Prevalence of Hypertension among Pakistani Immigrants in Oslo, Norway.

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LIST OF ABBREVIATIONS

WHO: World health organization
HP: Hypertension
SBP: Systolic blood pressure
DSP: Diastolic blood pressure
HDI: Human Development Index
NIS: National Insurance Scheme
GHO: Global Health Observatory
HBP: High blood pressure
UN: United nation UK: United Kingdom
USA: United states of America
PAK: Pakistan
NO: Norway
EH: Economic History US: United States
ABSTRACT

Introduction:
Hypertension is among the leading causes of deaths globally as every year millions of people die, including both males and females, and if it tends on increasing at the same rate as it is presently having, then, it will have a huge impact on the overall population across the globe. It is interesting to note that hypertension is higher among Asian immigrants living in Europe and America as compared with other regions.

Objectives:
The main objective of the study was to assess the prevalence of hypertension, assessment regarding the awareness of hypertension and association of age, education and family history on hypertension among the Pakistani immigrants in Norway.

Methodology:
286 participants were recruited to participate in a cross-sectional study which was conducted in the main Pakistani immigrant area of Oslo city, Norway. Convenience sampling technique was used to select participants and a specific criterion was set for the said purpose in order to have perfect results. People in mosques, shops and Pakistani gatherings, were reached for the said purpose and their respective blood pressures were measured after filling out an informed consent through a Digital Blood Pressure Monitor (CH-452) in a sitting position (three times from left arm after the individual participants were allowed to rest for 5 minutes). Blood pressure was measured to the nearest 2 mmHg value and the mean value obtained from these three readings was used as a data in order to
be analyzed by using SPSS software version 22. Data was continuously collected over a five-month period from August 2015 to December 2015 and overall 52.1% participants were males and 47.9% were female.

Results:

The overall prevalence of hypertension among the participants was 39.5% (n=113) with 95% CI (30.5, 48.5). The result showed that 43% (n=64) with 95% CI (30.9, 55.1) of men were found to be hypertensive compared to 35.8% (n=49) with 95% CI (22.4, 49.2) among women. Among participants that were found to be hypertensive (n=113), 40.8% females and 59.4% of males were unaware of having hypertension. Among hypertensive participants, 50% of males and 51% females had previous family history of hypertension. With increase in age, risk of developing hypertension increases. In participants with high level of education, risk of having hypertension decreases.

Conclusion:

Hypertension is a very common problem among Pakistanis living both in Pakistan and abroad, particularly in Norway, as those who were living in Norway were found to have very high ratio of the hypertension. Men were reported to have more hypertension problems as compared with women despite of then fact that ratio of hypertension among both was significantly high. More than half of participants were found to be unaware of having a hypertension problem and the reasons quoted by participants for the high blood pressure include, they had never checked their blood pressure or visited a doctor for that purpose. Many participants having hypertension also had a family history of the hypertension.

Key words:

Hypertension, Pakistani immigrants, risk factors.
1 INTRODUCTION

Hypertension is a leading risk factor of mortality across the globe, as it is main reason for coronary heart diseases, and ischemic stroke(1) etc. There are many consequences of high blood pressure, also known as a silent killer(2), including renal failure, heart failure, visual impairment and peripheral vascular disease(1) etc. It affects both men and women but the risk of developing hypertension is greater among the higher age groups(2). Many population are affected by hypertension across the globe however, it is known to be a very common problem among the Asian immigrants, particularly Pakistanis(around 25 %) living in Europe and America(3). Poor Diet, lack of education, stress, discrimination are major risk factors (4) (5).

Many people(19%) living in Pakistan are suffering from various cardiovascular diseases especially hypertension (6). Diabetes, physical inactivity, obesity and high salt intake are reasons behind high rate of cardiovascular diseases(7).

Both immigration and stress are strongly linked with hypertension. As stress, which is the leading factor of hypertension, increases after migration from one place to another, subsequently increasing the risk of hypertension. Therefore it was necessary to find out current status of hypertension after their respective migration to another country. The main objective of this study is to determine the current prevalence of hypertension among Pakistani immigrants living in the city of Oslo, Norway.

The thesis consists of different divisions, beginning with a literature review in next chapter of relevant literature found in the area of interest. In chapter three, methodology is described, both the theoretical foundation, and the practical implementation of data analyzing and collection. The relevant results of the research are presented in chapter four, leading to the discussion in chapter five,
where the results as well as methodological limitations and strengths are discussed. The thesis ends with a conclusion in chapter six followed by recommendation and future research in chapter seven.
2 LITERATURE REVIEW

2.1 Background of Pakistani population in Oslo, Norway.

2.1.1 Facts of Pakistan

Pakistan is an Islamic country with a population of approximately 200 million, according to the recent census, among which 96% are Muslims, 02% are Christians, Hindus are only 1% and the remaining percentage is associated with other minorities that include Ahmedis, Parcis etc(8). While there are four provinces in Pakistan named as Punjab, the largest province, Sindh, Khyber Pakhtunkhawa and Baluchistan, the national language of Pakistan is Urdu and official one is English along with other regional languages depending on the provinces(8).

2.1.2 Immigrants Population in Norway

Total population of Norway is 5.2 million among which Immigrants in Norway make up 13.8 % of the population and Norwegians born from immigrants parents include 3 % of total population (9). Immigrants in Norway come from 221 countries which include Immigrants from Europe (53%), Asia (30%), Africa (12%), North America (1%) and South America (3%)(9). Statistics Norway has provided a number of reasons for immigration to Norway and It is estimated that 39% immigration to Norway is for family purpose, 32% for work purpose, while 23% are refugees, only 5% of people arrived here for educational
purposes(9). Most of these immigrants are living in the cities of Oslo and Drammen(9).

According to surveys conducted by statistics Norway 2017, Immigrants from Poland form the largest group in Norway followed by Lithuanians, Swedes and immigrants from Somalia(9). Pakistani immigrants (about 30000) are the fifth largest group in Norway as majority of them, about (85%), are living in and around Oslo (9).

The first generation of Pakistani immigrants (both men and women) had a lower rate of employment in Norway (44.6%) compared to other Asian immigrants (53%)(10). Among employed Pakistanis, men had a higher employment rate (60%) compared with women (28%) (10). Birth rate among Pakistani families is higher than that of ethnic Norwegians (10). Norwegians born to Pakistani parents make up the largest proportion of Norwegians born to immigrant parents(9) and Joint family system persists among Pakistanis living in Norway, as it is common to have five to six members of the household living in the same house. (10). While two out of three Pakistanis have their own home in Norway(10). Men have better Norwegian language skills (reading) as compared to women(10).

Education level among the first generation of Pakistani immigrants was low, with around 12% of them classed as educated and Children of first generation of Pakistani parents were more educated(10). Generally, first generation Pakistanis in Norway worked in the tourism, hospitality and transport sector and 5.3% of them run their own business(10). Norwegian language skills among the overall immigrant population is considered poor with only one out of three immigrants is considered to have a good grasp over the Norwegians language(reading) and same is the case with Pakistanis(10).
2.1.3 Pakistani immigration to Norway

Pakistani immigration to Norway started in the 1970s as “guest workers” during the Norway Immigration Scheme (11, 12) as the scheme included the inflow of cheap unskilled workers from other countries (11, 12). That scheme allowed these immigrants to settle temporarily in Norway (11, 12) following a sharp increase in the number of Pakistani migrants, which resulted in the decision by the Norwegian government to settle these immigrants permanently in Norway (11, 12). This gave rise to the trend in Pakistani workers to bring their respective families to Norway, beginning the second generation of immigration from Pakistan (11, 12). These Pakistanis worked hard and learned Norwegian language and now we can find Pakistanis in almost every field including politics, medical, engineering, economics, and advocacy among others (11, 12).

2.1.4 Typically Pakistani diet

There is difference in diet among people living in rural and urban areas in Pakistan and Pakistani immigrants in Norway are mostly from rural areas. Generally, Pakistani diet consists of three meals per day and people in the rural areas mostly eat vegetables as compared to urban ones where meat and fast food consumption is higher. In rural areas first meal of the day starts with chapatti, traditional Pakistani bread made up of whole wheat corn, salad or fried eggs and people usually take lassi, a yogurt based water, as a drink, while in urban areas, people start breakfast with bread and jam. It is interesting to note that tea is very common among Pakistanis as they take it many times all the day.

Lunch time meal is common both in urban and rural areas and it consists of salan, prepared from meat, vegetables and fish dishes, with chapatti.
Dinner which is the last meal consist of salan with boiled rice or chapatti. Fruit and tea are also consumed during dinner time. Traditionally, the best Pakistani dish “biryani”, a spicy cuisine made from rice with chicken or mutton.

“Mithai” is a popular sweet in Pakistan. Made from milk with sugar and fats. Common fruit includes Mangoes, grapes, oranges, apples and bananas.

2.1.5 Lifestyle changes among Pakistanis immigrants in Norway

Many Pakistanis who migrated to Norway were from rural areas of Pakistan and after their respective migration, they underwent many changes resulting in many consequences that will also be discussed.

2.1.6 Change in food habits

Pakistanis in Norway have changed their food consumption habits as in Pakistan, they mostly used to eat hot meals three times a day, however, after migration to Norway, food consumption habits became similar to Norwegian food habits that includes just a single hot meal a day(13) and many have started eating Norwegian bread in the breakfast and lunch whilst many still continue to take their respective traditional Pakistani breakfast and lunch(13). Many Pakistanis have started eating Norwegian food items which include fish, sausages, burgers, boiled potatoes and spaghetti while others have started to decreasing an intake of oils(13). The use of fats and sugar has increased among many Pakistani immigrants resulting in higher levels of obesity(13) but most important of all is that after migration to Norway, many Pakistanis started taking meals irregularly along with increased level energy intakes (14).
2.1.7 Lack of physical activity

One of the main reasons of obesity among Pakistani immigrants in Norway is lack of physical activity as during the study many women agreed that they became physically less active after arriving in Norway compared to the time they spent in Pakistan (14). Possible explanation for this might be that they did more practical work in Pakistan than they do in Norway as they mostly stay at homes, in Norway, busy in home tasks.

In Pakistan, most of women who live in the rural areas are involved in farm work (14), but most of the women who moved to Norway belonged to rural areas which is the main cause of a shift in their respective routines (14). Another important aspect is the availability of many machines (for example cloth washing machine and dishwashing machine etc.) in Norway, as household work is considered very easy compared to Pakistan (14) so their respective habits also change accordingly, while in Pakistan, all this house works are carried out by women, keeping them physically active (14).

2.1.8 Health

Many lifestyle changes have occurred among Pakistani immigrants in Norway, as mentioned above, due to which physical activity has been decreased and energy intake has been increased resulting in the increase in the body weight which became the reason many health related problems, especially increased risk of type-2 diabetes and obviously the hypertension (13).

Incidence of diabetes is considered very high among Pakistani immigrants in Oslo and it is estimated that about 21% of men and 36% of women between the age of 40 and 59 are diabetic (14). The ratio of gestational diabetes is very high among Pakistani women living in Norway (20%) while this ratio is very low (about 4%) among women living in Pakistan (14). It is estimated that about four
out of five Pakistani women in Norway get gestational diabetes compared to one out of five among Norwegian women(14).

It has been found that Pakistani immigrants, both men (25%) and women (18%), have more hypertension than other immigrants living in Norway(15).

2.1.9 Risk factors of Hypertension

Major risk factors of Hypertension related to this study include the following.

➢ **Age**

Age is a contributing factor of hypertension(16). When a person gets older blood pressure increases and risk of being hypertensive also increased significantly(16). Among men, those aged 45 and above are at a risk of hypertension, and among women, those ages 55 year and above are at risk(16).

➢ **Family history**

High blood pressure is also genetic. Hereditary factors play an important role in acquiring hypertension(16). The risk of acquiring CVD can increase up to 50% if both parents are suffering from heart diseases (16). A person can develop stroke if their parents had a stroke when they were young and risks of acquiring a stroke is even higher among females whose mothers had previously suffered from a stroke (16).
Education

The occurrence of hypertension is also linked with education. Several studies have found that people with less education have more chance of developing hypertension (17, 18). For people who are more educated, on the other hand, chances of developing hypertension are low (17, 18).

2.2 Hypertension Globally

Hypertension is considered as one of the biggest risk factor of premature death worldwide and every year about 9.4 million people die due to it(19). Globally, overall prevalence of hypertension in 2008 was 40 % among adults aged 25 years and above(2). About 4 in 10 persons aged 25 years and above suffer from raised blood pressure (20). In 2000, about 1 billion people had hypertension(20). It is estimated that if hypertension increases at the same rate globally, cases of hypertension will increase by 60%, which is 1.56 billion, by 2025(3).Among all WHO regions, Africa has the highest prevalence of hypertension among both males and females combined(3), while in America it was lowest with 35% among both sexes (4). Prevalence of hypertension among South Asians is slightly higher at 36%(3). Men are considered to have more hypertension than women(19, 21), and prevalence of hypertension is lower in high-income countries (35%) compared with middle and low-income countries (40%)(19, 21).

Prevalence of hypertension is increasing dramatically in developing countries. One of the reasons provided for this rise is urbanization(22). In a report it was concluded that many studies have confirmed that hypertension is more common in urban areas compared to rural areas(22). Better incomes but unhealthy lifestyles are associated with urbanization(22). Increase in income leads to an increase in the desire for modern eases, such as replacement of a healthy diet
vegetables and items with more fiber contents) to unhealthy diet (fast food and others things which includes high salt contents) and physical inactivity increases (22). These factors not only result in hypertension but also many others chronic diseases such as diabetes and hyperlipidemia (22). Lack of education and poor lifestyle are strongly linked with risk of hypertension (22).

2.3 Hypertension in South Asian

Cardiovascular diseases are increasing very rapidly in south Asians and it has been estimated that if current rate of CVD persists, south Asians population will account for about 40% of the total world burden of cardiovascular diseases. (23)

In a systematic review of 33 observational studies it was found that overall prevalence of hypertension in south Asian was 27% (24). In prospective urban rural study (PURE), it was found that about one third of participants had hypertension. (24) Among them Bangladeshis had the highest prevalence of hypertension (39.3 %), followed by Pakistanis (33.3%), and Indians had the lowest (30.7%) prevalence of hypertension. (24)

In a report on hypertension in developing countries, it was found that the overall prevalence of hypertension in china was 20.6%, India was 22.6% and 20.7% in Pakistan (22)

Socioeconomic status have strong influence on prevalence of hypertension in both rural and urban south Asian population (25). There is a significant difference in the prevalence of hypertension between rural and urban populations (25). Obesity, diabetes, dyslipidemia and tobacco consumptions are major risk factors that are more common in urban areas than rural areas and these risk factors are strongly associated with hypertension (25). Studies from
India, Pakistan and Sri Lanka showed that prevalence of hypertension in urban areas was higher than rural areas (25).

2.4 Hypertension in Pakistan

According to National health survey in Pakistan it was found that about 18% of adults and 33% of people above 45 years are suffering from high blood pressure (26). 50% of people with known hypertension remained untreated (26).

In another study, it was found that the overall prevalence of hypertension was 26% (7). Males had more hypertension than females and that hypertension increases with age (7).

In a study, which was conducted in different provinces of Pakistan, it was found that prevalence of hypertension in Punjab was 17.3% among men and 16.4% among women (27). In Sindh, the prevalence was 19.0% among men and 9.9% among women (27). In KPK, it was 23.7% among men and 28.4% among women and in Baluchistan it was 25.3% among men and 41.4% among women (27). There was clear evidence that hypertension was more common in urban areas (22.7%) compared to rural areas (18.1%) (27).

Major risk factors in development of hypertension among Pakistanis include Tobacco use, physical inactivity, diabetes and high intake of salt (27) (7).
2.5  Hypertension among South Asian immigrants in Europe

Immigrants from south Asia arrived in Europe after the end of Second World War(4). There was a need of people in Europe at that time(4). Many people from Pakistan, India and Bangladesh arrived during this time in Europe(4). It is estimated that about 2 million people from South Asia are living in the UK, which represents 4 % of total population of UK(4).

A study was conducted in UK on South Asians immigrants, which showed that Indian men and Pakistani women have high rate of hypertension (4).

A study on Indians living in West London and Indian living in India was conducted which showed that blood pressure of Indian men living in West London was higher than Indians living in India(28).

A study conducted in Sweden showed that Iranians living in Sweden had a higher prevalence of hypertension (50 % men and 33 % women ) compared to Iranians in Iran (24.5 %men and 21.8%)(29).

2.6  Hypertension among Asian immigrants in United States of America

Hypertension is very common among Americans(30). It is estimated that every third American has hypertension in US(30). In 2008, it was found that about 43.9 % of male and 56.1 % of female deaths was due to hypertension(30).

South Asian community (Pakistani, Indian, Bangladeshi) are the largest growing immigrants population in the United States(5). The rate of cardiovascular
diseases, particularly hypertension is very high among these communities in the US(5). The risk of cardiovascular diseases among Indians is 3 to 4 times higher than for white Americans(5).

Major risk factors associated with hypertension among Asian immigrants in US includes lack of education, unemployment and discrimination n(30). These factors lead to an increase in stress levels which results in hypertension(30).

In a study, Asian immigrants were asked their reason of being hypertensive(5). Indian immigrants cited social isolation and stress as the main reasons, whereas participants from Pakistan said that they had hypertension even before they arrived in the US due to poor diet, lack of health facilities and lack of education in Pakistan(5). Bangladeshi participants cited changes in social norms upon migration as the reason for developing hypertension(5).

Another study on Asian immigrants including Pakistanis and Indian was conducted in Chicago which showed that about 32 % of participants had hypertension(31).

2.7 Hypertension among immigrants in Norway

According to the Oslo immigrant health study, Pakistani immigrants had the highest prevalence of hypertension (25 % men and 18 % women) compared to other immigrant groups(15). Sri Lankan immigrants were second (23 % men and 18 % women), while Turkish immigrants (22 %men and 15 % women) are third(15). Among Iranian immigrants, 14 % men and 11 % women had hypertension, while among Vietnamese immigrants, 17 % men and 15 % women had hypertension(15).

Another study conducted by Zahid et al compared hypertension between Pakistanis living in Norway and Pakistanis living in Pakistan, which showed
that women in Pakistan had higher systolic and diastolic blood pressure than women in Norway and men in Norway had higher systolic blood pressure as compared to men in Pakistan(32). Results showed that hypertension among Pakistanis in Pakistan is more common than Pakistanis in Norway except systolic pressure in males(32). Reason of having more rate of hypertension in Pakistan is due to lack of access to doctors, lack of awareness and undiagnosed hypertension as compared to Norway(32).

2.1 Summary of literature review

Very limited data is available on hypertension among Pakistani immigrants in Norway. Data from literature review shows that immigrants have a high prevalence of hypertension especially Pakistanis, Bangladeshis and Indians in European countries. These immigrants have a higher rate of hypertension as compared to people living in their homeland. Risk factors are almost common among all Asian immigrants in Europe and USA, which includes salt intake, stress, lack of education, age, tobacco and alcohol use, lack of physical activity and diabetes.
2.2 Rationale of study and objectives

2.3 Rationale of study

Limited data was available before on hypertension among Pakistani immigrants living in Norway. Only one study was conducted on Pakistani immigrants in Norway by Oslo Health Immigrant in 2002 (15). This study was 14 years old and only limited to prevalence of hypertension.

The current prevalence of hypertension was unknown therefore, this study attempts to address this gap. The current study was conducted in 2015 and it noted the current prevalence of hypertension and other findings including immigrant awareness about having hypertension, age, level of education and family history as a major contributory factor for hypertension.

2.4 Objectives

2.4.1 Main objective

To estimate prevalence of hypertension and associated risk factors among Pakistanis living in Oslo, Norway.


2. Explore associations between background factors and hypertension
   a. Is there any association between education and hypertension?
   b. Is there any association between age and hypertension?
   c. Is family history of hypertension a risk factor for hypertension?

3. To assess Pakistani immigrants awareness about having hypertension.
3 SUBJECTS AND METHODS

3.1 Study area

This study was conducted in the city of Oslo, Norway having a total population of 648,000 people approximately and about 30 % of the population consists of immigrants, that make up to a total of approximately 1,90,000 people(9). Among immigrants, Pakistanis are one of the largest communities living in Oslo, followed by people from Sweden, Poland and Somalia etc(9). There are also immigrants from Turkey, Philippines, Sri Lanka and Syria, forming quite a large part of the society(9). Main immigrant areas in Oslo include Grønland, Furuset, Helsfyr, Stovner and Lindeberg.

Figure 1: Map of Norway
3.2 Study design and population

A cross-sectional study was conducted over a period of 5 months (from August to December 2015). Study data from 286 participants was collected from the city.

3.3 Sample Selection

3.3.1 Inclusion Criteria

1. Pakistani immigrants, living in Oslo, men and women aged 35 and above

3.3.2 Exclusion Criteria

- People of other than Pakistani nationalities.
- Pregnant women.
- Presence of co-morbidities (Diabetes, kidney disorders, all type of cancers.)

3.3.3 Operational Definition

1. Hypertension
Hypertension is defined as Systolic blood pressure equal to or above 140 mmHg and diastolic blood pressure equal to or above 90 mmHg (33).
3.4 Sample selection process

Pakistani immigrants living in Oslo who met the inclusion criteria were included in the study. Participants were approached by visiting different mosques, Pakistani community parties and Pakistani shops.

3.5 Sample size calculation

Sample size was calculated using open epi. calculator.

Sample Size for Frequency in a Population

Population size (for finite population correction factor or fpc)(N): 27000
Hypothesized % frequency of outcome factor in the population (p): 25% +/- 5
Confidence limits as % of 100 (absolute +/- %)(d): 5%
Design effect (for cluster surveys-DEFF): 1

Sample Size(n) for Various Confidence Levels

<table>
<thead>
<tr>
<th>Confidence Level(%)</th>
<th>Sample Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>80%</td>
<td>123</td>
</tr>
<tr>
<td>90%</td>
<td>202</td>
</tr>
<tr>
<td>95%</td>
<td>286</td>
</tr>
<tr>
<td>97%</td>
<td>349</td>
</tr>
<tr>
<td>99%</td>
<td>489</td>
</tr>
<tr>
<td>99.9%</td>
<td>789</td>
</tr>
<tr>
<td>99.99%</td>
<td>1090</td>
</tr>
</tbody>
</table>

Equation

Sample size \( n = \frac{[DEFF*Np(1-p)]}{[(d^2/Z^2_{1-\alpha/2})*(N-1)+p*(1-p)]} \)

With 95% Confidence interval, required sample size was therefore \( n = 286 \).
3.6 Data collection

3.6.1 Survey procedure

A cross-sectional study was conducted in the main immigrant areas of Oslo that include Grønland, Fureset, Helsfyr and Lindeberg.

Experience from previous immigrant studies suggests that random sampling based on the Statistics Norway (SSB) database and written information and contact is an unsuccessful approach to recruiting among many immigrant groups. We decided therefore to choose convenience sampling technique.

Convenience sampling technique was used in order to recruit the participants. The information about the study was spread in different mosques, Pakistani community centers and Pakistani shops. Those who were interested in the study was given more detailed information, the purpose and its benefits of the study. A written informed consent was taken from willing participants. Blood pressure was measured using by a Digital Blood Pressure Monitor (CH-452) in sitting position in three times (in one minute interval) from left arm after the individual participants were allowed to rest for 5 minutes. Blood pressure was measured to nearest 2mmHg value. The mean value obtained from these three readings was used in analysis. Information including people’s awareness about having hypertension, person taking hypertensive drugs, age, family history and level of education was collected using a pre-structured questionnaire.
Female research assistant

Blood pressure was measured by a trained medical doctor in private rooms at mosques and homes and female research assistant was recruited to measure the blood pressure of female participants.

3.7 Statistical methods:

Descriptive statistics in the form of frequencies, percentages, means (standard deviations) and/or medians (inter-quartile range) were estimated from the data. Differences in prevalence of hypertension in different socio-demographic categories (for example, within male and female) were assessed using the test of proportions (frequencies, crosstabs). To assess factors that are associated with hypertension of Pakistanis living in Oslo, binary logistic regression models were fitted in the data. The modeling process proceeded in two steps; first, univariate binary logistic models were fitted to the data in order to identify significant factors ($P < 0.05$). Secondly, all significant factors from the univariate analyses together with clinically relevant variables were used to fit an adjusted binary logistic regression model. All analyses was performed in SPSS version 22 and significance level set at $\alpha = 0.05$. 
3.8 Ethical approval:

The study was approved by Regional Committee for Research Ethic in Norway (Appendix 3).

Prior to recruiting the participants, detailed information about the study was explained to every individual (Appendix 2). All the participants were informed about the benefits of the study and that they could withdraw from the study at any time without providing any reason and that there would be no consequence of refusing to participate in the study. Only willing participants were included in the study by taking a written informed consent. All participants found to be hypertensive were advised to have their check up with their general physicians. All data was kept confidential, and no names were mentioned in the questionnaire (Appendix 1). Only serial numbers were used. All information of participants was kept in a safe locker, accessible only to the researcher.
4 RESULTS

A total of 286 participants (149 females and 137 males) aged between 35-100 years were included in the study (Table 1).

The results showed that overall prevalence of hypertension was 39.5 % among both men and women combined. 42% of participants were from age group 35-44 years. All the participants were married. Most of the participants (53.8%) had attained 10-12 years of education (Table 1).

Table 1: General Demographic characteristics of study population (Males and Females)

<table>
<thead>
<tr>
<th>Variable</th>
<th>N (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>286 (100%)</td>
</tr>
<tr>
<td>Gender:</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>149 (52.1)</td>
</tr>
<tr>
<td>Female</td>
<td>137 (47.9)</td>
</tr>
<tr>
<td>Hypertension:</td>
<td></td>
</tr>
<tr>
<td>Cases</td>
<td>113 (39.5)</td>
</tr>
<tr>
<td>Non-cases</td>
<td>173 (60.5)</td>
</tr>
<tr>
<td>Age groups:</td>
<td></td>
</tr>
<tr>
<td>35 – 44</td>
<td>120 (42)</td>
</tr>
<tr>
<td>45 – 54</td>
<td>93 (32.5)</td>
</tr>
<tr>
<td>55-100</td>
<td>73 (25.5)</td>
</tr>
<tr>
<td>Marital status:</td>
<td></td>
</tr>
<tr>
<td>Married *</td>
<td>286 (100)</td>
</tr>
<tr>
<td>Education:</td>
<td></td>
</tr>
<tr>
<td>Less than 9</td>
<td>49 (17.1)</td>
</tr>
<tr>
<td>10-12</td>
<td>154 (53.8)</td>
</tr>
<tr>
<td>13-15</td>
<td>71 (24.8)</td>
</tr>
<tr>
<td>Above 16</td>
<td>12 (4.2)</td>
</tr>
</tbody>
</table>
*All participants were married.

Both males and females were recruited differently because of different recruitment methodology. So males and females are presented separately in different tables.

**Table 2** shows the demographic characteristics of hypertension in females. Out of 286 participants, the number of female participants was 137(47.9%). Prevalence of hypertension among females was found to be 35.8%. Results showed that about 40.8% of females were not aware of having hypertension. Among those having hypertension, 55.1% were taking anti-hypertensive drugs. Among hypertensive participants, 51% of participants had a family history of hypertension. The highest hypertension prevalence was found in age group between 45-54 years (44.9%). All female participants were married. Females with 10-12 years of education had 57.1% rate of hypertension.

**Table 2: Demographic characteristics of hypertension (cases and non-cases) in Females**

<table>
<thead>
<tr>
<th>Variable</th>
<th>N (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Females:</td>
<td>137 (47.9)</td>
</tr>
<tr>
<td>Hypertension:</td>
<td></td>
</tr>
<tr>
<td>Cases</td>
<td>49 (35.8)</td>
</tr>
<tr>
<td>Non-cases</td>
<td>88 (64.2)</td>
</tr>
<tr>
<td>Awareness of having hypertension:</td>
<td></td>
</tr>
<tr>
<td>Aware</td>
<td>29 (59.2)</td>
</tr>
<tr>
<td>Not aware</td>
<td>20 (40.8)</td>
</tr>
<tr>
<td>Participants taking anti-hypertensive drugs:</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>27 (55.1)</td>
</tr>
<tr>
<td>No</td>
<td>38 (44.9)</td>
</tr>
<tr>
<td>Family history of hypertension:</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>25 (51)</td>
</tr>
</tbody>
</table>
Table 3 shows demographic characteristics of hypertension among both cases and non-cases among males. Prevalence of hypertension among male was 43%. Awareness of having hypertension among males was just 40.6%. Participants that were using anti-hypertensive drugs was 40.6 % and 50% of males with hypertension also had a family history of the hypertension. Males with age group (55-100) years had the highest prevalence of hypertension which (40.6 %). All male participants of this study were married. Participants which had attained 10-12 years of education had the highest rates of hypertension (54.7%).

## Table 3: Demographic characteristics of hypertension (cases and non-cases) in Males

<table>
<thead>
<tr>
<th>Variable</th>
<th>N (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Males:</td>
<td>149 (52.1)</td>
</tr>
<tr>
<td>Hypertension:</td>
<td></td>
</tr>
<tr>
<td>Cases</td>
<td>64 (43)</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>-----------------------------</td>
<td>------</td>
</tr>
<tr>
<td><strong>Non-cases</strong></td>
<td>85 (57)</td>
</tr>
<tr>
<td><strong>Awareness of having hypertension:</strong></td>
<td></td>
</tr>
<tr>
<td>Aware</td>
<td>26 (40.6)</td>
</tr>
<tr>
<td>Not aware</td>
<td>38 (59.4)</td>
</tr>
<tr>
<td><strong>Participants taking anti-hypertensive drugs:</strong></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>26 (40.6)</td>
</tr>
<tr>
<td>No</td>
<td>38 (59.4)</td>
</tr>
<tr>
<td><strong>Family history of hypertension:</strong></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>32 (50)</td>
</tr>
<tr>
<td>No</td>
<td>30 (46.9)</td>
</tr>
<tr>
<td>Do not know</td>
<td>2 (3.1)</td>
</tr>
<tr>
<td><strong>Age groups having hypertension:</strong></td>
<td></td>
</tr>
<tr>
<td>35 – 44</td>
<td>16 (25)</td>
</tr>
<tr>
<td>45 – 54</td>
<td>22 (34.4)</td>
</tr>
<tr>
<td>55-100</td>
<td>26 (40.6)</td>
</tr>
<tr>
<td><strong>Marital status:</strong></td>
<td></td>
</tr>
<tr>
<td>Married</td>
<td>149 (100)</td>
</tr>
<tr>
<td><strong>Education: (Participants with Hypertension)</strong></td>
<td></td>
</tr>
<tr>
<td>Less than 9</td>
<td>8 (12.5)</td>
</tr>
<tr>
<td>10-12</td>
<td>35 (54.7)</td>
</tr>
<tr>
<td>13-15</td>
<td>19 (29.7)</td>
</tr>
<tr>
<td>Above 16</td>
<td>2 (3.1)</td>
</tr>
</tbody>
</table>
4.1 Unadjusted binary logistic regression models in males and females showing the association between hypertension and possible risk factors.

Table 4 shows association between age and level of education on hypertension in males in unadjusted analysis. The risk of hypertension was 2.51 times higher among participants in age group 45-54 and 3.41 times higher in age group older than 55 years as compared to 35-44 age group. The odds of hypertension in participants with education level 13-15 was 50 % (1-0.50=0.50) lower and 42 % (1-0.58= 0.42) lower in participants with more than 16 year of education as compared to participants with less than 9 year of education.

Table 4: Association between age and level of education on hypertension (Males)

<table>
<thead>
<tr>
<th>Factor</th>
<th>Univariate analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>OR (95% CI)</td>
</tr>
<tr>
<td>Age group (ref: 35-44) (n=58)</td>
<td></td>
</tr>
<tr>
<td>45-54 (n=45)</td>
<td>2.51 (1.12, 5.70)</td>
</tr>
<tr>
<td>55-100 (n=46)</td>
<td>3.41 (1.50, 7.74)</td>
</tr>
<tr>
<td>Education level (ref: Less than 9) (n=15)</td>
<td></td>
</tr>
<tr>
<td>10-12 (n=77)</td>
<td>0.73 (0.24, 2.21)</td>
</tr>
<tr>
<td>13-15 (n=52)</td>
<td>0.50 (0.16, 1.61)</td>
</tr>
<tr>
<td>Above 16 (n=5)</td>
<td>0.58 (0.07, 4.56)</td>
</tr>
</tbody>
</table>

N=Total number of male participants in different age and education level groups.
Table 5 shows association between age and level of education on hypertension in females in unadjusted analysis. Risk of getting hypertension was 3.53 times higher in age group 45-54 and 5.21 times higher in age group older than 55 as compared to 35-45 age group. The odds of hypertension in participants with education level 10-12 was 43% lower and in group 13-15 was 73% (1-0.27=0.73) lower as compared to participants with less than 9 year of education.

Table 5: Association between age and level of education on hypertension (Females)

<table>
<thead>
<tr>
<th>Factor</th>
<th>Univariate analysis</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>OR (95% CI)</td>
<td>P-value</td>
<td></td>
</tr>
<tr>
<td>Age group (ref: 35 - 44)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>45-54 (n=48)</td>
<td>3.53 (1.51,8.23)</td>
<td>&lt; 0.01</td>
<td></td>
</tr>
<tr>
<td>55-100 (n=27)</td>
<td>5.21 (1.94,13.9)</td>
<td>&lt; 0.01</td>
<td></td>
</tr>
<tr>
<td>Education level (ref: Less than 9) (n=34)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10-12 (n=77)</td>
<td>0.57 (0.25,1.29)</td>
<td>0.179</td>
<td></td>
</tr>
<tr>
<td>13-15 (n=19)</td>
<td>0.27 (0.07,0.97)</td>
<td>0.04</td>
<td></td>
</tr>
<tr>
<td>Above 16 (n=7)</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>

N=Total number of females participants in different age and education level group.

4.2 Adjusted binary logistic regression models in males and females showing the association between hypertension and possible risk factors.

Table 6 shows association between age and hypertension in males in adjusted analysis. After adjusting for level of education, the risk for hypertension was 2.83 and 3.71 times higher among subjects with age group 45-54 and 55-100 respectively as compared to those in age group 35-44 years.
Table 6: Association between age and hypertension in males

<table>
<thead>
<tr>
<th>Factor</th>
<th>Multivariate analysis</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age group (ref: 35 - 44)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>45-54</td>
<td>2.83 (1.2, 6.67)</td>
<td>0.02</td>
</tr>
<tr>
<td>55-100</td>
<td>3.71 (1.5, 9.2)</td>
<td>0.005</td>
</tr>
<tr>
<td>Education level (ref: Less than 9)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10-12</td>
<td>1.23 (0.36, 4.18)</td>
<td>0.74</td>
</tr>
<tr>
<td>13-15</td>
<td>0.78 (0.22, 2.81)</td>
<td>0.71</td>
</tr>
<tr>
<td>Above 16</td>
<td>1.96 (0.21, 18.07)</td>
<td>0.55</td>
</tr>
</tbody>
</table>

Table 7 shows association between age and hypertension in females in an adjusted analysis. After adjusting for level of education, the risk for hypertension was 3.14 and 3.6 times higher among subjects in the age groups 45-54 and 55-100 respectively as compared to those in age group 35-44 years.

Table 7: Association between age and hypertension in females

<table>
<thead>
<tr>
<th>Factor</th>
<th>Multivariate analysis</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age group (ref: 35 - 44)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>45-54</td>
<td>3.14 (1.32, 7.47)</td>
<td>0.01</td>
</tr>
<tr>
<td>55-100</td>
<td>3.6 (1.2, 10.7)</td>
<td>0.02</td>
</tr>
<tr>
<td>Education level (ref: Less than 9)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10-12</td>
<td>0.73 (0.28, 1.87)</td>
<td>0.51</td>
</tr>
<tr>
<td>13-15</td>
<td>0.40 (0.1, 1.7)</td>
<td>0.204</td>
</tr>
<tr>
<td>Above 16</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>
5 DISCUSSION

5.1 Discussion of main findings

The current study focused on finding the current prevalence of hypertension among Pakistani immigrants living in Oslo, Norway. It was found that Pakistanis had a high rate of hypertension. Both men and women were affected by higher degree of hypertension.

Prevalence of Hypertension:

The current overall prevalence of hypertension among participating Pakistani immigrants was found to be 39.5 % in this study, which is higher than the previous study (22%) by Oslo Health Immigrants(15). Possible explanation might be that the study sample size is smaller as compared to Oslo immigrant study and secondly that Oslo immigrant study was conducted in 2002 and there is a 14 years gap between these two studies. With increase in time, hypertension might have increased.

In the current study prevalence of hypertension has been found to be higher than that of studies conducted in UK including study by Barnett et al that showed that Pakistani immigrants were 25 % likely to have a hypertension(4). Furthermore, another study in London showed that South Asians including Pakistanis have around 42 % hypertension (males 51 % and females 33%) (34). Similarly, a study by Koochek et al showed that prevalence of hypertension among Iranian immigrants in Sweden was 42 % (29).
Studies conducted in Pakistan showed a different prevalence’s between 14 to 26 % among men and women (7, 35) (36). The prevalence of hypertension we have found in our study is higher than the prevalence found in studies conducted in Pakistan. The difference might be due to migration to Norway and secondly due to the change in life style from low-income country to high-income country. A study in West London on Indian immigrants also showed that Indian immigrants in London have higher blood pressure compared to Indians living in India (37). However, similar to the findings of the current study, a population based study in Karachi, Pakistan showed that prevalence of hypertension was 40.2%(38). These studies indicate that people from many Asian countries are at high of hypertension in different regions of the world due to many reasons as mentioned earlier.

**Awareness of having hypertension:**

Another objective of this study was to assess Pakistani immigrants’ awareness of having hypertension, the result was quite surprising as it was found that about 40.8% females and 59.4% of males having hypertension were unaware of that before. Similarly, a study conducted in Pakistan by Safdar et al, revealed that 58 % of participants were unaware of having a hypertension (7). Similarly, a study conducted on south Asian including Pakistani, Indian and Bangladeshi living in UAE, which showed that only 76.4 % of participants having hypertension were unaware of having hypertension before(39).

On the contrary, another study in European countries showed that there was 30 % of hypertension unawareness among European participants(40)

There might be different reasons for the difference between awareness of hypertension among south Asian and Europeans.

South Asian countries are mostly under developing countries and People from south Asian, which are living abroad either in Europe and in UAE, are mostly
people belonging from labor class and have mostly low level of education and they don’t visit doctor regularly. While European people belong to developed countries and mostly having high level of education and they visit doctors regularly for general medical checkup.

In current study, participants were mostly from the first generation of migrants i.e. those people mostly have background from Kharian (rural area) and adjacent areas of Pakistan, but migrated to Norway and the education levels among them is generally lower.

**Family history of hypertension**

Another objective of the study was to assess family history of hypertension and the current study revealed that participants with hypertension, about 50.5% had a family history of it in both males and females. Hypertensive participants having family history status were not compared with non-hypertensive ones because research questions were only confined to hypertensive participants having family history of the hypertension. A study conducted in Italy showed that participants with hypertension, 19% had family history of it (17).

**Association of age with Hypertension**

In current study, we found strong association between age and hypertension in both males and females. People in older age (45 years and above) have high rate of hypertension as compared to younger ones (35-45 years). This was further confirmed by a study conducted in Pakistan, which shows that hypertension was increased with age in both gender (7). A study on Filipino immigrants in US also showed that risk of hypertension increases with age and is more common among people with older age (46 years and above) (41).
Association of education with hypertension

In current study, we found that people with low level of education have high rate of hypertension as compared to people with high level of education.

A study in Italy showed that hypertension is more common among less educated people while people with high education, the risk is very low (17).

Similarly, a study on Dutch women in Netherlands showed that women with low level of education, chances of gestational hypertension are more as compared to women with high level of education (42).

5.2 Methodological Discussion

5.2.1 Study design

The current study design was cross-sectional study design. Cross-sectional studies are usually undertaken over a short period of time and at one time point (43). Cross-sectional studies are conducted to find out present prevalence of any disease in a given population (43) (Figure 2).

Figure 2: Different study designs
In cross-sectional studies, data can be collected on an individual basis including information about current condition of any disease and associated risk factors(43).

These studies are relatively cheaper than other studies and easy to carry out in a short period of time and with limited budget(43). These studies are usually used in public health planning and there is no need of a follow up(43).

There are some limitation of such studies. For example, the sequence of events indication is not given by these studies(43) therefore, it is difficult to estimate whether exposure occurs before, during or after the onset of outcome disease(43). In these studies, it is also difficult to conclude causality(43).

The current study design which is cross-sectional was chosen in order to find out the present prevalence of hypertension among Pakistani immigrants at one time point, and, secondly, due to limited budget and short period of time from August to December. Some of associated risk factor were also identified for example awareness, age, level of education and family history by the current study. Identifying risk factor for any disease is very helpful for management and prevention of disease(43).

5.2.2 Population and sample size

Sample size was calculated based on prevalence of hypertension of 25 %. In the current study we reached the whole sample size as it was planned, which is considered adequate for the prevalence study. Nevertheless, we do not have information on non-respondents. It might be that people who did not give consent are different in their lifestyle, health seeking behavior or in other ways from the participants.
5.2.3 Assessment Tools

The blood pressure was measured by digital blood pressure Monitor (CH-452). The blood pressure was measured by following the SOPs given by the manufacturer along with machine. Blood pressure was measured 3 times and an average was taken in order to avoid any huge difference between blood pressure measurements. The machine was checked and cleaned daily.

However, we cannot say that machine is 100% accurate. A small difference in blood pressure measurement might have occurred and affected the result.

Information was gained through self-reported questionnaire with help of Urdu speaking interviewer and pilot testing was conducted before start of study.

5.2.4 Bias

➢ Selection bias

Selection bias occur when participants are not randomly selected from the population(44) Participants which are recruited are not actually true representation of population(44)

When there is systematic difference between characteristics of people recruited for investigation or study with those who are not recruited, selection bias can occur (45). A selection bias can occur when majority of participants who are willing to participate are suffering from same disease (which has to be assessed)(45). However, people who are not suffering from disease and their disease status is known might not participate(45).

People were recruited from different places after providing information about the study. In this study, it might be possible that people who were interested in health field had participated while those who were not interested did not
participate, and this might have affected the result. For example, it is possible that people with known hypertension had participated more just to know their current status of hypertension. People with unknown hypertension who had not participated may have not explored their hypertension status. High prevalence might be due to this selection bias. Selection bias can also occur if there is unequal age distribution of participants.

In current study, the method of recruiting females was different from males due to cultural sensitivities, so selection bias might have occurred.

➢ Information bias:

Information bias refers to the systematic error that arises during collecting information from the participants(45). This type of error might be from respondent, interviewer or instrument used to measure for example blood pressure(44)

These types of bias occur when researcher obtains information from the participants in an improper way(44). To avoid information bias, self-made questionnaire was developed.

This type of questionnaire was made in order to make easy for both respondent and myself to understand well and was in local language (Urdu).

However there might have information bias occurred while collecting data between males and females because some of females were recruited by female research assistant. So there is chance that bias have occurred as she mightly had obtained data differently from me. Secondly, information about family history was collected only from those participants having hypertension and not from all participants. So might be an information bias.
5.2.5 Validity:

A study is considered as valid if both systematic and random error are minimized as much as possible\(^{44}\) \(^{45}\). Validity is defined as accuracy of measurement of method.

There are two types of validity.

- **Internal Validity**

  Any results obtained through epidemiological studies needs to be assessed in terms of their internal and external validity\(^{44}\) \(^{45}\). Internal validity is the consideration about the possible effect of randomization in sampling, variations and bias\(^{44}\) \(^{45}\). Is it possible to draw any sound conclusion relating to the study population. In this study the participants were not randomly selected. Internal validity is threatens by systematic error and can be improved by good study design\(^{44}\) \(^{45}\). Steps were taken to reduce measurement bias for example same digital blood pressure monitor was used to measure blood pressure. Same technique was used to measure blood pressure of both males and females. Blood pressure was measured three times and mean average were taken.

- **External Validity**

  External validity or generalizability refers to the ability to generalize the findings to a broader population or refers to the degree to which obtained results can be applied to the participants which was not included in the study\(^{44}\) \(^{45}\).

  Not all the Pakistanis immigrants are living in Oslo but there are large number of Pakistanis immigrants, who are living in other part of Norway. The current study was conducted in the city of Oslo. So our findings cannot be generalizable to the Pakistanis living in other parts of Oslo and Norway.
5.2.6 Strengths

Cross-sectional study was conducted to measure the prevalence of hypertension. Cross-sectional studies are most accurate method in order to measure out the prevalence of any disease and their associated risk factors. The study included almost all age groups from 35-44, 45-54 and 55 and above. Both males and females were included in the study.

Short and simple questionnaire (which was translated into local language Urdu in order to make easy for participants to understand) were used for this study in order to save time and make them easy to understand questions included. Only serial numbers were used in questionnaire instead of name of participants, which increases the confidentiality.

All the data was taken by qualified persons including me and medical doctor, female research assistant. Not only prevalence of hypertension was assessed but awareness, association between age, level of education and family history on hypertension were also studied. The study conducted by same interviewer who speak Urdu which made the communication easier.

5.2.7 Limitations

In the current study self-made questionnaire was used instead of validated questionnaire, so the validity of the study might not be strong. Reason behind was that I tried to make questionnaire so simple and short as possible because it was easy for both of participants and me to understand well and to avoid misunderstanding and safe time of participants.

Certain biases could have affected the result for example information and selection bias. More participants with already known hypertension might have participated.
The result could not be generalized to whole Pakistanis living in other part of Oslo and Norway.

Many other immigrant’s groups were also interested in this study. Unfortunately, this study was limited to Pakistani immigrants.
6 CONCLUSION

Hypertension is very common among Pakistanis living in Pakistan and among Pakistanis living in Norway. Pakistani immigrants in Norway were found to have a high prevalence of hypertension as compared to that in Pakistan. Prevalence of hypertension among males and females were significantly high. So we can conclude that in Norway Pakistani immigrants have high ratio of hypertension and the reasons are very important for understanding why it is so. Possible reasons such as unawareness of hypertension, as more than half the participants were found unaware of having hypertension. Many of them have never visited doctor for this purpose. Family history is another major problem, lack of physical exercise, eating of unhealthy food for example very spicy food, heavy meals, more intake of sugar and salt, and more meals in a day. Norway is a very cold country as compared to Pakistan so Pakistani immigrants in Norway drink less water, walk less, less training, they have more social issues and problems here in Norway due to which they feel stress. Heavy diet can work in warm climate but not always in cold climate if one is not doing physical exercise in cold climate.
After seeing the results of hypertension among Pakistani immigrants in Norway and after my conclusion about possible reasons of hypertension among Pakistani immigrants in Norway I recommend few things to higher authorities and policy makers in Norway. Proper awareness should be given to the Pakistani immigrants in Norway for example diet plan, education about possible risks due to lack of physical exercise, risks of always eating spicy food, sugar and salt intake. Future research should be done on why Pakistani immigrants in Norway do not visit doctor. It’s important to see and understand what barriers are there in access to health care as they are not visiting doctors. If there are barriers then they must be sort out either they are at individual level, structural level and cultural level. It is very important to prevent Pakistani immigrants in Norway from different diseases associated with the hypertension. As if they suffer from diseases then the cost related to health care will increase. It is rightly said that prevention is better than cure. Finally, it’s not just Pakistani immigrants in Norway are more to be concerned but other immigrants population are equally important and future research should also be focused on other immigrants group as they are also part of this Norwegian society. Other risk factors of hypertension should also be addressed in future researches.
REFERENCES


9 APPENDICES

9.1 Appendix: 1 Questionaire

<table>
<thead>
<tr>
<th>Sr. No</th>
<th>Age:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sex</th>
<th>Marital status</th>
</tr>
</thead>
<tbody>
<tr>
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<tr>
<th>Systolic B.P</th>
<th>Diastolic B.P</th>
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Result:
Hypertension/No hypertension

Do you know you have hypertension?

a) Yes
b) No

Are you taking any hypertensive drugs?

a) Yes
b) No
Do you have any family member with hypertension?
   a) Yes
   b) No
   c) Don’t know

From which generation did you belong?
   a) First generation
   b) Second generation
   c) Third generation

Years of education Completion
   a) ≤ 9 years
   b) 10-12 years
   c) 13-15 years
   d) ≥16 years
9.2  Appendix: 2 Informed consent

Request for participation in a research project

Prevalence of hypertension among Pakistani immigrants in Oslo,

Background and purpose

This is a request for you to participate in a research study that intends to find out the current prevalence of hypertension among Pakistani immigrants living in Oslo. Most of people do not know whether they have hypertension or not. It is very helpful to find out whether you have hypertension or not which may help you to avoid development of chronic disease in later stages of life.
What does the study entail?

Blood pressure will be measured of every participant after filling out informed consent and then a short questionnaire will be filled out by interview. You will have immediate feedback whether you have hypertension or not.

Potential advantages and disadvantages

The advantage for you as participants is that you will get to know that whether you have hypertension or not. If we find that you have hypertension, you can contact your GP, who may help you to avoid development of chronic diseases in later stages of life.

What will happen to the samples and the information about you?

All the information about you will be kept confident as we will not write your name and only serial number will be used. It will not be possible to identify you when results are published.

Voluntary participation Participation in the study is voluntary. You can withdraw your consent to participate in the study at any time and without stating any particular reason. This will not have any consequences for your further treatment. If you wish to participate, sign the declaration of consent on the final page. If you later have questions concerning the study, you may contact (Farhad Mohsin cell no.48643279)
Consent for participation in the study

I am willing to participate in the study.

I confirm that I have given information about the study.

(Signed by the project participant, date)

(Signed, role in the study, date)
Appendix: 3 Ethical Approval & Amendment from REK

Marte Kjøllesdal
Institutt for Helse og
Samfunn Universitetet i Oslo
0318 Oslo

2015/947 Hypertensjon blant pakistanske innvandrere i Oslo

Forskningsansvarlig: University of Oslo
Prosjektleder: Marte Kjøllesdal

Vi viser til søknad om forhåndsgodkjenning av ovennevnte forskningsprosjekt. Søknaden ble behandlet av Regional komité for medisinsk og helsefaglig forskningsetikk (REK sør-øst C) i møtet 11.06.2015. Vurderingen er gjort med hjemmel i helseforskningsloven (hfl.) § 10, jf. forskningsetikkloven § 4.

Prosjektomtale

Høyt blodtrykk er et globalt folkehelseproblem som forårsaker 7.5 milliner dødsfall årlig. Tidligere studier har vist en høy forekomst både i Pakistan og blant pakistanske innvandrere i Norge. Denne studien vil bidra med oppdatert kunnskap om forekomsten av høyt blodtrykk blant pakistanske innvandrere i Norge, og også se på familiehistorie av høyt blodtrykk som en risikofaktor, samt undersøke hvor stor andel av de med høyt blodtrykk som vet at de lider av det. Studien vil inkludere 285 pakistanner, 35 år, bosatt i Oslo. Disse vil rekutteres gjennom pakistanske moskeer, butikker og nettoverk av kjente. Informasjon vil samles ved hjelp av spørreskjema og blodtrykk vil bli målt. Deltakene får umiddelbart vite sitt blodtrykk, og om det krever videre oppfølgelse.

Vurdering

Komiteen vurderte innledningsvis om prosjektet kan skaffe til veie ny kunnskap om helse og sykdom, jf. helseforskningsloven §§ 2 og 4, og konkluderte med at prevalensmåling av høyt blodtrykk hos en antatt risikogruppe må sies å ligge innenfor helseforskningslovens virkeområde.

Til tross for ovennevnte beskrevne metodologiske svakheter, finner komiteen likevel å kunne godkjenne prosjektet. Studien er lite invasiv og kan vanskelig sees å være etisk uforsvarlig. Komiteen anbefaler imidlertid at man i prosjektgruppen tar seg komiteens merknader ad notam, og vurderer om man kan gjøre noen endringer, for eksempel med sikte på et mer representativt utvalg, dette for å gi studien mer vitenskapelig styrke.

**Vedtak**
Prosjektet godkjennes, jf helseforskningslovens §§ 9 og 33.

Tillatelsen er gitt under forutsetning av at prosjektet gjennomføres slik det er beskrevet i søknaden og protokollen, og de bestemmelser som følger av helseforskningsloven med forskrifter.


Komiteens avgjørelse var enstemmig.

**Sluttmelding og søknad om prosjektendring**
Prosjektleder skal sende sluttmelding til REK sør-øst på eget skjema senest 30.06.2016, jf. hfl. § 12. Prosjektleder skal sende søknad om prosjektendring til REK sør-øst dersom det skal gjøres vesentlige endringer i forhold til de opplysninger som er gitt i søknaden, jf. hfl. § 11.

**Klageadgang**

Med vennlig hilsen

Britt-Ingrid Nesheim
professor dr. med. leder
REK sør-øst C

Claus Henning Thorsen
Rådgiver

**Kopi til: UiO: universitetstidruektor@uib.no**