Chapter 1

General Introduction
Cardiovascular disease and related non-communicable diseases

Cardiovascular disease (CVD) is the leading cause of death in the world [1]. Patients with CVD and heart failure report a lower quality of life as compared to the general population [2] and have a limited life expectancy. This poses a great challenge to the public health professionals and is a burden on the public health system [3]. Diabetes affects an estimated 135 million individuals worldwide, and an alarming increase in the prevalence of diabetes is expected in both developed and developing countries. It is being reported that the worldwide prevalence of T2DM is expected to double within the next two decades. The rising prevalence of overweight and obesity in several countries is becoming a global pandemic [4]. Similarly studies from around the world have reported high prevalence of hypertension, hypercholesterolemia and low levels of HDL [5, 6].

Diet and cardiovascular disease

The high prevalence of cardiovascular disease and related non-communicable disease could be explained by genetic as well as lifestyle factors. Diet is one of important lifestyle factors which might contribute to the increased risk of developing CVD and related non-communicable diseases [7, 8]. There are certain dietary items which have a protective effect against the cardiovascular disease, diabetes and obesity but on the other hand there are also certain dietary items which increases the risk for cardiovascular disease, diabetes and obesity. For example fruits and vegetables have a protective effect against cardiovascular disease [9]. Similarly breakfast is also an important component of the daily dietary routine and it has been shown in a study that the men who regularly skipped breakfast had a 27% higher risk of heart attack or death from coronary heart disease than those who did eat a morning meal [10]. The soft drinks and excessive use of sugar is related to increased body weight, obesity and Type 2 diabetes [11]. The milk based products might provide high amount of fat. The intake of saturated fats is associated with obesity and increased risk of heart diseases [12]. Excessive intake of salt is one of the leading cause for high blood pressure which ultimately leads to the heart diseases [13].
Asia, cardiovascular disease, related non-communicable diseases and traditional Asian diet

Asia is the most populous continent in the world. Asia can broadly be divided into regions of East Asia, South Asia, Southeast Asia and the parts of Middle East. All these regions comprise of diverse populations and distinct ethnicities who are profoundly divided on religious and cultural lines. For example, in South east Asia we have countries like Indonesia, East Malaysia, Singapore, Philippines, East Timor, Brunei etc. and South Asia comprises of countries like India, Pakistan, Bangladesh, Sri Lanka, Nepal etc. Most of the people in Indonesia, Malaysia and Pakistan follow the religion Islam but in India majority follows Hinduism. In terms of culture, South Asian culture has distinct differences from the Southeast Asian culture; there are differences within the culture of South Asia and Southeast Asia.

Cardiovascular disease is the leading causes of death among the Asians [14]. The greatest increase in T2DM will occur in Asia in next two decades where it will affect more than 130 million individuals [15]. Obesity is on rise among Asians and they tend to develop cardiovascular disease and diabetes at lower BMI as compared to the Caucasian populations [16]. In Indonesia, CVD has increased from 18 to 28% as the cause of all deaths between 1995 and 2002 [17, 18]. Similarly India which is the second most populated country in world has shown high prevalence of cardiovascular disease and diabetes [7, 19]. Pakistan is one of the largest countries in South Asia, with a population of 180 million. CVD accounts for 34% of all deaths in Pakistan [20]. In addition, Pakistan stands 9th regarding the prevalence of obesity worldwide [4].

Genetic and lifestyle factors are responsible for the development of non-communicable diseases among Asians [21]. Diet is presumed to be a key lifestyle factor contributing to this increased risk of obesity, diabetes and CVD [7, 22]. The traditional Asian diet generally consists of high fibre and healthy foods like fruits, vegetables, rice, beans, meat, legumes, fish and nuts; though it varies by region within Asia. South Asia and Southeast Asia are two important regions in Asia and they differ profoundly in terms of their dietary behaviours. The traditional South Asian cuisines mainly consist of wide variety of seasonal fruits and vegetables of rice and wholemeal grains; fish is not part of traditional diet but it is consumed largely in coastal areas of South Asia. In addition, cooking at home is preferred for economical and cultural reasons. Similarly the traditional Southeast Asian diet generally
Asian migration, diet, cardiovascular disease and related non-communicable diseases

Migration is an age old phenomenon embedded in the history of mankind comprising of many push and pull factors. The recent human history has seen big waves of migration towards the developed regions [23]. Many European countries experienced large Asian migration connected with decolonization after world war II. This included migration of Surinamese including Javanese and Hindustanis to The Netherlands. Javanese and Hindustanis are people of two different ethnicities who were originally brought as indentured labourers to work on sugar plantations in Surinam. Javanese originally lived in Java area of Indonesia, while Hindustanis lived in modern day states of Bihar and Uttar Pradesh in India. Similarly South Asians including Pakistanis, Indians and Bangladeshis migrated to UK. Some of the Pakistanis relocated from England to The Netherlands; in addition Pakistani immigrants in Netherlands come from different parts of Pakistan.

Migration and acculturation are associated with changes in chronic disease patterns [24]. The existing evidence points to an elevated risk of coronary heart disease and diabetes type 2 among immigrants from Asia as compared to the local population in the UK [25, 26]. In addition, Asian immigrants (Hindustani Surinamese) have shown higher prevalence of diabetes as compared to the ethnic Dutch and the African Surinamese people in Amsterdam, The Netherlands [27].

Brief history of Asian migrants in the Netherlands

There are many Asian subgroups residing in the Netherlands including South Asians and Southeast Asians. In our thesis we will focus on South Asians including Pakistani and South Asian Surinamese living in the Netherlands presuming ethnic differences among different Asian subgroups living in the Netherlands. These immigrant groups have different migration patterns to the Netherlands.

The Pakistani community in The Netherlands is a “hidden community” which means that Pakistanis are not under the radar of public health professionals like the native Dutch population and other ethnic minorities namely Turkish, Moroccan and Surinamese. There are 18579 Pakistanis in Netherlands according to the Central bureau of statistics, the Netherlands;
10493 are males while 8086 are females. The total number of first generation Pakistanis are 10832 including 6520 males and 4312 females. The total number of second generation Pakistanis are 7747 including 3973 males and 3774 females [9]. The Pakistani immigrants in Netherlands come from different parts of Pakistan and some even relocated from England to The Netherlands. Dutch Pakistanis are similar in terms of intra-ethnic distribution to the Pakistanis living in the USA dominated by Punjabi ethnicity but they differ from British Pakistanis, where the Kashmiri ethnicity is more prevalent; Dutch Pakistanis have shorter mean duration of stay in The Netherlands (20-30 years) as compared to the Pakistanis living in UK and USA (more than 40 years) [10].

Surinam was a former Dutch colony in South America. After the independence of Surinam in 1975 and subsequent political troublesome years, many Surinam people came to The Netherlands. They represent many groups including Africans, Hindustanis, Chinese and Indonesians. South-Asian Surinamese have migrated twice, first from India to Surinam around 1873 as indentured labourers, mostly from the modern day states of Uttar Pradesh, Bihar and adjoining areas; and then after the independence of Surinam in 1975, many South Asian Surinamese migrated from Surinam to the Netherlands. South-Asian Surinamese constitute approximately 1% of the total population of the Netherlands. According to most recent data published on Surinamese in 2008 by CBS, there are 10% Surinamese living in Amsterdam out of which 40% are of South Asian origin [28]. In the seventies, 20,000 to 25,000 Javanese (Surinamese) came to the Netherlands. Javanese (Surinamese) have migrated twice, i-e from Java in Indonesia to Surinam and then Surinam to The Netherlands. About a century ago their ancestors came from Java region of Indonesia to Surinam as contract labourers after the abolishment of slavery. They settled mainly in and around the cities of Groningen, Amsterdam, The Hague, Rotterdam and Zoetermeer in The Netherlands. They are well integrated into Dutch society and ensure at the same time to maintain their Javanese identity through Javanese associations who regularly organize meetings.

**Gaps in literature**

In The Netherlands, most of the studies about diet and cardiovascular disease risk of immigrants have focused on Surinamese including South Asian Surinamese, Moroccan and Turkish immigrants due to their large presence [29, 30]. There is lack of study on other Asian
immigrant groups including Pakistani and Javanese Surinamese regarding their diet and disease risk in the Netherlands. Furthermore studies on dietary changes after migration in South Asian Surinamese have had mixed results [31, 32] but the literature lacks studies regarding the theoretical underpinning to explain this dietary change.

**Main aim of thesis and research questions**

To explore the diet and cardiovascular disease risk among South Asians including Pakistanis and South Asian Surinamese with the presumption that there are ethnic differences regarding diet and cardiovascular disease risk among different Asian subgroups living in the Netherlands. We will answer the following research questions in this thesis.

1. What is the prevalence of cardiovascular disease and related non-communicable diseases like overweight, obesity, diabetes, hypertension and hypercholesterolemia among indigenous and immigrant Pakistanis?

2. What is the intake of foods like fruits, vegetables, rice, meat, fish, sugar sweetened beverages, and tea and coffee with sugar and the change in dietary habits related to the development of cardiovascular disease among Pakistanis after migration from Pakistan to the Netherlands?

3. What is the dietary change among Hindustani Surinamese living in the Netherlands and how it can be explained with the help of a dietary model?

4. What are the diet and disease differences between Pakistanis living in the Netherlands and the local Amsterdam population and between Javanese Surinamese and South Asian Surinamese living in Amsterdam, the Netherlands?
Outline of thesis

Chapter 2 and 3 will focus on diet and cardiovascular disease risk among Pakistanis. Chapter 4 will explore the change in diet of Hindustani Surinamese through a dietary model. Chapter 5 and 6 will focus on diet and disease differences between immigrant Pakistanis and the local Amsterdam population and South Asian Surinamese in comparison with the Javanese Surinamese.

Chapter 2 will systematically describe the gender and ethnic differences regarding the prevalence of general/central obesity and cardiovascular disease (CVD) risk factors such as diabetes mellitus type 2, hypertension, and hypercholesterolemia among the indigenous and immigrant Pakistani communities. Chapter 3 will focus on the intake of foods relevant for cardiovascular disease and the change in dietary patterns of Pakistani immigrants after migration to the Netherlands. Chapter 4 will explore the association between acculturation and diet in South-Asian Surinamese living in the Netherlands. Chapter 5 will compare the general health status and prevalence of myocardial infarction, diabetes, overweight, obesity, high blood pressure and fruit and vegetable intake between Pakistani immigrants living in The Netherlands to that of general population living in Amsterdam. Chapter 6 will explore the diet and disease differences between the two Asian groups namely, South Asian Surinamese and Javanese Surinamese living in the Netherlands.
References


