “Turkey” was taken as the reference variable, for self reported health “poor health” and for chronic diseases “no chronic disease” were taken as reference variables.

The model containing all the independent predictor variables was statistically significant. X^2 (15, N= 726) = 138.892, P = .000, (Hosmer and Lemeshow Test: X^2 (8, N=726) = 7.765, sig = .457. This indicates that the model was able to distinguish between participants who had W-SAD and who did not have W-SAD. According to Cox and Snell R square (.174) and Nagelkerke R square (.307), the model was able to explain between 17.4 % and 30.7 % of the variance in W-SAD and the model correctly classifies 86.6 % of W-SAD cases.

Age, presence of mental distress, frequent visits to the psychiatrist, self reported health and presence of chronic diseases showed a statistically significant contribution to the model. The strongest predictor of W-SAD was presence of mental distress with an odds ratio of 2.7 (95% CI = 1.6 – 4.6) which shows that participants with mental distress had a 2.7 times higher likelihood to also have W-SAD than the participants without mental distress, controlling for all the other independent variables in the model (Table 8).

Smoking (X^2 (1, n=864) =4.654, p=.031, Phi =.077 (p=.023)), country of birth (X^2 (4, n=900) = 18.631, p=.001, Cramer's v=.144 (p=.001) and alcohol consumption (X^2 (2, n=871) = 11.148, p=.004, Cramer's v=.113 (p=.004)) were significantly associated with S-SAD. A logistic regression analysis with those three variables and age showed that the country of birth and alcohol consumption have a significant impact on the prevalence of S-SAD with the highest odds ratio of 2 with moderate levels of alcohol consumption (Table 9).

Summer- SAD prevalence rate was very small, hence risk factors were not calculated for Summer-SAD.

Discussion

To our knowledge this is the first study on SAD among immigrants in Norway and also the first study to analyze number of different factors associated with the prevalence of SAD in Norway.

Out of the total target population of 7890, only 3019 participated in this survey, thus the response rate for the total sample was 39.7% which was comparatively low. The survey team, in addition to sending written reminders to the invitees, adopted several other measures to maximize participation rate. These are described in detail elsewhere (43,44), in short, the main questionnaire, consent form and the information sheet were translated into the five different languages of the participants, the coordinator worked closely with immigrant groups,

lectures and meetings were organized and radio and TV advertisements were broadcasted. Nevertheless the response bias in this survey due to the low participatory rate has found to be minimal (44).

Different ethnic groups had different participation rates in the survey (see table 1). This could have influenced the outcome of the data. The Sri Lankan group, who had the highest participatory rate, also had the statistically significant lowest prevalence rate of W-SAD and also the lowest level of S-SAD. This finding is not very surprising given the fact that it has been already shown that the Sri Lankan group has the lowest levels of mental distress compared to the other four groups in the same survey (43). On the other hand, this finding could be due to selection bias because the Sri Lankan group was over-represented in the survey. However, in contrast to many other studies, participants in our study were naïve to the idea of SAD. The participants were not informed specifically about SAD and it was not advertised in the media.

Missing values of the SPAQ questionnaire resulted in exclusion of a considerable number of subjects from the analysis. In addition subjects who have lived in Norway less than 3 years were also excluded from the analysis making the final number of subjects in the analysis to 1047 (13.8% of the eligible population). The influence of removal of a large number of subjects from the analysis, on generalization of the findings of the study cannot be denied. A comparison of the most important characteristics between the total sample (n=3019), analyzed sample (n=1047) and the removed sample (n=1972) are shown in table 10. The differences in mean age, mean number of years lived in Norway, mean value of total GSS, average score of HSCL and Percentage of males and females are not significantly different in the three samples. Thus, removal of those subjects from the original sample has not affected the main socio-demographic characteristics of the sample which were used in the analysis.

In contrast to many of the other surveys on SAD our sample contained more males than females. The total sample comprised of only 43% females. The same was true for all the different five groups except Vietnam (table 1). Similar pattern of participation rates have been observed in other population surveys of mental health among immigrant groups (51, 52). Nonetheless this could have influenced some of the results obtained in the analysis of the data, especially the prevalence rates of SAD among different genders. W-SAD prevalence is described as higher among women than men in the literature (3, 9), and only few studies have not found any differences between genders (21, 32). In our survey prevalence of W-SAD

among the men and women in the total sample was not statistically significant. However there was a huge variation within individual groups. Sri Lankan males had a significantly lower prevalence (5.8%) than the Sri Lankan females (20.8%), while the Pakistani group had the opposite (see table 5).

In contrast to W-SAD, prevalence of S-SAD for the total sample was higher among men than women and it was also observed among Sri Lankan and Turkey men. But this difference was not statistically significant for the total sample.
Prevalence rate of Summer-SAD was 2.9% for the total sample and for both males and females. This finding is similar to the Summer-SAD prevalence in other published data, but lower than the prevalence rates found among immigrant groups (33,38,50).

The supplementary questionnaire which contained the Seasonal Pattern Assessment Questionnaire was not translated into the native languages of the participants and it was in Norwegian and English only. This was one of the limitations of the survey. However the prevalence rates of SAD were similar to the rates that had been estimated in epidemiological surveys in other parts of the world (9). Nevertheless the urgent need of culturally validated instruments for epidemiological surveys among immigrant populations should be again reiterated here.

All the five groups had an age range between 31 and 60 years. The cohort younger than 31 years was not included in the survey which may be a drawback when analyzing the effect of age on SAD prevalence. However the main study was designed to include the participants born between 1942 and 1971 only, hence the younger age group was not included (43). Age had a significant negative association with W-SAD but not with S-SAD prevalence. Anyway this finding could not be commented on much because of the limited age range of the participants. However, the negative correlation of age with GSS score shows that the older age has less SAD prevalence than the younger age which is in accordance with the previous findings (9,12,26,31).

Mean number of years spent in Norway for the total sample was 12.8 years with a range between 3 to 35 years. Duration of stay in a particular geographical area has been described as a protective factor for developing SAD (24). In our survey only the Sri Lankan group showed a significant positive correlation between the total GSS score and the number of years living

in Oslo. However this correlation was small and the coefficient of determination was only 1.4%. Nevertheless this finding is interesting because the Sri Lankans are the youngest and the comparatively newest immigrant group participated in this survey (43, 44). But in contrast, the Sri Lankan group also has the statistically significant lowest prevalence rates of W-SAD. In addition, this finding is corroborated by a qualitative study, the authors have recently conducted among the Sri Lankan immigrants living in Oslo (not published yet).

Migration to a higher latitude from a lower latitude has been found to be associated with higher prevalence levels of SAD, especially among immigrants (9,21,22). The prevalence of W-SAD for the total sample was 15.2% which is not as high as one would expect to find in an immigration population, especially in a place like Norway where one would experience extreme seasonal weather changes. On the other hand, individual W-SAD prevalence rates among the five immigrant groups varied significantly. The highest prevalence rate of W-SAD was found among the Iranians with a 21.5% (one of the highest prevalence rates compared to published literature) and the lowest was among the Sri Lankans (6.7%, almost as same as the ethnic Norwegian males) (9). The huge differences of prevalence rates among different groups of immigrants reiterate the error of viewing different immigrant groups as one homogenous entity.

Prevalence rates of S-SAD for the five different immigrant groups showed the same type of a huge difference between groups (see table 5). On the other hand prevalence rate of S-SAD for the total sample (13%) was less than the W-SAD prevalence (15.2%). The same pattern was observed among individual groups except among the males born in Sri Lanka and Turkey. This was an unexpected finding and contradicts the available literature. S-SAD is a milder form of SAD and almost all the published literature find it to be higher than the prevalence rates of W-SAD (7, 9, 21, 25). However the SPAQ has been described as discriminating poorly between W-SAD and S-SAD and the same could have happened in our analysis (34).

W-SAD was significantly associated with country of birth, presence of chronic diseases, self reported health, frequent visits to the psychiatrist or the GP, presence of mental distress and age. According to the logistic regression analysis presence of mental distress and frequent visits to the psychiatrist had odds ratios of 2.7 and 2.6 respectively. On the other hand the most commonly described risk factors for W-SAD such as female gender, unemployment or

lower income level, living alone, higher education level and length of stay were not significantly related to the prevalence of W-SAD. Employment status, education level, civil status and length of stay also have had mixed pattern of association with W-SAD, with some surveys finding them to be not significant as risk factors and suggesting other factors such as individual variations, stress and climatic changes could be more responsible for W-SAD prevalence (19,23,26).

Smoking and alcohol consumptions are commonly known factors associated with mental diseases. However, only smoking was significantly associated with W-SAD in this study. On the other hand, S-SAD was significantly associated with both of these factors. Moderate levels of alcohol consumption had an odds ratio of 1.9 showing that there is a 1.9 higher chance of getting S-SAD among moderate level alcohol consumers than the non consumers when all the other factors are controlled.

In conclusion; the prevalence rates of W-SAD, S-SAD and Summer-SAD were not as high as expected for the total sample in this study. Different immigrant groups had different prevalence rates of SAD indicating the heterogeneity of immigrant groups and their health behavior and health needs. Culturally validated instruments for epidemiological surveys among immigrant groups should be a priority. Country of birth, age, mental distress, smoking, self reported health, presence of chronic diseases, and frequent visits to the psychiatrist or the GP were significantly associated with W-SAD prevalence and smoking, alcohol consumption and country of birth were significantly associated with S-SAD prevalence.

Tables

Country	Male			Female		
	Number	%	% within country	Number	%	% within country
Turkey	103	17.2	56.3	80	17.9	43.7
Sri Lanka	168	28.0	61.1	107	23.9	38.9
Iran	148	24.7	60.9	95	21.2	39.1
Pakistan	90	15.0	58.8	63	14.1	41.2
Vietnam	90	15.0	46.6	103	23.0	53.4
Total	599	57.2		448	42.8	

Table 11: Total population for country

Variable		Male		Female	
		Number	%	Number	%
Living with Partner	Yes	508	87.6	391	90.7
	No	72	12.4	40	9.3
Education	Up to 10 years	160	26.9	183	42.1
	11 to 12 years	145	24.4	88	20.2
	More than 13 years	289	48.7	164	37.7
Employment	Yes	459	78.1	257	57.9
	No	129	21.9	187	42.1
Smoking	Currently smoking	194	33.5	48	11.3
	Not smoking	385	66.5	375	88.7
Alcohol consumption	Low	342	58.5	377	88.9
	Moderate	219	37.4	46	10.8
	High	24	4.1	1	0.2
Mental distress	Yes	114	20.7	123	29.6
	No	438	79.3	292	70.4
Self reported Health	Poor	35	6.0	43	9.8
	Not very good	196	33.7	183	41.8
	Good	298	51.2	189	43.2
	Very good	53	9.1	23	5.3
Self reported Diabetes	Diabetic	38	6.6	34	7.9
	Non diabetic	535	93.4	398	92.1
Obesity (according to BMI)	Obese	77	12.9	101	22.5
	Not obese	521	87.1	347	77.5
Physical activity	Active	291	51.3	199	48.8
	Inactive	276	48.7	209	51.2
Frequent visits to the GP	Yes	190	33.0	186	42.5
	No	386	67.0	252	57.5
Frequent visits to the Psychiatrist	Yes	21	3.9	29	7.2
	No	519	96.1	373	92.8
Chronic diseases	No diseases	323	53.9	221	49.3
	1 Disease	164	27.4	142	31.7
	2 Diseases	69	11.5	61	13.6
	3 or more Diseases	43	7.2	24	5.4

Table 12: Number and percentages of different variables for the total sample

Variable	Male		Female	
	Mean	SD	Mean	SD
Age	42.5	7.2	42.4	7.7
Duration of living in Norway	13.9	7.2	12.2	6.5
Average HSCL score	1.48	0.64	1.61	0.69
Total score GSS	6.0	4.6	6.2	4.7

Table 13: Mean value and Standard Deviation (SD) of age, duration of living in Norway, Average HSCL score, and Total score GSS for the total sample

Country	GSS				Average HSCL			
	Male		Female		Male		Female	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Turkey	6.3	4.9	7.1	4.8	6.3	4.9	7.1	4.8
Sri Lanka	4.7	3.8	4.7	3.9	4.7	3.8	4.7	3.9
Iran	7.6	4.6	7.7	4.6	7.6	4.6	7.7	4.6
Pakistan	6.2	4.8	5.5	4.9	6.2	4.8	5.5	4.9
Vietnam	5.2	4.5	5.9	4.7	5.2	4.5	5.9	4.7
Total	6.0	4.6	6.2	4.7	6.0	4.6	6.2	4.7

Table 14: Mean value and Standard Deviation (SD) of age, duration of living in Norway, Average HSCL score, and Total score GSS for different groups

Country	Male				Female			
	W-SAD		S-SAD		W-SAD		S-SAD	
	Number	%	Number	%	Number	%	Number	%
Turkey	12	13.6%	22	25.0%	15	20.8%	9	12.5%
Sri Lanka	8	5.8%	14	10.1%	7	8.0%	4	4.6%
Iran	28	20.6%	23	16.9%	20	23.0%	17	19.5%
Pakistan	16	20.3%	6	7.6%	6	13.3%	5	11.1%
Vietnam	10	13.2%	6	7.9%	15	16.3%	11	12.0%
Total	74	14.3%	71	13.7%	63	16.4%	46	12.0%

Table 15: Prevalence rates of W-SAD and S-SAD for different groups

Variable	X^2	df	p	phi or Cramer's V	p
Gender	.435	1	.510	-.025	.447
Country	18.631	4	.001	.144	.001
Living with a partner	2.246	1	.134	-.056	.096
Education	.104	2	.950	.011	.950
Employment	3.036	1	.081	-.062	.064
Smoking	4.654	1	.031	.077	.023
Alcohol consumption	11.148	2	.004	.113	.004
Mental distress	3.506	1	.061	.069	.047
Self reported health	2.244	3	.523	.051	.523
Self reported diabetes mellitus	.265	1	.607	-.024	.475
Obesity	.492	1	.483	.028	.405
Physical activity	.065	1	.798	.012	.721
Frequent visits to the GP	.021	1	.885	.008	.803
Frequent visits to the Psychiatrist	.017	1	.896	.005	.896
Chronic diseases	.970	3	.809	.033	.809

Table 16: Results of the Chi squared test with independent variables and S-SAD

Variable	X^2	df	p	phi or Cramer's V	p
Gender	.621	1	.431	.029	.378
Country	20.590	4	.000	.151	.000
Living with a partner	2.773	1	.096	.062	.069
Education	.380	2	.827	.021	.827
Employment	2.157	1	.142	.053	.116
Smoking	9.707	1	.002	.110	.001
Alcohol consumption	3.424	2	.180	.063	.180
Mental distress	82.833	1	.000	.319	.000
Self reported health	83.025	3	.000	.308	.000
Self reported diabetes mellitus	2.591	1	.107	.061	.073
Obesity	.213	1	.644	-.019	.559
Physical activity	1.477	1	.224	-.045	.190
Frequent visits to the GP	39.222	1	.000	.215	.000
Frequent visits to the Psychiatrist	47.335	1	.000	.248	.000
Chronic diseases	61.722	3	.000	.262	.000

Table 17: Results of the chi squared test with independent variables and W-SAD

Variable	B	SE	Wald	df	p	Odds ratio	95% C.I for odds ratio	
							Lower	Upper
Country			9.252	4	.055			
Country (1)	-.425	.456	.868	1	.352	.654	.267	1.599
Country (2)	.449	.342	1.723	1	.189	1.566	.802	3.060
Country (3)	.752	.419	3.227	1	.072	2.121	.934	4.819
Country (4)	.640	.406	2.481	1	.115	1.896	.855	4.202
Self reported health			8.945	3	.030			
Self reported health (1)	-.297	.358	.691	1	.406	.743	.369	1.496
Self reported health (2)	-1.121	.434	6.657	1	.010	.326	.139	.764
Self reported health (3)	-19.609	4957.259	.000	1	.997	.000	.000	.
Smoking	.475	.266	3.177	1	.075	1.068	.954	2.710
Frequent visit to Psychiatrist	.943	.390	5.862	1	.015	2.568	1.197	5.510
Frequent visit to GP	.262	.268	.955	1	.329	1.299	.768	2.197
Chronic diseases			9.042	3	.029			
Chronic disease category (1)	-.111	.309	.130	1	.719	.895	.488	1.640
Chronic disease category (2)	.859	.346	6.168	1	.013	2.362	1.199	4.653
Chronic disease category (3)	.443	.450	.971	1	.324	1.558	.645	3.761
Age	-.042	.018	5.299	1	.021	.959	.925	.994
Mental distress	1.002	.267	14.098	1	.000	2.724	1.614	4.596
Constant	-.511	.920	.309	1	.578	.600		

Table 18: Results of the Logistic Regression analysis for W-SAD

Variable	B	SE	Wald	df	p	Odds ratio	95% C.I for odds ratio	
							Lower	Upper
Country			14.195	4	.007			
Country (1)	-1.007	.344	8.568	1	.003	.365	.186	.717
Country (2)	-.123	.277	.198	1	.656	.884	.513	1.522
Country (3)	-.854	.410	4.330	1	.037	.426	.190	.952
Country (4)	-.718	.339	4.478	1	.034	.488	.251	.948
Smoking	.171	.235	.530	1	.467	1.187	.749	1.880
Alcohol consumption			9.142	2	.010			
Alcohol consumption (1)	.678	.225	9.032	1	.003	1.969	1.266	3.064
Alcohol consumption (2)	.478	.580	.678	1	.410	1.612	.517	5.024
Age	-.005	.015	.097	1	.755	.995	.967	1.025
Constant	-1.509	.684	4.859	1	.027	.221		

Table 19: Results of the Logistic Regression analysis for S-SAD

	Total sample	Analyzed Sample	Removed sample
Age	42.1	42.4	42.0
Number of years in Oslo	12.8	13.1	12.6
Total GSS	6.1	6.1	6.2
Average HSCL	1.54	1.53	1.54
Percentage of Females	44.0%	42.8%	44.8%

Table 20: Mean values of age, Number of years lived in Norway, Total GSS, Average HSCL score and Percentage of females in the Total sample (n=3019), Analyzed sample (n=1047) and the removed sample (n=1972)

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(2) Invitation to participate in the research study of Mental Health of Sri Lankan Immigrants Living in Oslo

Many studies have found that the immigrants have different needs of health care than the native populations. Immigration is associated with high levels of mental distress. When one is living in a foreign country for a long time, the influence of culture, language, weather and many other factors can influence the mental health of the individual.

Health research is needed to plan health policies and to allocate resources for health facilities. Research done on mental health of immigrants in Norway has shown that many of them have higher levels of mental distress. There are only a few researches done on mental health among the Sri Lankan immigrants living in Oslo. There is an urgent need of more research on this aspect for health policy making which will eventually benefit the immigrants living in Norway.

The research is conducted as a part of the Post Graduate Degree in Masters in International Community Health, Section for International Health, Department of general practice and community medicine, Faculty of Medicine, University of Oslo, Norway.

Our research study is proposed to be carried out among the Sri Lankan immigrants living in Oslo, Norway. Participation in the study is voluntary and not participating will not affect you in any way. If you are willing to participate and decide to withdraw halfway through the interview, you can do so without any repercussions. The study involves a single face to face interview in with the researcher which could last for about one hour to one and a half hour. The interview will be conducted in your mother tongue and the researcher will take down notes during the interview. The interview will not be tape recorded or filmed. The interview will be held at a place and time of your convenience. The interview is aimed at finding out how your mental health is and how you are coping with the challenges in a foreign environment.

No one except the research group will know that you have participated in this study. The information you provide will be dealt with utmost confidentiality and will not be divulged to anyone. Your name or any other personal information will not be shown when the study is published.

Researchers

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3. Prof. Edvard Hauff
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(3) Invitation letter in Tamil

ஒஸ்லோ நகர்வாழ் இலங்கை குடியேற்றவாசிகளின் மனநலம் பற்றிய ஆராய்ச்சி ஆய்வொன்றில் பங்கேற்க அழைப்பு

பூர்வகுடி மக்களுடன் ஒப்பிடுகையில், குடியேறிய மக்கள் வேறுபட்ட சுகதார தேவைகளுடனுள்ளார்கள் என்பதை பல்வேறு ஆய்வுகள் தெரிவிக்கின்றன.
குடியேற்றம் என்பது உயர்மட்ட மனநெருக்கடியுடன் தொடர்புடையதாக இருக்கின்றது.
ஒருவர் வெளிநாடொன்றில் நீண்ட காலமாக வாழும்போது,அந்நாட்டின் கலாச்சாரம்,மொழி,சீதோஷ்ண நிலை மற்றும் மற்ற பல காரணிகளின் செல்வாக்கு அந்நபரின் மனநலத்தில் பாதிப்பை ஏற்படுத்துகின்ற்றது.

சுகாதார கொள்கைகளை திட்டமிடவும்,சுகாதார வசதிவாய்ப்புகளுக்கு வள ஆதாரங்களை ஒதுக்கீடு செய்வதற்கும், உடல்நலம் சம்பந்தப்பட்ட ஆராய்ச்சிகள் அவசியமாகின்றன.
நோர்வே நாட்டில் குடியேறியுள்ள மக்களின் மனநலம் சம்பந்தமாக இதுவரை செய்யப்பட்டுள்ள ஆய்வுகளில்,அவர்களினதிகமானோர் உயர்மட்ட மனநெருக்கடியுடன் இருப்பதாக காட்டப்பட்டுள்ளது.
ஆயினும் ஒஸ்லோ நகர்வாழ் இலங்கை குடியேற்றவாசிகளின் மனநலம் சம்பந்தமாக ஒருசில ஆய்வுகள் மட்டுமே இதுவரை மேற்ற்கொள்ளப்பட்டுள்ளன.
சுகதார கொள்கைகளை திட்டமிடவும் அதன் மூலமாக நோர்வே வாழ் குடியேற்றவாசிகள் பயனடையவும் இத்துறையில் மேலும் அதிகமான ஆய்வுகளை மேற்கொள்ளவேண்டியது அவசர தேவையாக உள்ளது.

இந்த ஆராய்ச்சி ஆய்வு,நோர்வே நாட்டின்,ஒஸ்லோ பல்கலைக்கழகத்தின்,மருதுவ பீடத்தின்,பொது மருத்துவ பயிற்ச்சித்துறை மற்றும் சமூக மருத்துவ பகுதியின்,சர்வதேச சமூக உடல்நல முதுநிலை பட்டப்படிப்பின் ஒரு பகுதியாக நடத்தப்படுகிறது.

எமது ஆராய்ச்சி ஆய்வை நோர்வே நாட்டின்,ஒஸ்லோ நகரில் வாழும் இலங்கை குடியேற்றவாசிகள் மத்தியில் மேற்கொள்ள தீர்மனிக்கப்பட்டுள்ளது.
ஆய்வில் பங்குபெறுவது தன்விருப்பத்திற்குறியது;ஆய்வில் பங்குபெறாமை எவ்வழியிலும் உங்களை பாதிக்காது.
நீங்கள் விருப்பத்துடன் பங்குபற்றி,பின்னர் பேட்டியின் இடையில் திரும்ப முடிவு செய்தால், நீங்கள் எவ்வித விளைவுகளுமில்லாமல் விழக முடியும்.
இந்த ஆய்வு,ஒன்றிலிருந்து ஒன்றரை மணி நேரம் நீடிக்கக்கூடிய, ஆராய்ச்சியாளருடனான நேரடி பேட்டியை உள்ளடக்கியது.
நேர்காணல் உங்கள் தாய் மொழியில் நடத்தப்படும்.
ஆரய்ச்சியாளர் நேர்காணலின் போது தேவையானவற்றை குறிப்பெடுத்துக்கொள்வார்.
பேட்டி, நாடாப்பதிவோ அல்லது படமாக்கலோ செய்ய்ப்படமாட்டது.
நேர்காணல் உங்களுக்கு வசதியான இடத்திலும் நேரத்திலும் நடைபெறும்.
உங்கள் மனநலம் எந்நிலையில் உள்ளது என்பதை கண்டுபிடிப்பதுடன் நீங்கள் எப்படி ஒரு வெளிநாட்டுச்சூழலில் சவால்களை எதிர்த்துச்சமாளிக்கின்றீர்கள் என்பதை அறிவது இவ்வாய்வின் இலக்காக உள்ளது.

நீங்கள் இந்த ஆய்வில் கலந்துகொண்டமை ஆராய்ச்சி குழுவிற்கு மட்டுமே தெரியும்.
நீங்கள் கொடுக்கும் தகவல்கள் மிகவும் நம்பகத்தன்மையுடன் கையாளப்படுவதுடன் வேறுயாருக்கும் தெரியப்படுத்தப்படாது.
ஆய்வு வெளியிடப்படும் போது உங்கள் பெயர் அல்லது மற்ற தனிப்பட்ட தகவல்கள் அதில் காட்டப்படமாட்டாது.

ஆராய்ச்சியாளர்கள்

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3. Prof. Edvard Hauff
4. Dr. Lars Lien

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(4) Interview guide

Basic information

- Can you tell me something about yourself

Living in Norway

- What were your experiences when you first arrived in Norway?
- How do you feel now about life in Norway?
- How do you feel about working here in Norway?

Social networks

- Tell me about with whom do you live in Norway?
- Can you please tell me about the experiences you have about bringing up children in Norway?
- Can you please tell me about the social support networks that you have among Sri Lankans living in Norway?
- Tell me about your friends you have in Norway?

General health

- What do you think about your health?
- What do you do during your leisure time?
- What do you usually do when you feel unwell/ sick?
- What are your experiences with the Norwegian health care system?
- How do you feel about your weight?

Mental health

- What do you think about your mood?
- What is/are the reasons for your answer?

Seasonal variations

- Do you feel the seasonal variations in Norway?
- What are the different activities you do during different seasons?
- How do you explain your mood during different seasons?

Conclusion

- How has this interview been for you?